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New Business Model for the Container Liner Industry: *CABS* *(Clean Air BridgeS)*

By

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Acknowledgments

At the outset, I would like to thank all people who have actively supported me along the research work. Finding the required pool of experts willing to participate in the evaluation process was cumbersome and long-lasting activity. Therefore, the support received from experts who have contributed this study, both with their valuable time and precious expert knowledge, deserves my outmost gratitude and appreciation. Equally so, I would like to thank all those who have helped me in my (too often futile) attempts to access the industry experts and eventually gain their support, gentlemen, you have managed to knock and open the doors that were unknown or unreachable to me, your successful agency skills are most highly appreciated.

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Abstract

The relevance of the Container shipping industry for the World economy by far exceeds the relatively small percentage share it holds (in the range of 13%) within the total world fleet. By enabling the emergence of new economic strategies, namely the outsourcing of the manufacturing to the low-cost locations, it has earned the attribute of being the key facilitator for the globalisation of the world's economy.

Throughout the historical development, the container shipping industry has continuously enjoyed the exceptionally high growth at double-digit annual rates. Such a positive landscape has changed after the global financial crisis in 2008, and the industry has since been exhibiting the ill-performance at unprecedented scale. Despite various measures undertaken, it has fallen short in achieving the market stabilization for a decade now.

The literature on strategies aiming to achieve long-term stabilization of the industry (as-a-whole) is scarce. This study contributes to the existing discussion by holistic analysis of the underlying reasons for such bad performance, as well as with the creation of the paradigm shifting strategy for its long-term stabilization.

The Design Science Research (DSR) paradigm was applied to achieve the set targets. As fundamentally problem-solving paradigm, it extends the existing boundaries by creating new and innovative artefacts. Following the prescribed methodology comprising three cycles (Rigor, Relevance, Design), the pool of major Problems and Opportunities (P&O) was determined (*Market Concentration, Service Quality, Carrier's Financial Stability, Relationship Dynamics, Overcapacity, Competition Authorities, Service Commoditization, Transparency & Visibility*). This P&O pool was used as the input for the design process of the new artefact. Both the Prototyping and Business Model Canvas techniques were applied for the creation of the New Business Model (NBM), which represents the final artefact designed in this study.

In line with the requirements of the DSR, the evaluation of the NBM was exercised in a form of the qualitative analysis performed by the Expert Panel.

Results of the study well substantiate the hypothesis about the need for the redesign of the existing business model in order to achieve the long-term stabilization of the Container Liner Industry. They also confirm the notion of significantly changed operational landscape (i.e. reduced demand growth), which is to be considered as the "New Normal" landscape in which the industry needs to operate. Furthermore, findings demonstrate that implementation of the New Business Model set out in this study, would positively impact the overall performance of the Container Liner Industry and thus facilitate its long-term stabilization.

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List of Abbreviations and Acronyms

3PL	Third Party Logistics
BER	Block Exemption Regulation
CR4	Four-firm Concentration Ratio
DSF	Danish Ship Finance
DSR	Design Science Research
EBITDA	Earnings Before Interest Taxes Depreciation and Amortization
ESC	European Shippers Council
FFA	Forward Freight Agreements
FF	Freight Forwarder
GSF	Global Shippers Forum
HHI	Herfindahl Hirschman Index
IS	Information Systems
IT	Information Technology
ITF	International Transport Forum???????
IMO	International Maritime Organization
LNG	Liquified Natural Gas
M&A	Merger and Acquisition
MEPC	Marine Environment Protection Committee
NBM	New Business Model
NVOCC	Non-Vessel Operating Common Carrier
P&O	Problems and Opportunities
TEU	Twenty-foot Equivalent Units
UNCTAD	United Nations Conference on Trade and Development
ULCS	Ultra Large Container Ships
VSA	Vessel Sharing Agreement

1 Introduction

World seaborne trade volumes are estimated to have accounted for over 80 per cent of the total world merchandise trade in 2015, while the annual world seaborne trade volumes have surpassed 10 billion tons for the first time (United Nations Conference on Trade and Development (UNCTAD), 2016). In value terms, different observers estimate the share of maritime trade at 55 per cent (Lloyd's List Intelligence, 2013 cited in UNCTAD 2016) and others at over two thirds of total merchandise trade (IHS Markit, 2016 cited in UNCTAD 2016). Total volumes of the containerized trade in 2015 are estimated at 1.69 billion tons, with 13.1 % percentage share of a container fleet in the world fleet (UNCTAD 2016). Yet, these relative percentage shares do not fully convey the relevance of this shipping segment, since the container shipping is attributed to be the key driver for the current landscape of the global economy and trade flows. Stemming from the decrease in time required to handle the cargo, transportation of containerized goods has significantly reduced shipping costs, subsequently allowing for the new economic strategies to emerge. Opposed to previous "near the customer" strategies at times when shipping of goods over long distances was not profitable, manufacturing of the goods could have now been outsourced to low cost locations, which facilitated the globalisation of the world economy.

Post global financial crisis in 2008, some important developments have occurred at unprecedented scale within this highly relevant shipping sector, namely, increasing vessel capacity (deployment of Ultra Large Container Ships - ULCS), severe decline in freight rates, financial performance, capacity demand and service quality, as well as the progressing market consolidation and concentration. Market analyses performed by various stakeholders, unanimously report about dire conditions the industry has been exposed to.

Despite the implementation of various measures, the container shipping industry has fallen short in achieving the market stabilization for almost a decade now. This indicates that underlying causes for such ill-performance may lay beyond the scope of the regular cyclicality that is known to be inherent to a shipping industry.

This study will investigate observed drawbacks of the container liner industry in order to determine underlying dynamics of their generation. Findings of such analysis will be used to innovate a new business model that would enable the industry to achieve long term stability and enhanced performance levels. Evaluation of the innovated business model will be exercised through the assessment of its value proposition.

The reminder of this study is composed as follows. Firstly, we describe the background and current status of the container liner industry. We then define the main research question and sub questions, as well as the research design and methodology that will be applied throughout the study. We continue with the depiction of problems and opportunities associated with the current model of the business conduct. We then design new business model that will mitigate determined drawbacks, report about the evaluation process, and finalize the study with conclusive notes and propositions for the further research work.

2 Background

To put containerized trade in perspective, total volumes in 2015 are estimated at 175 million twenty-foot equivalent units (TEUs) (UNCTAD 2016). Percentage share (measured in dead-weight tonnage) of the container fleet in world fleet over recent decades is presented in Table 2-1.

Table 2-1: Percentage share of Container fleet in World fleet (measured in dead-weight tonnage)

Year	1980	1990	2000	2010	2015	2016
Container fleet (%)	1,6	3,9	8,0	13,3	13,1	13,5

Source: Compiled from UNCTAD (2016)

Looking in retrospect, Jensen (2017) differentiates three major timescales in historic development of the container liner industry. The first one relates to container inception period when the containerization had slow uptake until late 1960s. By then the standardization of containers took place, which had set the scene for rapid expansion. The second timescale roughly encompasses period between mid-1990s and financial crisis in 2008. This period was characterized by exceptionally high growth, mainly driven by the production outsourcing. Over the course of 25 years, market demand exhibited average annual growth of 8%, with annual capacity growth of 11%, resulting in 13-fold growth of nominal fleet capacity from 1980 to 2005 (Jensen, 2017). The third timescale encompasses period from the emergence of financial crisis until the present time. This period is characterized by deaccelerated growth of the market demand, record low freight rates and introduction of largest class of container ships (Ultra Large Container Ships - ULCS). Since these market elements are of great relevance for current and future developments within the container liner industry, we shortly deliberate about underlying dynamics.

Preceding year 2008, liner's strategy was determined by the high demand growth. Fleet expansion policies were in line with this phenomena and permanent overcapacity of the container fleet was easily absorbed by such high growth rates. Recent demand growth in the container shipping is presented in Table 2-2.

Table 2-2: Demand growth in container shipping (Annual growth rates in percentage)

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Growth (%)	11.6	13.4	10.6	11.2	11.4	4.2	-9.0	12.8	7.2	3.2	5.0	5.0	2.0	4.0

Source: Compiled from UNCTAD secretariat calculations (2016)

Data demonstrates decline of the demand following year 2008, where the data for 2010 needs to be looked at from the perspective of negative growth in preceding year 2009.

Availability of financing at convenient terms in years preceding the global financial crisis has generated additional ordering spree among liners. The financial crisis resulted in complete collapse of the container shipping markets, with 2009 seeing global container volumes decline by more than 10% which was the first time that container shipping markets had experienced negative growth rates (Jensen, 2017).

Delivered fleet ordered before 2008, exacerbated overcapacity issues. In combination with increased fuel prices, this excessive overcapacity had ill effected freight rates and operating costs. According to Worldscale (2017), average worldwide bunker price for fuel-oil doubled from USD 341.16 per tonne in part of 2009 to USD 606.56 in part of 2010 and USD 686.00 in part of 2011. Reduction of unit costs by achieving economies of scale was selected as remedy strategy exercised in this environment. Maersk placed an order for series of 20 vessels of 18.000 TEU capacity in first quarter of 2011. This

was capacity increase of 2500 TEU (or 16 % percentagewise) compared to the largest container ship at that time (Maersk, 2014). In order to maintain the level playing field and achieve the same unit cost reductions, other carriers followed Maersk's decision and had ordered large container vessels ranging in size between 18.000 TEU and 21.000 TEU. Deployment of these large vessels in consequent years (upon 2013), has further pronounced overcapacity issues. Consequently, freight rates deteriorated to the record low levels. "In 2016 these developments culminated during the 1st quarter where spot rates from China to South America reached just 50 USD for a full container and to Europe where a few customers were presented with offers for literally zero freight rates" (Jensen 2017). Further exercised cost reduction strategy was market consolidation, where series of mergers and acquisitions occurred. At the same time, alliance membership was reshuffled and number of alliances reduced, from previous four to currently existing three (2M, The Ocean Alliance and The Alliance). This, inevitably, led to a market concentration as fewer carriers currently operate on the market. To support the notion of severity carriers were facing during this period, it is noteworthy mentioning the bankruptcy of one of the major carriers (Hanjin), which has also, in another way, contributed to the market concentration.

According to Port Technology (2017), "Drewry has reported that the top five carriers will control a little under 60% of the world's containership fleet by 2021. In 2005, the same bracket of carriers held around 37%. Drewry also expects the top 10 lines to control 80% of the fleet by 2021, an increase of 25% on 2005, while the three leading carriers in Maersk Line, MSC and CMA CGM will raise the 2005 figure of 26% to 42%".

2.1 Problem identification

Excessive overcapacity, low demand growth, low freight rates and market concentration can be designated as key features in contemporary landscape of the container liner industry. The unprecedented scale and duration of exhibited ill-performance, demonstrate that underlying dynamics have more profound causes than the regular cyclicality inherent to the shipping markets. They are arising from the current structure of the industry itself. Therefore, the observed phenomena will be analysed from the perspective of the potential to innovate new business model, that would mitigate determined structural flaws of the existing business model.

An issue that falls in the focus of attention is reduced demand growth that has been recorded in years post the global financial crisis. While other features of the container shipping (i.e. overcapacity, freight rate fluctuations), were regularly occurring during historic development of the industry, the low demand growth that continuously stretches over a decade, has not occurred before. Dynamics of the container shipping demand growth, exhibit traditional lifecycle development of the industries. According to Foresight University (2017) and Latham (2017), the S-curve (also called sigmoid function, logistic function or Gompertz function) is mathematical model used to describe the growth of one variable in terms of another variable over time. Many growth processes in fields from biology and physics to business and technology (e.g. population growth, diffusion of innovations, human and machine learning, language change, chemical reactions etc.) exhibit S-curve distribution. In business, the S-curve is used to describe the performance of a company or a product over a period of time. According to Foresight University (2017), following four phases can be seen in growth curve:

- Initiation/Birth
- Acceleration/Growth
- Deceleration/Maturing
- Saturation

S-curve and its four phases are presented in Figure 2-1.

Figure 2-1: S-curve and its phases

Source: Foresight University (2017)

In the case of a container shipping, this would transfer to a slow demand growth in the first stage of containerization (Initiation), high demand growth in second stage (Growth), reaching the inflection point at certain point of time and entering the third stage (Maturing) characterized with low demand growth. According to Jensen (2017), results of his study (focused on Transpacific market) undertaken in 2004 showed that market was already at inflection point at that point in time and that rapid growth could have been expected for a few years more.

When the growth curve hits inflection point, it is time to design new growth strategy (Harward University, 2016). Container shipping stakeholders, and most notably the shipping lines, failed to recognize the underlying shift to maturity stage (accompanied with significantly lower growth), as well as the necessity to steer their strategy away from the pursuit of rapid growth towards process efficiency (Jensen, 2017).

Besides entering the mature growth stage, there are additional challenges imposed to the industry. Combined effects of the fourth industrial revolution (e.g. artificial intelligence, the internet of things, 3D printing, and digitalisation) and ageing consumer base will introduce seismic changes to consumer demand and transform the shipping industry in years to come (Danish Ship Finance (DSF), 2017). The entire new business models will have to be developed to serve the industry and to champion the disruption, one needs to create a new and significantly enhanced value proposition for customers. Such a new value chain holds the potential to redefine the ecosystem of container trading (DSF 2017).

2.2 Research questions and objectives

Arising from the identified drawbacks and challenges, the research will be conducted in a way to provide answer to following main research question:

Main research question:

How can current operational practices of the container liners be changed to yield new business model of improved efficiency for all stakeholders?

The main objective of the research is to design new business model for the container liner industry that would improve existing performance levels of the industry as whole and simultaneously provide tangible benefits to all major industry stakeholders (service providers and service takers).

In order to achieve this objective, we need to apply model that would, in sufficient level of the detail, detect major problems that service providers and service takers are facing and propose set of mitigating measures that would facilitate the design of new business model. Viability of redesigned business model needs to be estimated in order to reach conclusion whether an impact of the same would be beneficial to stakeholders. Research will be guided by applicability of the new concept, so much so that new business model can, easily and quickly, be implemented in real business environment, shall the results of the study indicate such potential. Pursuing these objectives, we defined following research sub-questions that would support answering the main research question:

Research sub-questions:

1. **What are the main problems that industry stakeholders are facing?**
2. **What are key performance indicators of relevance for the assessment of the logistic network efficiency from the perspective of each stakeholder?**
3. **What changes can be introduced to simultaneously provide benefit to particular stakeholder and increase overall business model efficiency?**
4. **What would be the impact of new concept application?**

Research Design and Methodology

Principles of Design Science Research (DSR) will be used throughout this study. As this research method differs from the classic scientific research, we feel that underlying principles of DSR needs to be substantially explained and thus provide underlying framework for the appropriateness of DSR's application in this study.

General principles of Design Science Research

According to Mor (2010), "Herbert Simon (1969) distinguishes between the natural sciences and the sciences of the artificial. While the former have been the flagships of intellectual activity since the days of Newton, the latter are habitually suppressed as 'practical' sciences or 'vocational arts'. Yet most of our lives are situated amidst the artificial. At the core of the study of the artificial, Simon places the science of design. He asserts that design thinking is a defining feature of the human mind."

The "sciences of design" are the core of these "sciences of the artificial" (or "artificial sciences," e.g., engineering, computer science, medicine, business, architecture, painting, the human and social sciences) (Visser, 2010).

Visser (2010) notes, "Simon writes in the chapter titled 'The Science of Design: Creating the Artificial' (in which engineering design is the reference), 'historically and traditionally, it has been the task of the science disciplines to teach about natural things: How they are and how they work. It has been the task of engineering schools to teach about artificial things: How to make artefacts that have desired properties and how to design' (Simon, 1969/1996). Natural science is concerned with the

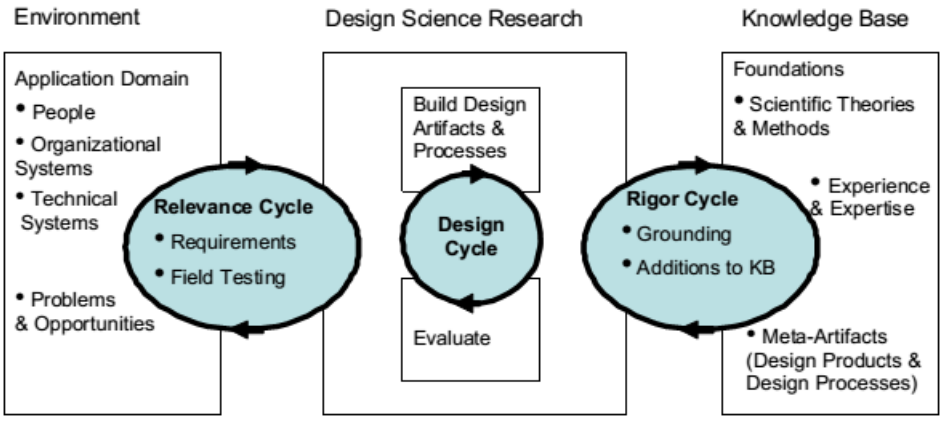
necessary, with how things are, whereas design is concerned with the contingent, with how things might be (Simon, 1969/1996)—or ought to be."

According to Hevner et al (2004), "In the design-science paradigm, knowledge and understanding of a problem domain and its solution are achieved in the building and application of the designed artefact. The design-science paradigm has its roots in engineering and the sciences of the artificial (Simon 1996). It is fundamentally a problem-solving paradigm. It seeks to create innovations that define the ideas, practices, technical capabilities, and products through which the analysis, design, implementation, management, and use of information systems can be effectively and efficiently accomplished (Denning 1997; Tsichritzis 1998)."

The design-science paradigm seeks to extend the boundaries of human and organizational capabilities by creating new and innovative artefacts, it addresses important unsolved problems in unique or innovative ways or solved problems in more effective or efficient ways (Hevner et al 2004). The design process generates solutions which it iteratively tests against an array of functional requirements (Mor, 2010)

Hevner (2007) analysed design science research as an embodiment of three closely related cycles of activities. "The *Relevance Cycle* bridges the contextual environment of the research project with the design science activities. The *Rigor Cycle* connects the design science activities with the knowledge base of scientific foundations, experience, and expertise that informs the research project. The central *Design Cycle* iterates between the core activities of building and evaluating the design artefacts and processes of the research. The recognition of these three cycles in a research project clearly positions and differentiates design science from other research paradigms" (Hevner 2007). These three cycles are presented in Figure 2-2.

Figure 2-2: Design Science Research Cycles



Source: Hevner, 2007

Design Science Research in Information Systems

Among many fields, DSR has found sound application framework within the domain of Information Systems (IS). Community of IS researchers and practioners is well provided with information about how to conduct, evaluate and present design science research. Hevner et al. (2004) describe boundaries of design science within the IS discipline via a conceptual framework for understanding information systems research and by developing a set of seven guidelines to assist researchers,

reviewers, editors, and readers to understand the requirements for effective design-science research. These seven guidelines are specified and described in Table 2-3.

Table 2-3: Design Science Research Guidelines

Guideline	Description
Guideline 1: Design as an artefact	Design-science research must produce a viable artefact in the form of a construct, a model, a method, or an instantiation.
Guideline 2: Problem Relevance	The objective of design-science research is to develop technology-based solutions to important and relevant business problems.
Guideline 3: Design Evaluation	The utility, quality, efficacy of design artefact must be rigorously demonstrated via well-executed evaluation methods.
Guideline 4: Research Contributions	Effective design-science research must provide clear and verifiable contributions in the areas of the design artefact, design foundations, and/or design methodologies.
Guideline 5: Research Rigor	Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artefact.
Guideline 6: Design as a Search Process	The search for an effective artefact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.
Guideline 7: Communication of Research	Design-science research must be presented effectively both to the technology-oriented as well as management-oriented audiences.

Source: Hevner et al., 2004

Hevner et al. (2004), "advise against mandatory or rote use of the guidelines. Researchers, reviewers, and editors must use their creative skills and judgment to determine when, where, and how to apply each of the guidelines in a specific research project. However, each of these guidelines should be addressed in some manner for design science research to be complete."

Application of the Design Science Research in this study

Due to the scope and complexity of the research area (container liner industry as a whole), a holistic approach towards problem identification and solution is required in order to include all elements of the relevance.

Modified business model of the container liner industry is the expected outcome of the research work and utility potential of this innovated business model needs to be evaluated in the study.

Arising from these requirements, and in conjunction with requirements stemming from the main research question and research sub-questions, design science research paradigm was selected as appropriate research method to achieve anticipated results.

Analysis of sub-research questions one (1) and two (2) will identify pool of problems and opportunities that container liner industry and particular stakeholders are currently facing. This falls under the realm of the Relevance Cycle of DSR activities.

Analysis arising from sub-research question three (3) will yield design of innovated business model that will be tailored to benefit the whole industry and each stakeholder. Thus, the newly designed business model will represent the innovation artefact of the DSR's Design Cycle activities, along which, the viability of the innovated artefact will also be evaluated. This will also provide an answer to the fourth (4) sub-question. Depending on the evaluation outcomes (and time availability), additional round(s) of the design iteration would be exercised in order to pursue the search towards optimal solution.

Evaluation of the new business model design is envisaged as the simulation process where the performance of the existing and innovated design will be compared.

An attempt to establish cooperation with stakeholders to use their actual trade data (e.g. transported number of TEU between set of ports on particular trade routes) as benchmark for the analysis of new design performance, will be exercised. As data sharing is always associated with confidentiality issues, shall the stakeholders be reluctant to cooperate and share such data, the alternative validation procedure will be applied.

Set of seven guidelines for effective DSR will be incorporated in the research work. In conclusive section of the study, a reflection on application of these guidelines within the study will be provided.

Regarding the activities of a Rigor Cycle, insights stemming from the existing scientific literature of relevance for the study will be applied during the design and evaluation processes of the DSR. Furthermore, the search for the expert (applied) knowledge will also be undertaken, whether that may be arriving from the interaction with industry experts or data sourcing from specialized information resources.

DSR does not intrinsically prescribe exclusive use of quantitative or qualitative research. Depending on the research area and the extent of the research, either one, or the combination of the two, can be applied. As the quintessence of this study is innovation of design artefact on the conceptual level, it is expected that qualitative research will dominate the research, especially along the design process of new business model. However, the use of quantitative analysis will be exercised where applicable. In that regard, the problem and opportunity definition stages of the research, as well as the artefact evaluation process, are perceived as appropriate areas for the application of this type of the analysis.

3 Problems and opportunities within the Container Shipping Industry

This chapter will determine the pool of problems and opportunities (P&O) arising from the existing business model exercised by stakeholders. We firstly define the scope of stakeholders included in the study. We then specify drawbacks encountered by stakeholders and discuss the underlying principles and evidence of detected drawbacks. In order to detect key problems industry is currently facing, we will search for the data related to the evaluation of key performance parameters and system inefficiency pronounced, as directly as possible, by stakeholders. In doing so, we will analyse available information on the company level (as particular entity within two groups of stakeholders - shippers and carriers), stakeholder's professional associations, internationally recognized expert institutions and leading market analysts. In search for the further explanation of the dynamics and evidence for detected problems, we will look for the scientific theories related to the particular phenomenon of interest.

This chapter will present selection of problems derived from the complete set of detected problems, with selection criteria being the relevance of the problem and its potential to improve the existing business model. Thus, each of the selected problems will simultaneously stand as an opportunity. Summary of detected problems and opportunities will be provided at the conclusive part of this chapter and it will be used as starting point for the design of the new business model within Design Cycle phase of the DSR.

3.1 Stakeholders

The transportation of containerized cargo represents a complex logistics activity. A typical transportation of the containerised cargo from the manufacturer to consumer comprises different logistics segments and activities. From the manufacturer's location, goods need to be transported to the nearby seaport by one, or combination, of the available multi-modal options, i.e. trucking, railways, or inland waterways. Seaborne segment (transhipment and deep sea) transports cargo from the origin seaport to the selected seaport adjacent to the consumers market. From this point onwards, goods are transported to the consumers by selected multimodal transport. Numerous stakeholders provide services along this complex logistics chain, i.e. carriers, shippers, NVOCC's, freight forwarders, agents, 3PL providers, customs, insurers, ports, terminal operators etc.

In accordance with the level of significance for the developments within the container shipping industry, this study will focus on stakeholders of the crucial influence for the lay out of the industry, i.e. container shipping companies (Carriers) as service providing entities and cargo owners (Shippers) from the service taking perspective.

3.2 Market concentration

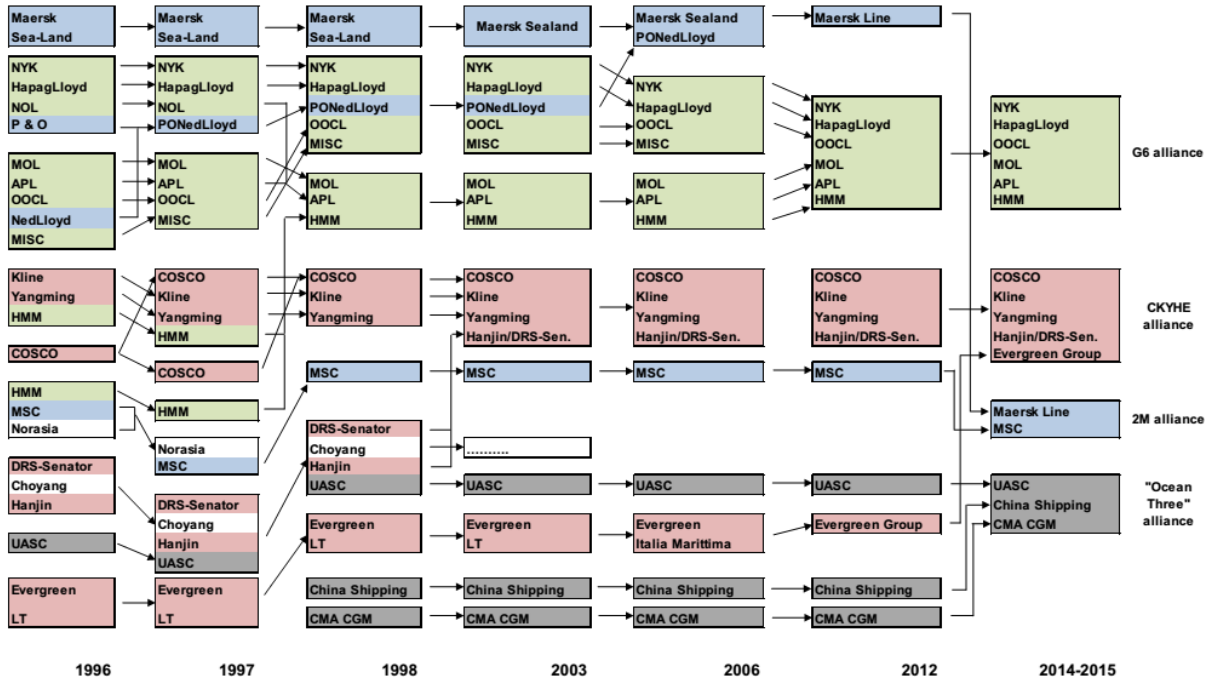
The key concern for shippers in the medium to longer term is treat of consolidation and concentration of the liner shipping industry (GSF, 2016a). Sharp reduction in demand driven by the economic crisis that started in 2007/2008, together with substantial growth of the world container vessel fleet and ever largest increase in ship size, accelerated the trend towards horizontal consolidation (mergers and acquisitions) and cooperation (strategic alliances and consortia) within the container shipping industry (OECD, 2015a).

Cooperative agreements, i.e. strategic alliances and consortia, enable carriers to reduce capital costs (Slack et al., 2002), share investment risks and increase vessel utilization rates (Ferrari et al., 2008; Parola et al, 2014).

Horizontal mergers and acquisitions enable "carriers to enter new markets, expand their geographic coverage and meet shippers' demands for wider coverage networks, they may also serve the purpose of strengthening the buyer power of carriers vis-à-vis global shippers or stevedores" (Cariou, 2008). They "offer carriers the opportunity for rationalizing supply, achieving economies of scale and scope, as well as diversifying the portfolio of vessels in terms of size" (Alexandrou, 2014; Fusillo,2009; Van de Voorde and Vanelslander, 2009).

Most recent developments demonstrate unprecedented level of the consolidation, resulting in a reduced number of global shipping lines from 20 to 11 in just two years (Lloyds List, 2017). Concentration also characterized carrier's cooperation strategies, where decreased number of the strategic alliances may be observed. The evolution of the strategic alliances is presented in Figure 3-1.

Figure 3-1: Evolution of strategic alliances (1996 – 2015)



Source (OECD, 2015a)

Significantly reduced number of operating alliances over the period 2014-2015 may be noticed. The four alliances existing at the time (2M, G6, CKYHE, Ocean Three) were further reduced to the current market structure comprising three operating alliances. The current landscape with a new alliance formation (fully operational as of April 2017), with specified member carriers and pertaining market shares, is presented in the Table 3-1.

Table 3-1: Current alliance structure (2017)

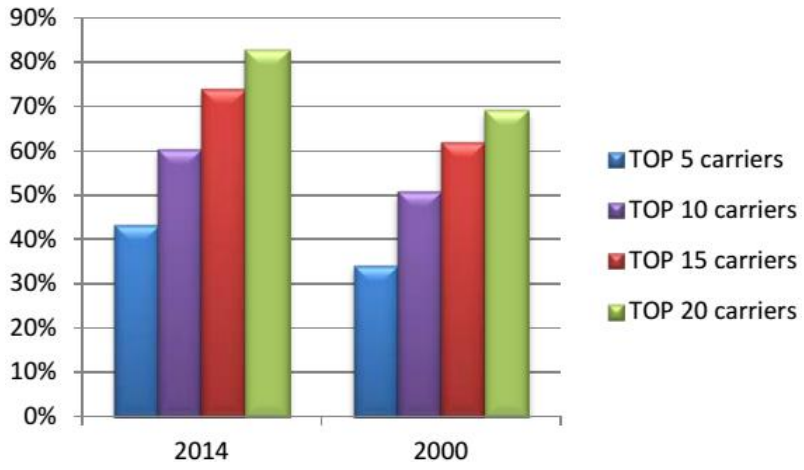
Strategic Alliance	Alliance members	Carrier's Market Share (%)	Alliance Market Share (%)	Combined Market Share of all Alliances (%)
2M	Maersk (including Hamburg Sud)	19.3	35.4	80
	MSC	14.5		
	Hyundai MM*	1.6		
Ocean Alliance	CMA CGM	11.6	28.1	
	COSCO/OOCL	11.6		
	Evergreen	4.9		
The Alliance	Hapag Lloyd (including UASC)	7.2	16.5	
	ONE (NYK, K Line and MOL)	6.5		
	Yang Ming	2.8		

Source: Adapted from Alphaliner, (2017)

**Note: 2M alliance was in discussion with HMM about possible membership, but ultimately decided to go with a Vessel Sharing Agreement (VSA). Under the agreement, HMM will purchase slots on the 2M routes connecting Asia with North Europe, the Mediterranean and the US East Coast, while continuing to operate Asia – US West Coast services on its own, with Maersk and MSC taking slots. Maersk and MSC will take control of an undisclosed number of vessels currently operated by HMM on the Asia – Europe and Asia – USEC routes. These vessels will be operated and marketed by Maersk and MSC (Flexport, 2017). Due to the highly integrated cooperation between 2M and HMM, capacities of HMM are included in the 2M scope.*

The effects of the consolidation in the industry may be illustrated by the evolution of the magnitude of the share of vessel capacity accounted for by the largest liner shipping carriers. According to OECD (2015a), top five carriers represented around 34% of vessel capacity in 2000 and 43% in 2014, respectively. The representativeness went from 50,8% to 60,4 % for the ten largest carriers. Evolution of the share of largest carriers is presented in Figure 3-2.

Figure 3-2: Market share of top ranked carriers (%)



Source OECD, 2015a

We have calculated the current share of top five and top ten carriers and results are presented in Table 3-2.

Table 3-2: Current market share of top five and ten ranked carriers (%)

Carrier's range	**Market share (%)**		
Top 5 (Maersk; MSC; CMA CGM; COSCO/OOCL; Hapag Lloyd)	34	43	64.2
Top 10 (Top 5 + ONE; Evergreen; Yang Ming; Pil; Zim)	50.8	60.4	81.9
Year	**2000**	**2014**	**2017**

Source: Own elaboration and OECD, 2015a

Calculated market shares (see Table 3-1 and Table 3-2) are clearly indicating increasing market concentration of the container shipping industry. In order to determine the market structure, we use the Herfindahl Hirschman Index (HHI) and the four-firm concentration ratio (CR4).

HHI is commonly accepted measure of the market concentration. It is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers (Hirata, 2017). The formula is given as:

HHI = $\sum_{i=1}^{n} Si^2$

Where "Si" is market share of firm "i" in the market.

According to Shepherd (1999) and Sys (2009), the HHI approximates 0 for a perfectly competitive industry and equals 10,000 for a monopoly. As a benchmark, a market with an HHI below 1000 is considered to be unconcentrated and unlikely to be subject to any adverse competitive effects. A 1,000-1,800 value generally indicates moderate concentration. Anything over 1,800 is highly concentrated. Calculation of the HHI value for the period from 1996 to 2007 show that HHI is never higher than 1000, meaning that the industry should be considered as an unconcentrated during that period (Sys, 2009). We have calculated the value of HHI for top 25 carriers of the current market landscape (2017) and it yields the value of 1055. This supports the conclusion of moderately concentrated market at present times (HHI range: 1000 < HHI < 1800). Table 3-3 presents HHI values in 2017 and selected years prior to 2007.

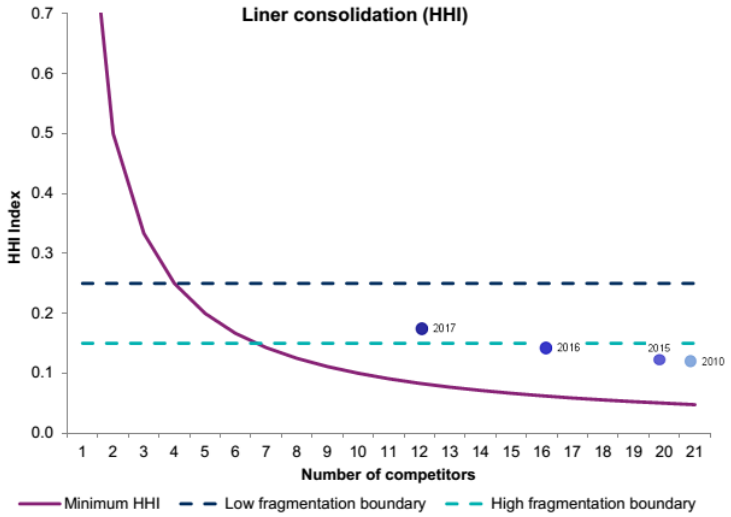
Table 3-3: HHI values for top 25 carriers in selected years between 1996 and 2017

Year	1996	1998	2000	2003	2005	2006	2007	2017
HHI (Top 25 Carriers)	512	530	640	637	631	851	813	1055

Source: Author compiled using Sys (2009) and own calculation

Recent evolution of the Herfindahl Hirschman Index is presented in Figure 3-3.

Figure 3-3: HHI - Recent evolution



Source: Drewry, (Spotlight Report, Two steps away from liners paradise, July 2017)

In comparison with the HHI values relative to the total TEU capacity of the global liner fleet, the degree of the concentration can differ significantly from trade to trade (Sys, 2009). As an outline for the difference, it may be mentioned that existing three alliances represent 96% of the global container capacity on all East – West trades (Flexport, 2017), opposed to a calculated 80% market share (see Table 3-1) relative to the global TEU capacities. Hirata (2017) calculated trade specific HHI values for three major trade routes, i.e. Asia – Europe, Trans – Pacific and Trans – Atlantic. Results indicate highly concentrated markets when looking from trade route perspective. This remains valid even with application of guidelines established by U.S. Department of Justice and the Federal Trade Commission that define higher thresholds and classify markets in accordance with the following criteria: (1) unconcentrated markets (HHI below 1500), (2) moderately concentrated markets (HHI between 1500 and 2500), and (3) highly concentrated markets (HHI above 2500) (The United States Department of Justice, 2017). HHI values for three major trade routes are presented in Table 3-4.

Table 3-4: HHI on East – West routes (basis 2014 alliance structure)

Year (2014)	**Asia - Europe**	**Trans - Pacific**	**Trans - Atlantic**
HHI	2492	2556	3240

Source: Hirata (2017)

Since calculated HHI values are clearly indicating increasing market concentration, we further analyse degree of oligopoly in which the liner shipping industry operates. This is relevant because the market structure under which a carrier operates will determine its behaviour and affect carrier's performance: its price setting, profits, efficiency (Sys, 2009). Micro economic theory traditionally divides industries into four categories, with two extremes, i.e. perfect competition and monopoly and two intermediary market structures, i.e. monopolistic competition and oligopoly (Sys, 2009). According to Martin (1994) industries are oligopolies when CR4 ratio is above 40%. CR4 ratio is summarized market share of 4 largest carriers, relative to the total capacity. We have calculated CR4 value for the current market structure and result is 58,6%. Industrial economics distinguish various stages along the spectrum of

oligopolistic behaviour (Sys, 2009). Gradients of the market concentration defined by Shepherd are presented in Table 3-5.

Table 3-5: Market Concentration Gradients

	MARKET TYPE	MARKET CONDITION
GRADIENTS IN CONCENTRATION	Pure monopoly	One liner operator holds 100%
	Dominant liner operator	One liner operator holds 40% to 99%
	Tight oligopoly	Four liner operators hold over 60%
	Loose oligopoly or effective competition	Four liner operators hold 25% to 60% + entry reasonably easy

Source: Sys (2009) and Shepherd (1999)

Calculated CR4 value falls in a narrow gap between pertaining market conditions for tight and loose oligopoly. The CR4 is very close to 60% threshold required for tight oligopoly (1.4% difference) but not exceeding it. On the other hand, entry barriers are considered to be high at present market conditions, as market entrant would need to deploy vessel of ULCS size and achieve high utilization rates in order to be able to compete with operating carriers (GSF, 2016a). Therefore, the current market structure neither fully complies with the conditions required for loose oligopoly. The percentage of fleet ordered by top ranked carriers in comparison with reminder of the market participants, indicates further market concentration in the years to come. Ordered capacities for carriers with market share above 2% of total fleet capacity is presented in Figure 3-4.

Figure 3-4: Orderbook of carriers above 2% of capacity market share (000 TEU)

Carrier group	Active ships	Orderbook	Total	Share (%)
Maersk Line	3,828	410	4,238	18.4%
MSC	2,916	187	3,104	13.5%
Cosco-OOCL	2,185	698	2,883	12.5%
CMA CGM	2,168	225	2,393	10.4%
Ocean Network Express (ONE)	1,378	340	1,719	7.5%
Hapag-Lloyd	1,533	40	1,573	6.8%
Evergreen	984	324	1,308	5.7%
Yang Ming	596	112	708	3.1%
PIL	358	144	502	2.2%
HMM	458	0	458	2.0%
Zim	308	11	319	1.4%
Wan Hai	235	15	250	1.1%

Source: Drewry, (2017)

We infer that recent M&A and alliance activities have pushed the market structure of the container liner industry on the brink of a tight oligopoly spectrum with expected surpassing of 60% benchmark (CR4 > 60%) with the deployment of ordered vessels.

Irrespective of precise degree of oligopoly of the current market structure, increasing degree of the market concentration can clearly be observed.

Arguably, non-collusive oligopoly would lead to a price stability and much closer match between capacity and demand. Decision making in non-collusive oligopoly is independently made by each firm based on anticipated behaviour of the other market participants and assumption of the worst possible reaction from the competitors. In price increasing scenario, firm will presume that others will not match the higher price and would thus gain price advantage against the firm. In the scenario on the other side of the spectrum, if the firm considers reducing the price, it presumes that others will follow that move, which would lead to an outcome where all market participants would be worse off (Drewry, 2017).

Yet, the opinion of shippers about effects of the increasing market concentration is coming from the completely opposite side of the argument. Consortia and alliances agree capacity between themselves, which materially affects price competition, furthermore, they also agree on other important drivers of competition among shipping companies, namely frequency of service, transit times and ports of call and thus reduce price and non-price competition between members (GSF, 2016a). Increasing market concentration is intrinsically associated with the growth of the carrier's market power, which enables them tacit setting of prices with higher margins. "The growth of global strategic alliances has produced barriers to entry for new entrants and made it almost impossible for independent carriers to compete on global trades. Absent independent shipping lines in genuine competition with alliances and consortia, effective competition will be eliminated or seriously compromised through the new market structure dependent on strategic alliances and exchange of information between their members. In concentrated markets, the sharing of information on a regular and frequent basis, reveals commercially sensitive elements of competitor's strategies in the market, including price, capacity or cost information is more likely to raise competition concerns" (GSF, 2016a).

Key findings: **Emergence of the oligopolistic market structure, market concentration, absence of independent service providers**

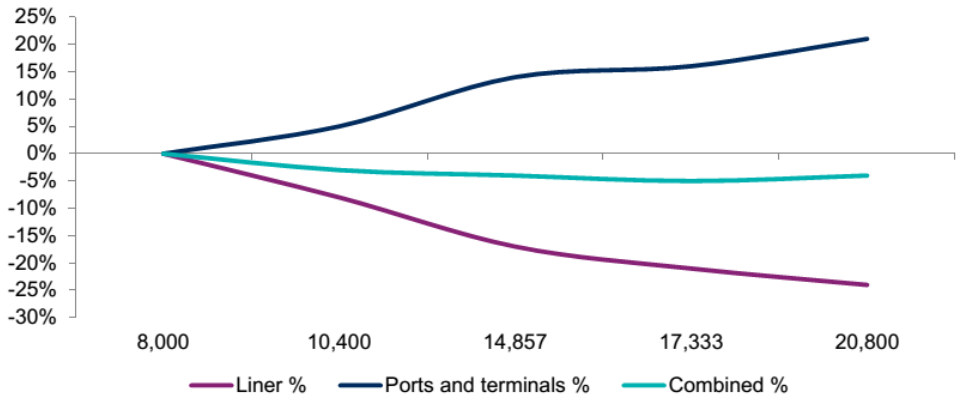
3.3 Service quality

Mega ships reduce supply chain efficiency on important parameters of the competition, including capacity, sailing frequency, transit times, ports of call and associated service quality, as higher economies of scale, associated with them, mean that fewer ships can operate in a market of given size and fewer carriers can efficiently operate on a route (GSF, 2016a). Frequency of calls has declined, the number of weekly Asia – North Europe loops decreased by 36% between 2012 and 2014, with weekly port calls on same trade route declining by 20% over the same period (Drewry 2014, cited in OECD/ ITF, 2015, p.31). Combined effects of increased capacity by the deployment of ULCS fleet and slow steaming practices exercised by carriers (as a measure to reduce increased fuel costs), have deteriorated efficiency and quality of the service provided to shippers. Furthermore, success of business model based on the deployment of ULCSs is dependent on near full utilisation factors to achieve necessary cost reductions and economies of scale (GSF, 2016b). In pursuit of meeting this criterion, carriers are practising "blank sailings", where ports (terminals) are omitted on scheduled sailing routes in case that such port call would not meet the high utilisation requirement.

Benefits arising from the greater economies of scale have been reaped by carriers while other stakeholders are faced with negative externalities, as costs associated with growth of mega ships are borne in other parts of the supply chain by shippers, ports and terminals and ultimately by end customers (GSF, 2016a). The combined cost savings for a shipping line and port "total system", peak at only 5% of the total network costs, while economies of scale diminish as vessel size rise beyond

18.000 TEU (Drewry, 2017). Percentage change of the combined cost savings in respect of the ship size is presented in Figure 3-5.

Figure 3-5: Percentage change of cost savings with increasing vessel capacity (TEU)



Source: (Drewry, 2017)

Diminishing level of the reliability, predictability and security of the shipper's supply chain, results in high costs of the holding stock and inventory management across their supply chain (GSF, 2016a).

Key findings: **Reduced service quality, sailing frequency, transit times, reliability, predictability and security of supply chain, increased holding stocks**

3.4 Carriers financial stability

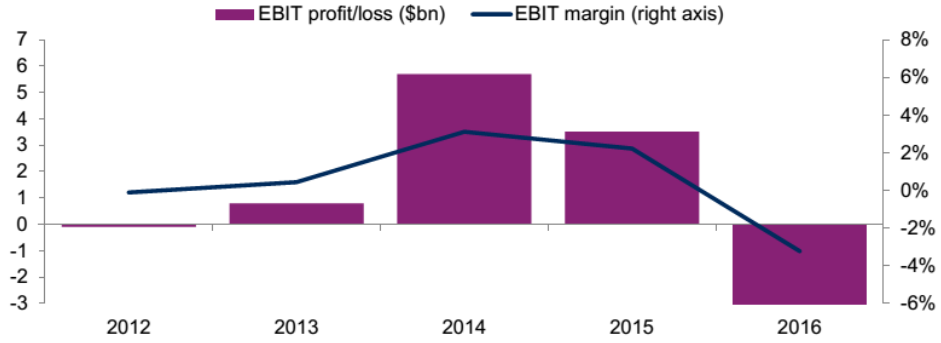
According to the market survey performed by ESC and Drewry (2017), the financial stability of carriers was on the top of the list of shipper's dissatisfactions. This particular concern of shippers may be outlined with developments related to Hanjin shipping company. It filed for bankruptcy protection in August 2016 which had negative consequences (e.g. vessel arrest by creditors, refusal of ports and terminals to accept Hanjin's ships and handle their containers without knowing who will be liable for the compensation, etc.) which have severely affected shipper's supply chains. In addition to this extreme case, even lower degree of carrier's financial distress may be detrimental for the shippers. Such troubled container liner could be targeted for the acquisition by financially stronger competitor, which could exacerbate another major concern of the shippers, namely the market concentration. Besides medium- and long-term effects of the increased market concentration, such acquisitions may also have severe short-term effects during the integration process of a new entity. According to ECS (2017), rearranging of service networks exercised by 3 new alliances in March 2017, has created capacity crisis resulting in lost contracts and sales i.e. some exports waited for two months to leave Europe (ESC 2017, cited in Loadstar 2017).

Undoubtedly, this particular item is of greater relevance for the carriers themselves. Therefore, we shortly analyse current financial landscape of the carriers.

Surplus of available container capacities in recent years has decreased freight rates that have reached lowest levels throughout 2016. Due to the ownership structure of the carriers (e.g. family owned MSC), financial results are not available for all carriers and it is, therefore, impossible to precisely determine their financial performance. Drewry estimated collective operating losses of the world's major container shipping lines to be $3.5 billion in 2016 (Lloyds Loading List, 2017).

Results for the selected pool of carriers (see below note for details) for the period between 2012 and 2016 are presented in Figure 3-6.

Figure 3-6: Estimated EBIT profit/loss and EBIT margins of container liner industry (2012 – 2016)



Note: EBIT margins based on average of sample carriers after currency conversion to US dollars when necessary. Sample consists of APL - excluded post 4Q15; CMA CGM; Evergreen Marine Corp; Hanjin Shipping (container) - excluded post -2Q16; Hapag-Lloyd, HMM (container until 4Q15, all acttvities thereafter); K Line (containerships); Maersk Line; Matson (ocean transportation); MOL (containerships); NYK (liner); Regional Container Lines; Samudera Container Lines; Wan Hai; Yang Ming and Zim.

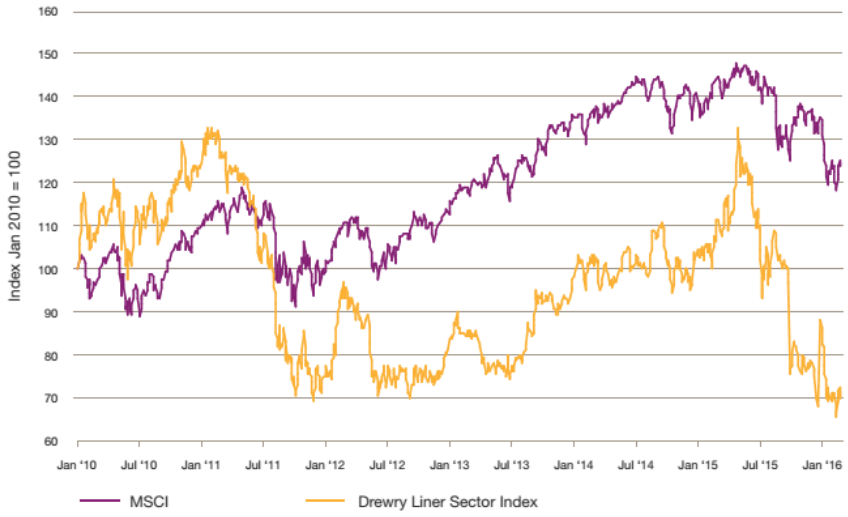
Source: Drewry, Spotlight Report, Liners Paradise, 2017)

In order to reduce operating costs through the deployment of megaships (and associated economies of scale), carriers had to incur significant capital investments in their newbuilding programs. This had influence on their credit profiles as it increases the degree of their financial leverage.

In addition to the effects related to the new assets, excessive capital investment is intrinsically associated with M&A activities. These consolidation activities were recently exercised among carriers at unprecedented scale, which had significant effect on their financial profiles. Debt to equity ratio (debt/EBITDA) of Hapag Lloyd's has increased to 6.7 in December 2016 (from 4.3 in March 2016) after, approximately, $4 billion worth merger with UASC (Moody's, 2016a). Earlier acquisition of NOL by CMA CGM, has increased CMA CGM's leverage to 5.5 in 2016 from 4.2 in 2015 (Moody's, 2016). Acquisitions of the OOCL by COSCO and Hamburg Sud by Maersk, are valued at $6.3 billion and $4 billion, respectively (Bloomberg, 2017; Marinelog, 2017).

With such developments, credit rating agencies have decreased credit ratings of carriers. Furthermore, listed container shipping operators have delivered very poor shareholder returns over the past years, Drewry (2016) estimates that, on index basis average, container shipping sector returns have been 30% lower relative to other sectors (compared to MSCI Global Index).

Figure 3-7: Stock returns of container shipping index compared with MSCI index



Source: (Drewry, 2016, Consolidation in liners industry).

Liner industry is capital intensive sector, financial resources required to obtain adequate fleet of container ships are large. Additionally, M&A activities are significantly increasing level of the required investments. Highly leveraged position of carriers increases the risks from the perspective of capital investors and lenders, thus diminishing financing options available to carriers, and simultaneously effects the financing terms (e.g. higher cost of capital).

Additional pressure on the financial stability of the carriers is related to the asset impairments of carrier's fleet. According to Alphaliner (2016), NYK recognized impairment losses on its assets ($972 million) in 2016, comprising almost a quarter of the NYK's total asset value, while cumulative impairments of the top 18 carriers were estimated at 35 billion (Alphaliner, 2016, cited in World Maritime News, 2016).

Key findings: **Industry under financial pressure, poor financial results (EBITDA), high leverage and poor credit rankings of the carriers, poor shareholder returns, exposure to asset impairment**

3.5 Relationship dynamics between shippers and carriers

Degree of adherence to the contract by carrier and cargo being shipped as booked are both placed among top five service areas of shipper's disatsifaction (ESC and Drewry, 2017).

Shippers are faced with delayed schedules in their supply chains (irespective of the control level over their cargo), which leads to their inability to deliver cargo in time for the shipment (no-show events). This sets the chain of events that is detrimental both for carriers and shippers. In order to mittigate perishability of their capacities against the occurance of no-shows, carriers are exercising overbooking which, eventually, leads to shippers's cargo being left behind on booked sailings. Cargo is rolled over which creates disruption in shipper's supply chain. Conversely, shippers deliberately book more capacity than actually required, as a strategy to secure shipment for their cargo.

Depending on geography, the amount of down-fall can today range as high as 40% (Jansen, 2017). According to the CEO of Hapag Lloyd, this dynamic remains to be one of the major industry inefficiencies (Icontainers, 2017).

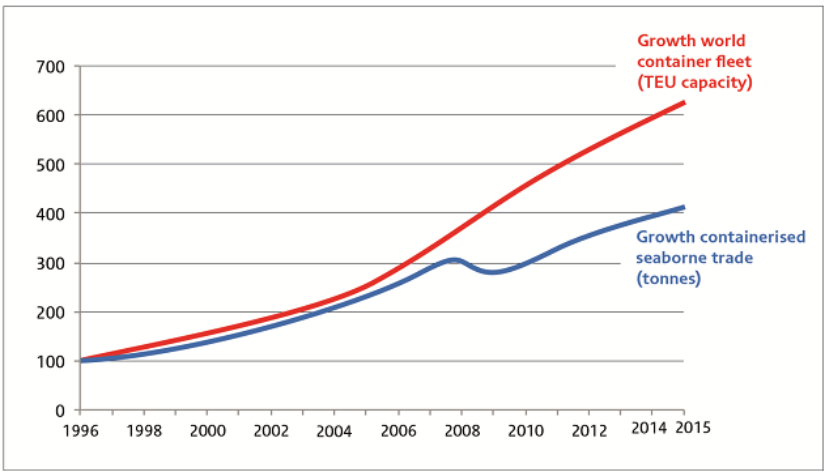
"Connected with the difficulties of charging the shippers for the damages incurred, it was standard practice of carriers not to penalise them for such failure of adherence to a contract. Reciprocally, the carriers were also not penalised for their practices. The lack of negative consequences for such behaviour, has sustained this dynamic over a long period of time. This matter was consistently brought up in all major liner shipping conferences for the past 20 years, illustrating difficulty of changing this within confines of the existing business model "(Jansen, 2017).

Key findings: **„No-show" and „overbooking" inneficiencies**

3.6 Overcapacity

Disconnect between the supply and demand post financial crisis in 2008 has created overcapacity within the industry. Figure 3-8 presents growth of the container world fleet and containerized seaborne trade.

Figure 3-8: Growth of container world fleet (TEU) and containerized seaborne trade (tonnes)



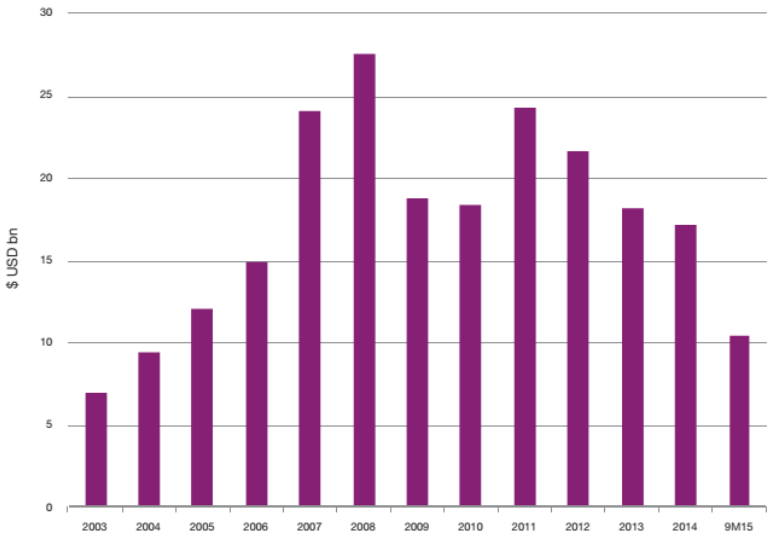
Source: OECD-ITF (2015)

With the current level of structural overcapacity being in the range of 10% - 20% (depending on whether the ability to increase sailing speed from current „slow steaming" practice is taken in consideration) and current order book equaling some 15% of the current fleet, it will take long time to resolve severe overcapacity that shipping lines are facing right now (Jansen, 2017).

Carrier's pursuit to secure market share and secure level playing field in terms of unit cost effectivness, is influencing their decision making process.

Recent developments within Ocean Alliance may be indicative in depicting the ordering dynamics among carriers. According to Drewry (2016), capital expenditures for large projects were in decline since 2011. This trend remained until recent time as last orders for mega-ships were placed in the third quarter of 2015 (World Maritime News, 2017). Figure 3-9 presents capital expenditures between 2003 and 2015.

Figure 3-9: Capital expenditures between 2003 and 2015 ($ billion)



Source: Drewry (2016), White Paper, Consolodation of the industry

Warned by the negative effects of self created overcapacity, carriers seemed to have achieved tacit agrement with regard to the ordering discipline. Yet, the contest driven strategies are inherent to the ordering policies of the carriers, which will continue to contribute to the persistance of the overcapacity issues within the industry. Developments within the Ocean Alliance speak in favour of such conclusion, where CMA CGM had the highest market share (11,6%) until equaled with Cosco's acquisition of OOCL (11,6% - see Table 3-1). Consequently, CMA CGM has placed an order for the series of nine 22.000 TEU ships. This enables CMA CGM to firmly maintain the leading position within its alliance, as well as the third position in the global liners ranking.

Key findings: Overcapacity persistance, Contest driven ordering of new capacity

3.7 Competition authorities

As the number of carriers is reducing with the increasing market concentration, the shippers are more likely to lobby anti-competition regulators to step in (Drewry, 2017). With market consolidated to the level where 6 to 10 major operators would control major trade lines, shippers deem it inevitable to reduce market share tresholds for alliance and consortia agreements so low that they would be ruled out on competition grounds (GSF, 2016a). Current alliance landscape encompasses 8 carriers in total (see Table 3-1), while expectation of further consolidation to 5 or 6 carriers has been announced by CEO of Maersk (Financial Times, 2017 cited in Shipping Watch, 2017). This clearly indicates that benchmark established by shippers have already been reached. Moreover, recent merger and acquisition operations (e.g. Maersk/Hamburg Sud, ONE) have all encountered regulatory issues, so any future deals may have to contend with conditions being applied that make them less attractive to conclude (Drewry,2017b). Consortia agreements are regulated by Block exemption regulation (BER) and shippers have openly questioned the effect of the current BER status with EU competition authorities. Review process of the existing BER arrangements will start in 2018 with new arrangement due in 2020 (ECS, 2017), with call of the shippers for the reduction of share tresholds at much lower level below current 30% (GSF, 2016a)

Market shift towards the oligipoly, has brought shippers to the state of an alert. They are closely monitoring market developments and are activly advocating for the competition investigations and regulatory interventions to be imposed on carriers. The Global Shippers' Forum (GSF), as the leading trade association for shippers engaged in international trade, has closely liaised with regulators and competition authorities. As a consequence, close monitoring of vessel sharing agreements (VSA) and alliance agreements (particularly their impact on rates and services), has been established by US and EU authorities. Furthermore, since the investigation could be self-initiated by competition authorities or on the basis of a shipper's compliant, GSF has established monitoring of various market criteria in order to be able to urge the regulators (e.g. capacity and price changes by key trade lines, transit times, frequency and service withdrawals, ancillary charges, bunker prices) (GSF, 2016b).

Key findings: Increasing scrutiny of carriers, limited potential for further market concentration/cooperation

3.8 Service commoditization

Recent restructuring of alliances has increased the level of cooperative service provision among the carriers. Differentiation enables competitive advantage to carriers (Jansen, 2017) and carriers work very hard to differentiate themselves, but their core product, point to point move of container, is now highly commoditised (Drewry, 2017a)

Key findings: **Service comoditisation, decreased potential for service differentiation**

3.9 Transparency and visibility related to the capacity bookings and rates

According to the Dutch Shipper's Association (EVO), reliability of the booking, availability of the cargo space and transparency of the rates, have been, respectively, ranked as first, second and seventh parameter of the relvance for the evaluation of the degree of service level provided by Carriers (European Shipper's Council (ESC), 2015). This indicates that slot booking with increased level of transparecy related to the availability of slots and guaranteed access to booked slots, is of the highest priority to Shippers. The same applies to the increased visibility of slot pricing determination.

Key findings: **Reliability of bookings and transparency/visibility about availability of capacities and rate definition, is perceived to have high value**

3.10 Pool of problems and opportunities within current Business Model of a Liner Shipping

Summary of the key findings detected from analysed segments of the container liner industry is presented in Table 3-6.

Table 3-6: Pool of detected Problems and Opportunities of existing business model

SEGMENT	P&O	DIRECTLY AFFECTED STAKEHOLDER
MARKET CONCENTRATION	Oligopolization / Market concentration	Shippers
	Absence of independent service providers	Shippers
SERVICE QUALITY	Reduced frequency	Shippers
	Increased transit times	Shippers
	Reduced reliability	Shippers
	Reduced predicability	Shippers
	Increased holding stocks	Shippers
CARRIER's FINANCIAL STABILITY	Poor financial results (EBITDA)	Carriers
	Highly leveraged carriers	Carriers
	Poor shareholders returns	Carriers
	Exposure to asset impairment	Carriers
RELATIONSHIP DYNAMICS	No show	Carriers
	Overbooking	Shippers
OVERCAPACITY	Overcapacity persistance	Carriers
	Orders driven by contestability	Carriers
COMPETITION AUTHORITIES	Increased scrutiny of carriers	Carriers
	Limited potential for further consolidation & cooperation	Carriers
SERVICE COMMODITIZATION	Increased service commoditization	Carriers
	Decreased potential for service differentiation	Carriers
TRANSPARENCY & VISIBILITY	Reliability of bookings and access to booked slots	Shippers
	Freight rate definition visibility	Shippers

Source: Author

4 Design of the New Business Model (NBM)

Along the analysis conducted in previous chapters, the need for the design of innovative business model has been detected. Besides such findings defined in the consulted literature (Jansen 2017, and DSF 2017), the composition and magnitude of problems defined in previous chapter (see chapter 3.10) calls for such approach. In this chapter we design new business model (NBM) in accordance with the procedures defined in relevant scientific and management literature.

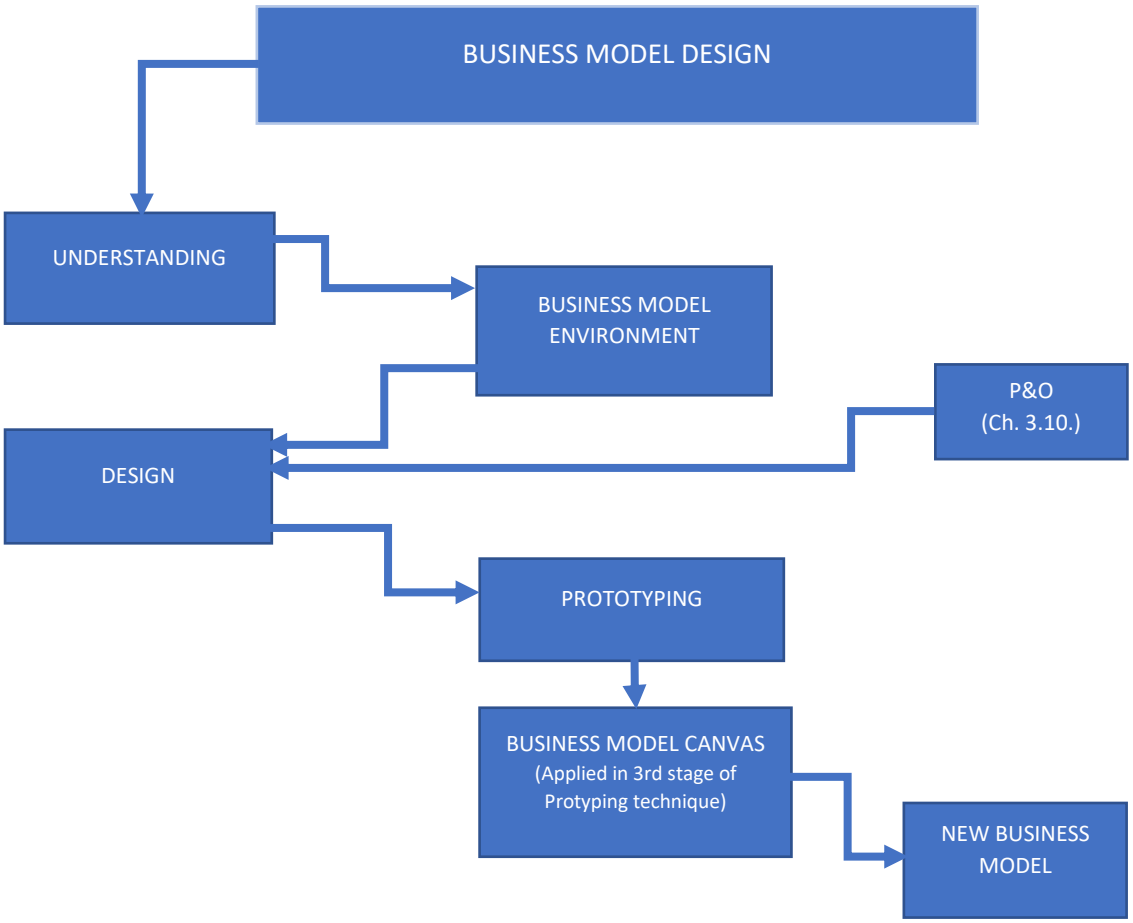
Generic business model design process consists of five stages: Mobilization, Understanding, Design, Implementation and Management (Osterwalder and Pigneur, 2010). In this study, we focus on two stages, namely Understanding and Design, while the remaining three stages will not be particularly worked out herewith. The reasons for such approach are stemming from the objectives defined for these three phases, namely, the Mobilize stage is preparatory stage focused on describing the motivation behind the project and creation of the awareness of the need for new business model (which was already done by the author along the preparation process for this study), while the Implementation and Management stages are related to the actual operational execution and further evolution of the new business model, which is beyond the scope of this study that is focused on the conceptual development of the NBM.

Understanding stage yields research and analyse elements needed for the business model design effort. Objectives of the Understanding stage are identification of needs and problems, information collection and immersion into the relevant knowledge. These objectives have been met by the work performed in previous chapters (see Chapter 3) of this study, but additional issues of the relevance will be, herewith, searched for. Design stage generates and tests viable business model options, transforms the information and ideas from the previous phase into business model prototype (Osterwalder and Pigneur, 2010). We firstly finalize the Understanding phase, findings of which, we then, implement (together with P&O defined in chapter 3.10) in the Design phase.

Various strategies and techniques can be applied in the Understanding and Design phases of the NBM design process (Osterwalder and Pigneur, 2010). Based on their applicability for the specific problems addressed in this study, we have selected the Business Model Environment strategy to be used in the Understanding phase and Prototyping as a design technique for the Design phase, respectively. Within the Prototyping technique, we also apply the Business Model Canvas technique for the creation of the New Business Model. The Business Model Canvas of the NBM represents the final artefact of the design work performed in this chapter and the study itself.

The flow of the applied business model design process exercised in this Chapter is presented in the Figure 4-1 (see Note in Figure 4-1).

Figure 4-1: Flow of the business model design process applied throughout Chapter 4



Source: Author

Note: Flow Chart shows stages of the Business Model Design analysed by this study (Understanding and Design stage, respectively). Within the Understanding stage, the Business Model Environment technique was applied, and its findings were (together with P&O from Chapter 3.10) used as input data for the Design stage. Within the Design stage, the Prototyping technique was applied, where in the third stage of that step, the Business Model Canvas technique was additionally applied. The result is the New Business Model which is represented in the form of the New Business Model Canvas.

4.1 Understanding phase of the Design process

4.1.1 Business Model Environment strategy

Business Model Environment strategy defines external environment as a „design space“ or context in which to conceive or adapt new business model. To get better grasp on your „design space“, rough mapping of four main areas of the environment is suggested. These are (1) market forces, (2) industry forces, (3) key trends, (4) macroeconomic forces (Osterwalder and Pigneur, 2010). Each of these four areas has set of sub-areas and questions, which are enabling more detailed identification of key elements. Four main areas of the business model environment with issues and items particularly addressed by each area, are presented in Table 4-1.

Table 4-1: Business Model Environment – Four main areas and key issues analysed

BUSINESS MODEL ENVIRONMENT			
MARKET FORCES	**INDUSTRY FORCES**	**KEY TRENDS**	**MACROECONOMIC FORCES**
Market Issues *Market Segments* *Needs and Demands* *Switching Costs* *Revenue Attractiveness*	*Competitors (Incumbents)* *New Entrants (Insurgents)* *Substitute products and services* *Suppliers and other chain value actors* *Stakeholders*	*Technology Trends* *Regulatory Trends* *Societal and Cultural Trends* *Socioeconomic Trends*	*Global Market Conditions* *Capital Markets* *Commodities and Other Resources* *Economic Infrastructure*

Source: Adapted from Osterwalder and Pigneur (2010)

We provide detailed analysis for each of the four main areas.

MARKET FORCES

Market Issues

Identifies key issues driving and transforming your market from Customer and Offer perspective (Osterwalder and Pigneur, 2010).

Following phenomena of major influence on the market transformation have been detected:

- Increasing market concentration on carrier's side
- Increasing scrutiny of carriers by antitrust regulators (driven and lobbied by the increasing concern among shippers)
- Absence of Independent Service Providers
- Reduced quality service provided to shippers
- Overcapacity issues
- Bad financial performance of the carriers
- Industry has reached Mature stage of life cycle characterized with low demand growth

Market Segments

Identifies major market segments, describes their attractiveness, and seeks to spot new segments (Osterwalder and Pigneur, 2010).

- Carriers and Shippers have been previously defined as major customer segments within container liner industry (see Chapter 3.1).
- Other customer segments (intermediaries acting between Carriers and Shippers like Freight Forwarders, NVOCC's, 3PL's) need also to be taken in the consideration in order to successfully design NBM that would match nuanced dynamics of the container liner industry.

- Ability to differentiate service by increasing the quality level at no increased costs, represents one of the biggest growth potentials.
- Declining trend has been noticed in the volumes carried by Carriers, where NVOCC's are gaining the market share (Haralambides, 2017). This increasing market share of NVOCC's indicates the NBM's potential to achieve feasible operations in cooperation with them (irrespective of Carriers), as their business model is based on outsourced services of the sea transportation of containers.
- Shippers interested in clean transportation of the goods is the peripheral segment that deserves the attention.

Needs and Demands

Outlines market needs and analyses how well they are served (Osterwalder and Pigneur, 2010).

To show the current substandard performance, we have focused on major stakeholder's needs detected (see chapter 3.10), which are, therefore, to be improved or resolved with the design of the NBM.

Shipper's needs:

- Higher service quality (increased reliability and predictability, shorter transport time)
- Less concentrated market
- Improvement of "no space" dynamics
- Higher visibility of capacity reservations and price formation

Carrier's needs:

- Resolution of overcapacity issues driven by "arm's race" behaviour of the competitors
- Improvement of financial performances
- Improvement of "no show" dynamics

Switching Costs

Describes elements related to customers switching business to the competitors (Osterwalder and Pigneur, 2010).

- Low switching costs for service takers (Shippers)
- Typically, Shippers allocate short to medium term contracts to Carriers and disperse total cargo volumes to various Carriers
- Easy substitute found both by Shippers and Carriers (that is inherent to the industry as a whole)
- Global demand for the transportation of containers is continuously high (in terms of volumes), with high fluctuation of the contracts between Shippers and Carriers
- Increasing commoditization of the Carrier's services endorses customers to switch contracts to competitors

Revenue Attractiveness

Identifies elements related to revenue attractiveness and pricing power (Osterwalder and Pigneur, 2010).

- Customers are willing to pay for the provision of higher quality services
- Highest margins can be achieved on the basis of the cost reduction that needs to be facilitated by the innovation of the business model and its operational characteristics

INDUSTRY FORCES

Competitors (Incumbents)

Identifies incumbent competitors and their relative strength (Osterwalder and Pigneur, 2010).

- Only 9 Carriers (see Chapter 3.2, Table 3-1) are providing global deep-sea services (extended with door to door logistic services)
- Growing trend towards consolidation through mergers and acquisitions
- Increasing market concentration
- Competitor's advantages: Established operations, Existing network of customers
- Competitor's disadvantages:
    - Inefficiencies arising from the drive to utilize their large fleets,
    - Large organizations /overheads,
    - Low potential to implement new and disruptive concepts due to the inherent habits and structure of their business conduct

New Entrants (Insurgents)

Identifies new, insurgent players and determines whether they compete with business model different from yours (Osterwalder and Pigneur, 2010).

- Insurgents in terms of the global deep-sea service provision are not existing, (some isolated ideas are emerging as the wish to develop inhouse shipping services as a cost reduction strategy, e.g. Amazon has announced its "Fulfilment by Amazon" program in 2013 which entails the container shipping project "Dragon Boat", so far Amazon has launched only freight forwarding services (Reuters 2016., cited in Gcaptain, 2016 and Bringg, 2016)
- High entry barriers (capital intensive industry, overcapacity in part deliberately created by the carriers as deterring measure towards new entrants)

Substitute products and services

Describes potential substitutes for your offers – including those from other markets and industries (Osterwalder and Pigneur, 2010).

- Carriers can align/compete with the principles introduced by NBM and offer similar services in dedicated manner with exception that market concentration/anti-trust problems remain unsolved without emergence of the new and independent stakeholders on the market
- Costs of the NBM's service will be lower due to the streamlined efficiency (e.g. more efficient routing will result with reduced voyage length, less fuel consumption, less re-stows etc.)
- Alternative transportation options are emerging (e.g. railway transportation between China and EU) but do not represent severe treat for the maritime supply chain on a global scale

Suppliers and other chain value actors

Describes the key value chain incumbents in your market and spots new, emerging players (Osterwalder and Pigneur, 2010).

- Carriers and shippers remain as the most influential market players
- NVOCC's are increasing their market share (Haralambides, 2017)

- Initial developments towards diminishing the role of freight forwarders by directly connecting shippers and carriers through digital platforms – e.g. Alibaba's shipping platform "One Touch" in cooperation with Maersk and CMA CGM (Supplychain247, 2017)
- Ports and terminals influence operations (efficiency, costs, connectivity etc.)
- With shift towards mandatory use of low sulphur fuels as of 2020 (Marine Environment Protection Committee (MEPC), 2017), beneficial cooperation may be established with suppliers of cleaner fuels (e.g. with LNG suppliers)

Stakeholders

Specifies which actors may influence your organisation and business model (Osterwalder and Pigneur, 2010).

- Relations with Carriers and Shippers, as major market stakeholders, will be crucial for the successful implementation of the NBM
- Shareholders pressure pushes Carriers to focus on financial results (NBM needs to provide benefits to Carriers in that segment in order to get in good terms with them)
- Shippers are driven by the price and quality of the service and will therefore be interested to use the business model that facilitates the same
- Shippers lobby with Competition authorities to scrutinize Carriers due to the increasing market concentration
- Arising awareness for the cleaner transportation of the End Consumers transfers into increasing demand for such services and more stringent environmental regulation prescribed by Environmental authorities

KEY TRENDS

Technology Trends

Identifies technology trends that could threaten your business model – or enable it to evolve or improve (Osterwalder and Pigneur, 2010).

- Digitalization is major emerging technology that is expected to influence the industry (peripheral adoption has commenced)
- New and more energy efficient vessel designs
- Increasing vessel size in search of lower unit costs through economies of scale

Regulatory Trends

Describes regulation and regulatory trends that influence your business model (Osterwalder and Pigneur, 2010).

- Anti-trust regulations
- New accounting rules (IFRS 16 New leases standard) for time-chartered capacities to be implemented in 2019 - chartered capacities will be shown in the Carrier's balance sheets (Moore and Stephens, 2017). As the volume of chartered fleet (in terms of number of vessels) accounts for 59% and for a half of the total capacity (expressed in TEU) deployed (OECD, 2015), such new accounting rules may significantly exacerbate Carrier's credit rankings and financial results. Additionally, this part of the fleet is, in general, leased by liner companies through long-term contracts (OECD, 2015), indicating that it will be significantly affected by the new lease standard.
- New environmental regulation towards use of cleaner fuels (IMO/MPEC, 2017)

Societal and Cultural Trends

Identifies major societal trends that may influence your business model (Osterwalder and Pigneur, 2010).

- Sustainability issues, Increasing consciousness of customers about global warming, Preference towards “green” purchases
- Increasing demand of cargo owners for the “greener” transportation
- Increasing perception of the shipping and related eco-systems (e.g. ports) as pollutants

Socioeconomic Trends

Outlines major socioeconomic trends relevant to your business model (Osterwalder and Pigneur, 2010).

- Ageing population in major/mature consumer markets (shift of spending pattern from consumer goods towards services, e.g. health, travel)
- Growing middle class in emerging markets (increasing demand for consumer goods)
- Potential shift of major trade routes (in a long run)
- Globally increasing urbanization

MACROECONOMIC FORCES

Global Market Conditions

Outlines current overall conditions from a macroeconomic perspective (Osterwalder and Pigneur, 2010).

- Steady state of World’s economy with the moderate growth i.e. 2,9 annual percentage change of the World Real GDP growth rate and 3,8 percentage change of the World trade volume in years 2018 and 2019, respectively (World Bank, 2017)
- Sentiment indicates confidence in the stability of the total container volumes with low but repetitive growth on “year to year” basis
- With increased market power, carriers are gaining more influence on the pricing and freight rates are heading towards recovery

Capital Markets

Describes current capital market conditions as they relate to your capital needs (Osterwalder and Pigneur, 2010).

- Credit availability restricted due to reluctance of classic financiers (e.g. shipping banks, private equity funds) to invest in shipping (this is especially pronounced in the container liner segment due to the poor bank ratings of the container liners and their low returns on the investment)
- Alternative financing models are emerging
- Shipyard’s drive to deploy capacities enables construction of the new capacities based on the national Export Agency financial programs (e.g. China, Korea, Japan) at convenient asset pricing levels and financing terms
- Increasing share of asset financing by specialised leasing companies

Commodities and Other Resources

Highlights current prices and price trends for resources required for your business model (Osterwalder and Pigneur, 2010).

- Main resource is vessel
- Fleet obtainment from the existing / sailing fleet would prevent additional overcapacity
- Construction of the new fleet at low asset pricing and of better technical characteristics (e.g. optimal compliance with the new fuel and energy consumption requirements) may turn to be more feasible solution due to currently low-priced newbuilding contracts
- Fuel is commodity directly linked with the industry
- Prices of a fuel are at the low levels for a long time with slightly increasing trend,
- Fuel costs are equal cost to all competitors
- New fuel requirements (IMO rules for global sulphur limit in 2020) represent both the challenge and the opportunity

Economic Infrastructure

Describes the economic infrastructure of the market in which your business operates (Osterwalder and Pigneur, 2010).

- Infrastructure of the relevance for the business operations is well developed (e.g. ports, terminals, infrastructure for other modes of the transportation etc).
- Global nature of the shipping industry enables implementation of various low tax policies

4.2 Design Phase of the NBM Design Process

In the Design phase we undertake the design process in order to generate new business model. As an input data required for the design process, we use both the pool of problems and opportunities (see Table 3-6) and findings of the Understanding phase of the design process (see Chapter 4.1). Osterwalder and Pigneur, (2010) define nine different techniques that are most suitable for the design of the NBM, out of which we have selected the Prototyping technique to be applied in this study.

4.2.1 Prototyping

Prototyping comes from the design and engineering disciplines and represents powerful tool for developing new, innovative business models (Osterwalder and Pigneur, 2010). A business model prototype can take the various forms of the definition and for the development of innovative business model on the conceptual level in this study, we have selected the Business Model Canvas technique.

Osterwalder and Pigneur (2010) propose prototyping process to include following three stages:

STAGE 1: Outline big issues

STAGE 2: Generate possibilities

STAGE 3: Prototype the Business Model

We introduce this approach and elaborate separately on each of the three Prototyping stages.

STAGE 1: Outline of big issues

In previous chapter (see Chapter 3), we have performed detailed analysis of the container liner industry issues. Detected problems have negative effect on performance parameters of the industry, both from the perspective of Shippers and Carriers. Therefore, the pool of issues summarized in previous chapter (see Table 3-6), needs to be addressed in order to develop NBM of improved performance levels. In addition to findings from the previous chapter, along the deliberations in Understanding phase of the Design process (see Chapter 4.1), we have detected following issues to be of the additional relevance for the design of NBM:

- Digitalization
- New Gas Emission Regulation (IMO Sulphur cap in 2020)
- New Accounting Regulation (IFRS 16 to be implemented in 2019)

STAGE 2: Generate possibilities

In this section we outline the main features of the new business model (NBM) and we provide explanation about which problems the particular feature reflects upon. Combined, these features generate framework of possibilities for the viable operational performance of the NBM.

Shuttle lines - The service network of the NBM will consist of shuttle lines between largest hub ports on major trade routes. Service provision in accordance with "conveyer belt" principles will significantly increase the level of service quality (reduced transport time, higher reliability and predictability, better service frequency, reduced inventory). It will also enable efficient cost optimization and subsequently the competitive pricing of the services offered.

Independent service provision – New independent service provider will reduce the market concentration in general, as well as the market share of the carrier (or alliance) that would use NBM's services, thus mitigating the increasingly imposed scrutiny of the carriers by the Competition Authorities.

Independent service provider will enable Carriers to outsource part of their capacities to the external entity and thus reduce their fleet size. This will deleverage Carrier's balance sheets and improve both their financial results and credit rankings, especially from the perspective of new accounting rules that prescribe chartered capacities to be included in carrier's balance sheet, which would further exacerbate their financial conditions.

The existence of the independently operated capacities will empower ordering discipline as carriers will have the access to the required capacities without the necessity to order new tonnage themselves. Economies of the scale stemming from the deployment of ULCS size of the vessels by NBM's entity, will thus be achievable to Carriers which will mitigate „arm's race" and „game theory" driven decision-making behaviour and inherent overcapacity issues.

The new service will primarily aim to obtain required fleet from the pool of the existing ships (either from carriers or tonnage providers), thus avoiding the ordering of a new capacities and further exacerbation of overcapacity issues.

Limited scope of activities – Scope of activities to be limited only to the „deep sea service" (no door to door services, containers not to be owned, leased or operated by NBM entity), this will clearly

distinguish NBM from being perceived as a competitor by the Carriers and will bring the NBM to their attention as viable outsourcing option for this specific segment of their entire service range.

Original intent of alliances in the late 1990s was to collaborate beyond maritime services and join forces in port operations and inland logistics, but in practice, ocean carriers decided to limit these agreements to shipping, in order to keep "independent" activities of their supply chain holding higher value-added potential (Panayides and Wiedmer, 2011 cited in OECD, 2015). This implies that reduced scope of Carrier's involvement with shipping activities (as activities with lower value-added potential) will enable them to focus on other activities within entire door-to-door supply chain that will yield higher value. Outsourcing of the deep-sea services to NBM in cost effective manner, will thus facilitate Carriers in achieving the higher yields. Asset light operations (as in case of logistics companies) are able to ensure higher rates of asset utilisation and, in general, they tend to achieve higher return on equity than pure, asset heavy, transportation companies (Haralambides and Acciaro, 2010). The logistics market is less dependent on the volatility of freight rates which countervails cyclicality in the liner industry, with a steadier source of revenue and possibility of obtaining higher margins by jointly offering ocean and hinterland transportation (*Ibid*).

There are over 20 different logistics services in international door-to-door supply chain that carriers can bundle under their own control (such as terminal handling, warehousing, stuffing/stripping of containers and cargo consolidation, container services, container logistics, cargo logistics, value-added logistics services, hinterland transportation), with plenty of room for expansion of shipping line's involvement in logistics (*Ibid*).

Limited market share capture - NBM is not envisaged to completely displace existing deep-sea services provided by the Carriers, it would capture smaller market share. This would enable Carriers to continue operations with their own fleets and maintain the control over the resources required for their operations. The targeted market share needs to be sized in such way to secure NBM's feasibility. Initially it can be set at the arbitrary value in the range between 10% and 20%, where the actual shuttle line services will be offered in accordance with detailed analysis of the particular trade route and the level of the service acceptance by the customers.

Service commoditization – As NBM's service will not provide any other services than deep sea transportation on shuttle lines between the hub ports, it will increase the degree of the service simplicity and have effect on its further commoditization. The increased commoditization will be useful as it will enable wide and efficient implementation of the price hedging instruments (e.g. Forward Freight Agreements – FFA's), thus providing possibilities for carriers to minimize the risks of the freight rate fluctuations. Furthermore, such extremely commoditized service (as opposed to the more complex and variable nature of "multi-porting" and "door-to-door" services provided by Carriers) will create possibilities for carriers to free their management resources and put in the focus the differentiation of the value proposition offered to their customers in extension to the basic deep-sea services outsourced from the NBM's entity. The provision of logistics services offers Carriers the opportunity for service differentiation aimed at premium pricing with provision of better service to customers (Haralambides and Acciaro, 2010).

Digitalization – Service sales will be realised through on-line booking platform. Availability of the service units (container slots) will be presented to customers on this booking platform and they would be able to make capacity bookings as per their needs. Principles of the yield management (similar to airline industry) will be applied, as well as options to hedge the service cost through the institute of "Freight Forward Agreements". Customers will also be able to trade with booked slots (on-ward sale of booked slots or purchase of additional slots required on the same booking platform) and thus align

their costs with the quantities of the containers they will actually carry on a particular voyage. This will improve the problematic booking habits related to the "No show" and "Overbooking" dynamics. Digitized service sales will contribute to the reduction of operational costs which will facilitate competitive pricing of the offered services (deep sea slots). Booking tool will display (with real time updates) to customers the plan view of slots available for the booking as per particular sailing, which will facilitate the visibility related to the slot availability. Furthermore, along the digitized booking procedure, the specific slot will be allocated to a customer (depending on the cargo type, container weight etc.). This will ensure the provision of the booking reliability to customers, as the access to and availability of the booked slots will be guaranteed to them.

New Gas Emission Rules – Solution to meet the new gas emission regulation (sulphur cap to be implemented in 2020) will be incorporated in the NBM. In addition to the higher oil distillates (i.e. MGO), there are several other prominent options, out of which LNG stands out as feasible solution. Operational profile of the NBM goes well in line with the landscape of the LNG infrastructure. Despite being perceived as one of the most prominent fuels that are to meet and surpass the new emission rules, the LNG infrastructure and bunkering services are scarcely available. With NBM's deep sea service provided only between hub ports, there is high potential to team up with LNG suppliers and infrastructure developers, as such operations will secure them the launching client for the LNG supplies. Despite the recently launched project by one of the global carriers, (CMA CGM's order for 9 LNG fuelled ships of 22.000 TEU, featured by large LNG tank sized to enable bunkering only at one point on round trip between Europe and Far East (CMA CGM, 2017)), the cooperation about establishment of the highly efficient LNG bunkering system with LNG suppliers (not participating in that project) can be realised. Moreover, the customers are increasing the level of the environmental awareness and deep-sea service based on the "green transportation" principles (coupled with the high level of the service quality), would be the additional benefit to NBM's customers. Shuttle services will facilitate the NBM's advantage of the lowest gas emissions compared to the other LNG fuelled services that would call number of ports on their voyages.

LNG powered fleet would be, therefore, included as the integral feature of the NBM in subsequent assessments. Feasibility of the LNG option should be carefully assessed from the perspective of the capex (assets will have higher price) and opex (fuel price needs to secure competitive service pricing) perspectives. Should such analysis indicate lack of the feasibility, NBM can be launched without LNG feature in initial stage where the service price will be of great importance for capturing of required market share. Transition from the fleet powered by regular fuel to the LNG powered fleet would be then diligently implemented as soon as the required conditions would be met (e.g. attraction of initial customers, availability of LNG powered fleet etc.).

STAGE 3: Prototype the Business Model

We have selected the Business Model Canvas technique for the creation of the New Business model. (Osterwalder and Pigneur, 2010) instigate that business model is best described through nine basic building blocks that cover four main areas of a business: customers, offer, infrastructure and financial viability. The nine building blocks of BM Canvas are:

1. Customer Segments (CS)
2. Value Propositions (VP)
3. Channels (CH)
4. Customer Relationships (CR)
5. Revenue Streams (RS)
6. Key Resources (KR)

7. Key Activities (KA)
8. Key Partnerships (KP)
9. Cost Structure (CS)

We elaborate about each of nine building blocks, taking in consideration that all detected problems and opportunities of the current container shipping business model are incorporated in appropriate building block. Each block is explained separately, and summary version of a New Business Model is presented in the Business Canvas at the end of this chapter.

CUSTOMER SEGMENTS (CS)

As indicated earlier (see Chapter 3.1.), we have distinguished two main groups of relevance for the container shipping industry, namely service takers (Shippers as actual cargo owners) and service providers (Carriers as key party that provides transportation and logistics services). NBM will address both stakeholders, as well as some intermediary parties (e.g. NVOCC, Freight Forwarders).
Therefore, the customers are segmented as follows:

- **Prime Customer Segment: Carriers**

  Carriers are envisaged to be prime customer segment that will exclusively be targeted in the initial stage of the NBM implementation. One of the main reasons for such exclusive interaction with global carriers is fact that NBM will provide sea freight services which is overlapping with the scope of services provided by the Carriers themselves. Therefore, the new service might be perceived by Carriers as another liner service aiming to compete with them, which may agitate Carriers and make them to act in defensive manner and reject the use of a new service. It is important for NBM to convey the message that NBM is about cooperation with Carriers instead of competing with them. Therefore, restraining from entering into direct relation with Shippers (as well as with freight forwarders and NVOCCs), would be a strong and candid signal to the Carriers that, in its core, NBM is designed to create synergy effects between NBM entity and Carriers. Carriers would be able to outsource one particular segment (i.e. deep-sea transportation) of their entire scope of services and enjoy various benefits (e.g. deleveraging, better financial results, reduced market concentration and scrutiny from the anti-trust regulators, high quality service at lower unit costs etc.). No containers will be owned or leased by NBM, thus leaving the rest of the door to door services for carriers to provide them to their customers directly. NBM is designed to achieve feasibility only by having a global Carriers as customers. Since currently there are only 9 global carriers (see Table 3-1), the entire market can be covered only by maintaining the relations with small number of customers. This will enable to operate with small sales team (lower overheads in general) and thus contribute to convenient service pricing.

- **Secondary Customer Segment: Shippers (NVOCCs, Freight Forwarders)**

  Should plan to establish cooperation with global Carriers fall short, there is alternative pool of customers to be addressed with NBM's value propositions. This is related to the direct engagement with cargo owners (Shippers) and intermediaries (NVOCC's, FFs) as they would be interested to use the service of a higher quality at commercially better terms. This secondary customer segment can also be a complimentary customer base beyond the point of initial acceptance of the NBM by Carriers. With positive experience from the initial service use, Carriers will be interested to accept direct relationship between cargo owners and NBM entity, as there will be additional

services (e.g. containers, various door to door logistic services other than deep sea leg) they will be entitled to provide directly to Shippers and intermediaries using NBM's service. Yet, should it be obvious that Carriers prefer exclusive access to the NBM services, any direct relation between NBM and Shippers (or intermediaries) may be omitted without influence on the feasibility of the NBM.

VALUE PROPOSITIONS (VP)

Value proposition is an aggregation of benefits that company offers customers (Osterwalder and Pigneur, 2010). Values may be quantitative (e.g. price, speed of service) or qualitative (e.g. design, customer experience).

NBM entity will act as an independent, common slot provider, without any participation in alliances or Vessel Sharing Agreements (VSA).

Independent status of the NBM entity and captured market share will decrease the market concentration and prevent stringent collusion rules to be implemented by anti- trust authorities. This will enable Carriers to undertake further merger and acquisition activities with smaller companies, as well as to expand cooperative practices (like VSA arrangements), without being bogged by the regulators.

NBM service will enable Carriers to outsource part of the resources they need for the fulfilment of their services towards own customers. They will be able to reduce the fleet size (both owned and chartered) which will enable them to improve their financial results (by deleveraging of their balance sheets) and credit rankings.

NBM service will be available at lower costs, which will be facilitated by following characteristics of the NBM:

- Optimized physical network (shuttle lines with shortest possible voyages between origin and destination port)
- Lower fuel and other operational costs (e.g. shortest sailing route, no container re-stows in intermediary ports etc.)
- Economies of scale (ULCS fleet deployment)
- Lower overheads (highly digitized operations (bespoke online booking platform) and relation maintenance with only few customers, i.e. 9 carriers or 3 alliances, respectively)

Shuttle line operations will increase the service quality (shorter transfer time, higher frequency, increased reliability and predictability) and reduce the holding stocks of the cargo owners.

Outsourcing of the NBM's fleet by Carriers will enable them to achieve the level playground in terms of the vessel size and unit costs. This will relax the level of competitiveness among the carriers and diminish the "game theory" driven decision making along their urge to match the vessel size ordered by the competition. It will positively affect dynamics inducing the overcapacity phenomena.

NBM represents ideal platform for the introduction of clean fuel types (LNG or other fuel of selection). Exclusive calling of major hub ports will enable easy launch of bunkering operations for the new fuel types as required infrastructure and services will primarily be available in these ports. Use of clean fuels on shuttle lines will result with the lowest gas emission supply chain, which would be additional quality for the customers. All credits arising from the reduced gas emissions, will be transferred to the customers (e.g. carbon credits etc.).

Possibility to trade with booked slots (adjust the booked slots with quantity of actual containers to be carried on the voyage) through dedicated on-line booking platform, will reduce "No show" and "Overbooking" problems. Furthermore, in occurrences when the NBM's entity will not be able to provide the access to a booked slot, the NBM's entity will be penalized for such failure by the credit allocation (in terms of monetary compensation) to the holder of the slot booking.

Increased level of the service customization (only deep-sea service between fixed hub ports) will enable efficient implementation of financial derivatives (FFAs) as the price hedging measure.

Transparency about actual slot occupancy and price determination – Information about slot reservations and occupancy will be updated in real time and full visibility about that will be accessible to customers through the on-line booking platform. Similarly, visibility related to slot pricing determination will also be provided to customers. This will be achieved on the basis of the slot pricing algorithmic formula integrated in the booking process on booking platform. This algorithmic formula will consist of following three factors:

- General component encompassing capex and opex (other than fuel) expenses incurred by NBM entity. This component will be determined arbitrary by the NBM entity with its discretion right to revise amount of this component in accordance with its internal financial dynamics. Any such revision will be communicated with customers in timely manner through digitized booking platform. Visibility on determination process for the amount of this component will not be available to the customers.
- Container Freight Rate Index component – freight rates (specific for subjected trade routes and hub port pairs serviced by NBM) indicated by commonly recognized institutions will be weighted in the total slot price with clear visibility on NMB's slot price change in accordance with freight fluctuation determined by such institutions (e.g. Drewry with World Container Index, Shanghai Shipping Exchange with Shanghai Containerized Freight Index etc.).
- Fuel Bunkering component – fluctuation of fuel prices will be weighted in the total NBM's slot price. Slot prices of the NBM will be visibly adjusted with fluctuations of fuel bunker prices in particular hub ports called by the NBM's fleet.

Therefore, the NBM slot price would be composed as follows:

NBM Slot Price = General Component + Weighted Container Freight Rate Index + Weighted Bunker Price

CHANNELS (CH)

The Channels Building Block describes how a company communicates with and reaches it Customer Segments to deliver a Value Proposition (Osterwalder and Pigneur, 2010).

Channels have five distinct phases, each responding to a following specific question:

- Awareness: How do we raise awareness about our company's products and services?
- Evaluation: How do we help customers evaluate our organisation's Value Proposal?
- Purchase: How do we allow customers to purchase specific products and services?
- Delivery: How do we deliver a Value Proposition to customers?
- After sales: How do we provide post-purchase customer support?

We can distinguish between direct Channels and indirect ones, as well as between owned and partner Channels.

We have selected owned and direct type of Channels for the NBM. Main Channel for the communication and delivery of the Value Propositions to customers will be proprietary on-line booking platform, where in initial stages, the dedicated project team will be assigned with a task to introduce the NBM to prime customer segments, i.e. global Carriers. We elaborate in more details about techniques planned for each of the five Channel phases:

Awareness: Dedicated project team will establish interaction with targeted customer segment. As prime target group encompasses only few entities (nine global Carriers), this activity would require rather small team of experts and resource engagement at relatively small scale. At point when decision would be made to introduce NBM to a secondary customer segment (Shippers, NVOCCs etc.), again the dedicated sales team would be composed with a task to establish interaction with these customers. The major entities within these domains that are operating significant trade volumes would be contacted. This pool of customers will include larger number of entities compared to prime customer segment, but it will still be limited in terms of size and required activities. In parallel with direct communication with target customer segment, the professional media channels, social media networks, conferences and professional associations of targeted customers will be used for the dissemination of information about NBM's principles and benefits.

Evaluation: Upon initial interaction with customers, joint team of experts will be established (e.g. with Innovation Departments on Carrier's side) as a task force to assess feasibility of NBM's implementation within the organisation of the particular Carrier or subjected alliance. Excessive assessment of the benefits arising from the NBM concept will be performed for a shuttle lines of the particular interest to the Carrier (or alliance). The use of the real operational data from Carrier's recordings, will enable the high accuracy of the analysis. Positive results of the analysis will incentivise Carriers to proceed with the implementation of the NBM in their operations.

Purchase: Purchase of slots will be exclusively performed through on-line booking platform, customers will have 24/7 access to the platform and real time visibility on available capacities. Majority of slot sales is expected to be arranged through mid- term contracts where larger volumes will be booked by customers for a certain period of time (e.g. six months) and actual slot occupation will be adjusted in accordance with the quantity of containers that customer will have for particular voyage. In cases when the customer will need additional slots or will have surplus of capacity reservations for a voyage, the onward sale and purchase of slots will be enabled as additional feature of digitized booking platform. At the point of slot booking, the particular slot will be assigned to a specific customer, with guaranteed right to use the booked slot.

Delivery: Delivery of Value Proposition to the customers will be secured by highly efficient organisation management, where each segment of the NBM (e.g. fleet management, digitalised booking platform etc.) needs to demonstrate performance of the highest professional standards. As the scope of the services will be reduced (compared to the services provided by the Carriers), it will be less challenging to achieve high performance results. The features of the NBM's design will self-enable the fulfilment of the large part of Value Propositions, i.e. shuttle lines will secure higher service quality, independent service will reduce market concentration etc.

After sales: Digital booking platform will be facilitated by the team of multidisciplinary experts (e.g. Certified Masters for the stowage planning, experienced freight forwarders for the freight documentation issues, IT experts for the digitized booking platform etc.) that would manage and supervise the ongoing operations and provide the problem-solving solutions to the customers in post purchase stage. Selection of top experts, continuous education and coordination between those

shore-based experts and the crew, will minimize the occurrence of complaints and provide effective problem-solving support to the customers.

CUSTOMER RELATIONSHIPS (CR)

The Customer Relationships Building Block describes types of relationships a company establishes with specific Customer Segments. There are several categories of Customer Relationships which may co-exist in company's relationship with a particular Customer Segment (Osterwalder and Pigneur, 2010).

The NBM will primarily use Dedicated Personal Assistance and Self-Service types of relationship. A dedicated team will be assigned to cater for the individual customer. As the number of customers included in the primary segment includes nine global carriers (or three global alliances, respectively), the high quality of assistance provided to a Carrier can be reached without significant complexities. The Self-Service type of the relation will be achieved through digitized booking platform which will facilitate customers to efficiently perform various activities on their own (e.g. slot booking, container tracing etc.). At the point when the direct relationship with secondary Customer Segment would be launched, the same techniques would be applied with them.

REVENUE STREAMS (RS)

The Revenue Streams Building Block represents the cash that company generates from each Customer Segment. Each Revenue Stream may have different pricing mechanisms, such as fixed list prices, bargaining, auctioning, market dependent, volume dependent, or yield management. In general, there are two main types of pricing mechanisms: fixed and dynamic pricing (Osterwalder and Pigneur, 2010).

The main revenue stream for NBM will be generated by freight charges collected from the customers for their usage of NBM's service. NBM's revenues may exclusively be based on the services provided to its prime customer segment, i.e. global Carriers. As this customer segment practically transports all container volumes on the global scale, serving only this limited pool of customers will secure sufficient volumes for the feasible performance of the NBM. Possibilities to generate revenue streams from the secondary Customer Segment (i.e. Shippers, NVOCCs), offsets the risks of relying on revenue stream generation from only one customer segment. The acceptance and use of NBM's services by Carriers will be of prime interest to NBM entity, yet the alternative ways for NBM to achieve feasibility have also been included in the NBM's design. There is also viable scenario that would include simultaneous generation of revenue streams from both customer segments. It may be anticipated that non-asset operating stakeholders will more readily accept the NBM services (driven by the benefits of higher quality service at lower cost, as well as for the cleaner transportation in case that LNG (or other clean fuel of selection) option will be included from the start). Since NBM will provide only the deep-sea service, they will need the remaining part of door to door services to be provided for their logistics needs. NBM can use such scenario to make direct sales of deep-sea services to the secondary customer segment and prompt the prime customer segment (Carriers) to directly provide the remaining scope of door-to-door services to Shippers or NVOCCs. This scenario would additionally support the outsourcing potential of the NBM and attract reluctant Carriers to use NBM capacities.

Irrespective of which Customer Segment will generate Revenue Streams (global Carriers; Shippers and NVOCCs or both segments combined), the dynamic pricing mechanism will be applied. Namely the Yield Management will be used, as the provision of container slots represents a perishable resource. The pricing model will resemble the principles of an air-line industry, meaning that price for the service will vary in accordance with the time of service purchase and availability of the free capacities.

Payment for the service usage will be exercised by customers prior to the service commence. Current practises within the container liner industry do not include advanced payment. Therefore, the customers will be requested to pay only the fraction of the full freight rate prior to the voyage commence. As customers will be able to enjoy the other benefits of the NBM features (i.e. overall lower service cost, possibility to sell purchased slots, higher service quality, fleet reduction and balance sheet deleveraging etc.), customer's consent about advanced partial payment may be anticipated. Moreover, mentioned benefits will also facilitate high utilization of the available capacities. This is further substantiated by NBM's ability to serve wide customer base (all global Carriers) at equal terms, by being free from any alliance or VSA agreements.

KEY RESOURCES (KR)

Key Resources can be physical, financial, intellectual or human, they can be owned or leased by the company or acquired from key partners (Osterwalder and Pigneur, 2010).

The fleet of vessels with adequate characteristics will be the Key Resource required for the efficient provision of the NBM's services. Fleet will comprise container vessels of the largest size in order to achieve economies of scale and base its service on the lowest possible unit costs. The particular size of the vessels for the specific trade route /shuttle line will be determined in accordance with the infrastructure limits in the ports of call.

The quantity of vessels required will be significant, which will result with high capital expenditure. Therefore, the availability of financial resources is another Key Resource of the relevance. As NBM will operate on major trade routes which are characterised by high volumes, the potential to generate revenues will be evident, and obtainment of required financial resources will be available. Assessment of NBM's feasibility will be the determining factor for the actual obtainment of the financial resources and the same needs to be clearly achieved by the design of the NBM itself.

Digitalized booking platform will be one of the crucial Key Resources. It will be used as a powerfull tool, tailor designed to successfully perform operational activities such as: service creation and marketing, capacity sales, service contracting (digitized issuance of shipment documentation), payment collection for the provided services (automated reimbursement from customer's bank account), operational management of contracted volumes (stowage plans for the particular voyage).

Human resources are also Key Resource of relevance for the successful implementation of the NBM. In the launching phase, the enthusiastic team of motivated experts will be required to promote the project and convert customers to use the innovative and disruptive concept such as the NBM. Therefore, the composition of such team would need to be thoughtfully arranged. In the operational phase, there will be sufficient pool of experts and talents for various professions required (logistics, seafaring, IT etc.).

KEY ACTIVITIES (KA)

The Key Activities are required to create and offer a Value Proposition, reach markets, maintain Customer Relationships, and earn revenues**.** Key Activities differ depending on business model type and can be categorized as follows: Production, Problem Solving and Platform/Network (Osterwalder and Pigneur, 2010).

With digitised booking platform being the one of the NBM's Key Resources, continuous development and maintenance will be an important activity, which then relates NBM with Platform/Network category type of a business model. As such service would differ NBM from the rest of the options offering deep-sea service, the quality of such interface between NBM and its customers (in terms of visibility, traceability, reliability, precision, user-friendliness and feel-good experience), will be of great relevance for the successful delivery of the Value Proposition.

As the main service comprises physical transportation of the containers by ships, the regular activities related to the efficient fleet management will also be an important part of the Key Activities (i.e. technical and crew management, seafaring operations from the origin to the destination port). With the NBM concept based on a shuttle lines, the operational management of such fleet will be less complex compared to the operational practices of other players on the market (e.g. stowing plans will be easier to produce as there will be no other port calls on the voyage).

KEY PARTNERSHIPS (KP)

The Key Partnership Building Block describes the network of suppliers and partners that make the business model work. Osterwalder and Pigneur (2010) distinguish between four different types of the partnerships:

- Strategic alliances between non-competitors
- Coopetition: strategic partnerships between competitors
- Joint ventures to develop new businesses
- Buyer-supplier relationships to assure reliable supplies

NBM can be described with coopetition type of the partnership. Since both the NBM entity and its prime customers (Carriers) will provide the deep-sea services, in a broadest sense, there will be competitive relationship between the two. Yet, the NBM is designed to achieve extensive cooperation with Carriers and its scope of services will be limited to the deep-sea transportation (while Carriers will provide wider scope of services). This will enable Carriers to outsource part of their activities and optimize their operations in terms of financial and service quality performance parameters. Therefore, the relation with Carriers is the Key Partnership. The NBM may feasibly operate by having only the global Carriers as customers and such realisation scenario would be the top priority for the NBM.

In case of the NBM launch with secondary customer segment, the Key Partnership will be established with Shippers, NVOCCs and Freight Forwarders. This partnership type will be buyer-supplier relationship created to assure reliable supplies.

Since the assets are the Key Resource, there is also significant potential to consider launch of the NBM in partnership with Tonnage Providers (who own assets required for the service launch and provide them to a Carriers through charter arrangements). It may be anticipated that enactment of the new accounting rules (IFRS16) will instigate shift in charter contracts dynamics between Carriers and Tonnage Providers (e.g. operating lease arrangements), which will increase the risks on the side of the Tonnage Providers. Therefore, the NBM service could be launched in cooperation with Tonnage Providers as the NBM service will be able to engage their assets on long term basis. The scope of cooperation between the NBM entity and Tonnage Providers could be limited to the asset lease, or, it could be extended towards their participation in the ownership structure of the NBM's entity, which would enable them to adjust their business model to the challenges arising from the new accounting rules (IFRS16). Such extension of the service scope provided by the Tonnage

Providers would not deteriorate relation with their regular customers (Carriers) as the NBM is designed in such way not to compete with the activities of the Carriers.

Close cooperation will be needed with ports and terminals of call. NBM will operate vessels of a large capacity (in order to achieve economy of scale) and, due to shuttle line service, the total quantity of containers carried will be handled (loaded or unloaded) only in one port. This could create congestions on terminals and therefore these operations will need to be well coordinated with them. As NBM will secure high volume of containers to ports / terminals, it may be anticipated that they will be highly interested in setting up of adequate procedures for the efficient cargo handling. Since the design of the NBM entails high level of the predictability, the container handling procedures at terminals will be efficiently planned in advance.

The independent service provision will reduce the market concentration levels. This will be one of the key benefits provided to the customers by NBM. Therefore, good cooperation with the national Competition Authorities will be one of the Key Partnerships, as their opinion would contribute to the wider use of independent NBM's services by Carriers.

With the implementation of environmentally cleaner fuels by the NBM, the relation with suppliers of selected fuel types will also be the Key Partnership. With its shuttle line principle, NBM represents the ideal platform for the application of the particular fuel type in its initial implementation stage (due to easier establishing of required infrastructure and bunkering operations in hub ports). This feature may be used as bargaining power to secure convenient arrangements with fuel suppliers.

Similar relations will be established with specialised and globally recognized sustainability institutions (e.g. Clean Cargo Working Group, Clean Shipping Index). Calculation procedures and monitoring equipment required for the measurement of gas emission reductions will be worked out in cooperation with them. Benefits of achieved gas emission credits will be transferred to the customers and monitoring system verified by the independent expert organizations will be of high relevance.

COST STRUCTURE (CS)

The Cost Structure Building Block describes the most important costs incurred while operating under a particular business model. We can distinguish between two broad classes of business model Cost Structures: cost-driven and value-driven, where many business models fall in between these two extremes (Osterwalder and Pigneur, 2010).

NBM needs to insure the service to be offered at competitive price level in order to be able to attract customers. Therefore, it may be considered to dominantly have a cost-driven structure. The greater service value will be delivered to customers, which will be achieved by the design features of the NBM and not by the value-driven cost structure of a business model.

The capital expenditure required for the fleet acquisition will be the highest cost. Operating costs will comprise regular costs of the shipping operations, i.e. fixed costs (e.g. crew expenses, fleet insurance and maintenance, depreciation, amortization) and variable costs (e.g. bunker costs, port dues and canal passages, cargo related costs (container handling), maintenance of key relationships etc.). The container liner service is scheduled in advance of the effective demand; therefore, it is characterised by high fixed costs (OECD, 2015).

Setting up of highly digitized business operations will require additional capital and operational costs which are not incurred, to such percentagewise extent, within the existing business model of the container liner industry. However, the positive effects of highly digitized operations will be well justified by decreased marketing and transactional costs, as well as with reduction in human resources.

4.3 New Business Model Canvas

Results of the prototyping technique applied through the analysis of the nine building blocks, are summarized in the form of the Business Model Canvas and presented in Table 4-2. This canvas depicts the New Business Model and represents the final artefact of the Design process.

Table 4-2: New Business Model Canvas

<table>
<tr>
<td rowspan="2">Key Partnerships

CARRIERS
(Coopetition type of partnership)

<u>Alternatively:</u>
SHIPPERS (NVOCCs)
(Buyer – Supplier relationship)

<u>Additionally:</u>
- Tonnage Providers
- Ports & Terminals
- Competition authorities
- Environmental agencies
- Clean fuel suppliers</td>
<td>Key Activities

Deep-sea Fleet Operations

Digital Booking Platform
(Development and maintenance)</td>
<td rowspan="2">Value Proposition
<u>Generic:</u>
• Deep sea service between hub ports on major trade routes
• Independent common slot provider
• Increased service quality:
- Shorter transit time and higher frequency
- Higher service reliability and predicability
- Reduction of holding stocks
• Lower service cost
• Reduced market concetration
• Provision of Outsourcing capacities
• Reduced overcapacity
• Lowest gas emissions (with transfer of emission credits to customers)
• Tranparency about slot availablity
• Guaranteed access to booked slots
• Cost hedging (FFAs and post-booking slot trade)
• Reduction of No-show and Overbooking dynamics
• Visibility about rate definition
<u>Specific to Carriers:</u>
• Fleet reduction (owned and chartered)
• Balance Sheet deleveraging
• Improved financial results and credit rankings
• Reduced scrutiny by Competition authorities</td>
<td>Customer Relationships

Dedicated Customer Assistance (specialised customer support teams)

Self Service (digital online booking platform)

Social media</td>
<td rowspan="2">Customer Segments

CARRIERS
-Primerily targeted customer segment
-Can be served exclusively

SHIPPERS (NVOCCs, FREIGHT FORWARDERS)
-Secondary (Alternative) customer segment
-Can be served exclusively (if Carriers oppose NBM use) or in combination with Carriers</td>
</tr>
<tr>
<td>Key Resources

Fleet of ULCS size vessels

Bespoke Online Booking Platform</td>
<td>Channels

Digital booking platform

Dedicated customer support teams (facilitating particular customer)

Web page and social media</td>
</tr>
<tr>
<td colspan="3">Cost Structure

FLEET ACQUISITION COSTS (Capital intensive, can be leveraged, e.g. leasing)

OPERATING COSTS (Deep-sea shipping activities - high fixed costs)

BOOKING PLATFORM COSTS (Development and maintenanace)</td>
<td colspan="3">Revenue Streams

FREIGHT RATE CHARGES
Depending the customer segment serviced, will be generated from one of the following sources:
- Exclusively Carriers
- Combined from Carriers and Shippers (NVOCCs, FFs)
- Exclusively from Shippers (NVOCCs, FFs)</td>
</tr>
</table>

5 Validation of the New Business Model

This chapter will define the principles according to which the evaluation of the design artefact (New Business Model) will be conducted. We firstly elaborate on relevant aspects of the Evaluation Process and then proceed with the definition of the Execution Protocol. Subsequently, we produce the Questionnaire which will be used as a tool to perform the required evaluation procedure.

5.1 Evaluation of the Design Artefact

Design Science Research paradigm prescribes Evaluation of the Design artefact to be an integral sub-process within the Design Cycle (see Figure 2-2; and Table 2-3). Original plan for the evaluation of the New Business Model (as an artefact of the design process) was to apply quantitative analysis by conducting the simulation which would compare performance characteristics of the existing and new business models (see Chapter 2.2). The meaningful conduct of such simulation would require stakeholder's (e.g. Carriers) participation and willingness to share their actual operational data (e.g. container volumes carried on selected routes, transport time, service costs incurred etc.). Along the process of the design artefact generation, numerous stakeholders were contacted and their reluctance to participate in such capacity was firmly established. Therefore, the alternative Evaluation method has been selected, namely the design artefact evaluation by the Expert Panel, where the expert evaluation will be obtained through the interaction with experts in the form of a Questionnaire.

5.2 Expert Panel

Since the NBM is designed to improve the overall performance of the container liner industry and deliver benefits to all stakeholders, the cohort of experts will be sought across the complete spectrum of the industry. In this way the evaluation of the design artefact (NBM) will be conducted from diversified base of knowledge and experience. Author will need to consider the credibility (expertise, experience) of each participating expert, which will be achieved through individual interaction with each expert in the opening stage of the communication.

Invitations to participate in the Expert Panel will be widely distributed to all stakeholders professionally involved with the container shipping industry. The minimum size of the Expert Panel will be set to include five experts, where at least one of them needs to come from the Prime Customer segment i.e. Carriers. Reason for this condition is that NBM would introduce the largest change in the business model of the Carriers and without reflection of an expert from that particular customer segment, the evaluation will significantly lack the relevance.

5.3 Questionnaire

Questionnaire will comprise three major parts:

- Introductory section (info of relevance for the Expert Panel demographics)
- Section related to the problem definition (feedback about how well the study defines problems and opportunities arising from the existing business model)
- Section related to the features of the design artefact (feedback about the impact and implementation potential)

In order to achieve feedback that will enable both explicit and nuanced conclusions, combination of questions with dichotomous (two mutually exclusive response choices) and multiple-choice-single-

response scale will be applied. Additionally, experts will be asked to elaborate their opinion about certain questions, with aim to use the same as the set of ideas for the improvement of the design artefact.
Experts will be given the option to choose between filling the Questionnaire on their own (without interaction with the author), or in a form of an interview (which could be in on-line interaction between the expert and author, or during the scheduled (face to face) meeting in cases where that would be reasonably possible). Interview would be structured in accordance with the questions defined in the Questionnaire and limited to the scope of questions defined there.
In order to secure the Questionnaire to be answered from the perspective of the same landscape of the container liner industry, the Questionnaire will be sent out to all participating experts at the same time. In this way, the potential influence of some major developments within the industry (e.g. mergers, acquisitions, bankruptcies, changed regulatory environment etc.) on expert's answers will be eliminated.

During the composition of the questions, the author will need to maintain unbiased approach and avoid guiding questions aimed to elicit desired reply. However, for the practical reasons (informed answering by the experts based on readily available info), certain level of summarized information presented in previous chapters of the study (e.g. tables, business model canvas, conclusion etc.) will be incorporated in the Questionnaire.
For the same reasons of avoiding the biased approach to the Evaluation Process, the canvas of the existing business model will not be presented in the Questionnaire. Though it may be perceived that "back to back" comparison between the existing and new business model would be efficient approach to perform the evaluation, it may, simultaneously, be impossible to avoid unintentional bias since both canvases would be created by the same author.

5.4 Objectives

Objective of the Evaluation process is to obtain appropriate feedback about whether the designed artefact (NBM) fulfils its aim of improving the existing business model.
Evaluation will be conducted in such way that it simultaneously meets following criteria:

- Collect useful feedback to be considered as set of ideas for further improvement of the design artefact
- Facilitate explicit definition of the answer to Main Research Question (see Chapter 2.2), i.e. whether the NBM will improve efficiency of the business model for all stakeholders
- Needs to adhere to guidelines and targets set out in Chapter 2.2 (see Guideline 3, Table 2-3*;* and paragraph *"Application of Design Science Research in this study")*

5.5 Metrics

Specific measurement criteria (or metrics), against which the design artefact (NBM) would be assessed, will not be determined for the Evaluation Process in this study. There are two main reasons for that, namely:

1. Design artefact that will be evaluated, represents conceptual construct (therefore it would be difficult to determine representative metrics).
2. Qualitative evaluation method (Questionnaire) will be exercised (instead of originally planned quantitative evaluation method in a form of comparative simulation between the existing and new business model).

Therefore, the Evaluation Process (i.e. Questionnaire) will be structured in such way that it provides the descriptive feedback of the Expert Panel, which would then be synthetized by the author to achieve the objectives of the Evaluation Process as set out in this chapter. In doing so, the feedback about the utility of the design artefact will be examined from the perspective of two elements, namely:

- NBM's efficiency (i.e. would NBM increase the efficiency of the container liner industry)
- NBM's applicability (i.e. how likely the NBM's implementation would be in the real-world environment)

5.6 Execution Protocol

Execution Protocol presents stream of activities required for the efficient evaluation of the design artefact (NBM):

1. Initial contact with experts. Send invitation to participate in the Expert Panel. Provide working version of the study and outline version of the same (5-10 pages summary of the study) which will enable experts to gain insight about the study and assess their ability/readiness to participate.
2. Allow experts to read the complete study and reflect upon the same. Selectively provide additional explanations in the study about NBM's features that are often found unclear or misunderstood by experts. Establish confidence about expert's understanding about aspired goals of the NBM and its design.
3. Send the Questionnaire to all participating experts at the same time (with max difference of few days, providing that number of experts corresponds with minimum defined size of the Expert Panel). Schedule interviews if experts select that form of evaluation.
4. Collect the Questionnaires. In case of interviews, record answers. Establish the completeness of the expert's work (contact experts again if something is incorrectly or incompletely done).
5. Record any additional feedback received from the Expert Panel that would be of use for further improvement of the NBM. Seek info about original sources of such additional feedback and make attempt to reach them.
6. Summarize and categorize the answers. Analyse and synthesize the feedback. Check how the outcome corresponds with objectives of the Evaluation Process.

6 Findings and analysis

In this chapter we provide information about findings related to the evaluation process, present the answers received and infer conclusions about the study results. Reflections upon the alignment of the study with the prescribed recommendations for the Design Science Research process (as defined in Table 2-3) are also included in this section.

6.1 General notes about Evaluation process

The original plan for the evaluation process of the design artefact has turned to be a non-doable option. Initial idea was to perform quantitative evaluation of the design artefact in cooperation with the industry stakeholders (i.e. Carriers - one of them, or, ideally within one Alliance), where their actual operational data sets would be used to perform comparative analysis of the network efficiency operating under the present business model and simulated results of the New Business Model (with comparison of metrics such as: transport time, transportation costs, fuel consumption, gas emissions, impact on Carrier's financial results etc.). Carrier's concerns about data disclosure was anticipated and maximum degree of the confidentiality, within the domain of the academic study, was offered to them. However, after long lasting deliberations, they declined participation in such evaluation process. Henceforth, the alternative plan for the evaluation of the design artefact was generated and eventually applied in this study.

As described in Ch. 5, the alternative evaluation method encompassed the qualitative evaluation of the design artefact by the Expert Panel, in the form of answering the questions set out in the Questionnaire. Special attention was dedicated to the relevance of the experts invited to evaluate the design artefact, which was ensured by sending the invitation only to the industry professionals with evident experience.

Furthermore, the intermediate step in interaction with contacted experts was applied, where the experts were asked to read the study and communicate all questions or comments they would have about the artefact, before making the final and committed decision about their participation in the Expert Panel. The purpose of this preliminary step in the interaction with experts was to establish well understanding of the Design artefact set out in the study. The required degree of their expertise was assured by the evidence of their professional engagement within the Container Liner industry. This request for the engaged approach of the experts, prior to the actual evaluation activity, had an impact on the time required to obtain the simultaneous commitment of the number and composition of experts defined by the minimum Expert Panel size (see Ch 5).

At first meeting of the conditions set out for the Expert Panel (minimum size and composition), the Questionnaire was sent out to experts. In order to secure that the evaluation is conducted in the uniform landscape of the industry (and thus avoid possible impact of substantial changes occurring over longer evaluation time, e.g. further consolidation or M&A activities, Alliance reshuffling, freight rate changes, new regulations etc.), the Questionnaire was simultaneously sent to all experts within the time span of two weeks.

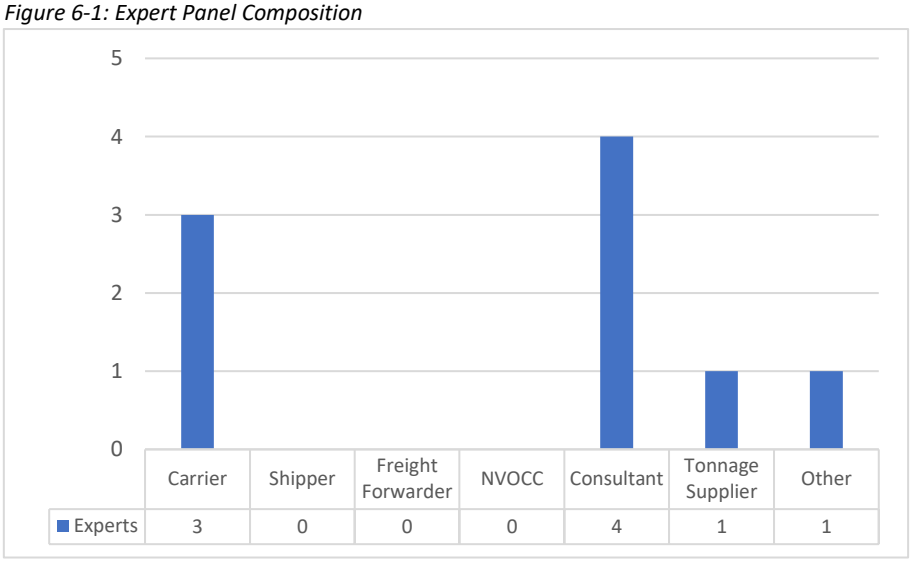
The Questionnaire comprised three different sections, first section was related to the participant details of relevance for the determination of the population profile. Second section addressed the design artefact from the perspective of establishing the expert's opinion about whether the study is efficiently defining the actual problems that industry is facing and whether these major problems would require revision of the existing business model to be mitigated. Third section of the Questionnaire was structured to collect expert's opinion about the impact of the NBM and its

implementation potential. We proceed with the presentation of the selected scope of answers of major relevance for the conclusion inference (see *Appendix I.* for the complete set of answers). Answers and conclusions are separately presented for each of the three sections of the Questionnaire.

6.2 PART A of the Questionnaire (Participant details)

Expert population contacted with the invitation to participate in the Expert Panel included the experts representing the stakeholders across the complete spectrum of the industry. Invitation was sent out to 52 experts (mainly available through author's network but also experts with publicly available contact details that were detected during the research work activities). Questionnaire has offered seven different identification categories to Experts, namely: *Carrier, Shipper, Freight Forwarder, NVOCC, Consultant, Tonnage Supplier* and *Other*. The Expert Panel in total comprised nine experts, yielding the response rate of 17,3%. Based on the selection of offered identification categories, the Expert Panel was composed as follows:

Figure 6-1: Expert Panel Composition



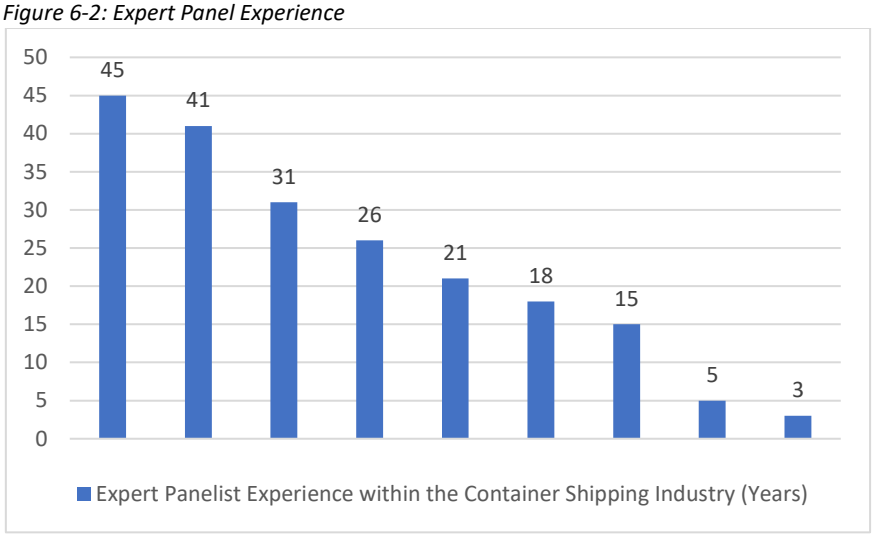
Source: Author

Notes:

1. *The expert who has selected the category "Other" has defined himself as "End-to-end Logistics Solution Provider", due to his position with the specialised Logistics unit owned and operated as the integral part within the corporate structure of one of the major Carriers.*
2. *One of the experts had both the experience of the Carrier and Tonnage Supplier, since the former prevails in terms of employment experience, he has identified as Carrier.*

Average experience in the Container Liner Industry of the Expert Panel participant was 22,8 years, with the shortest experience being 3 years (still with occupation of senior corporate position at the time of the evaluation) and the longest experience was identified to be 45 years.

Figure 6-2: Expert Panel Experience



Source: Author

The interview was performed with three Expert Panel participants, out of which two interviews were in face-to-face form and one as the telephone interview. The reminder of the experts filled the Questionnaire on their own and have provided the answers in email correspondence. Approximately with one third of the Expert panellists, no additional interaction was conducted about design artefact, and their evaluation was performed exclusively on the grounds of the study text provided to them. With the remaining part of the expert panellists, the level of the interaction was ranging from the level of answering minor questions (in a form of email correspondence or short phone calls) with regard to explanations about certain features of the design artefact, to the degree of more iterative exchanges with experts during the interviews.

6.3 Conclusions about the PART A of the Questionnaire (Participant details)

We conclude that the Expert Panel has successfully fulfilled the specified conditions, both in terms of the required panel size and its composition. Simultaneously, the required degree of the expertise was confirmed by the provided evidence about panellist's experience.

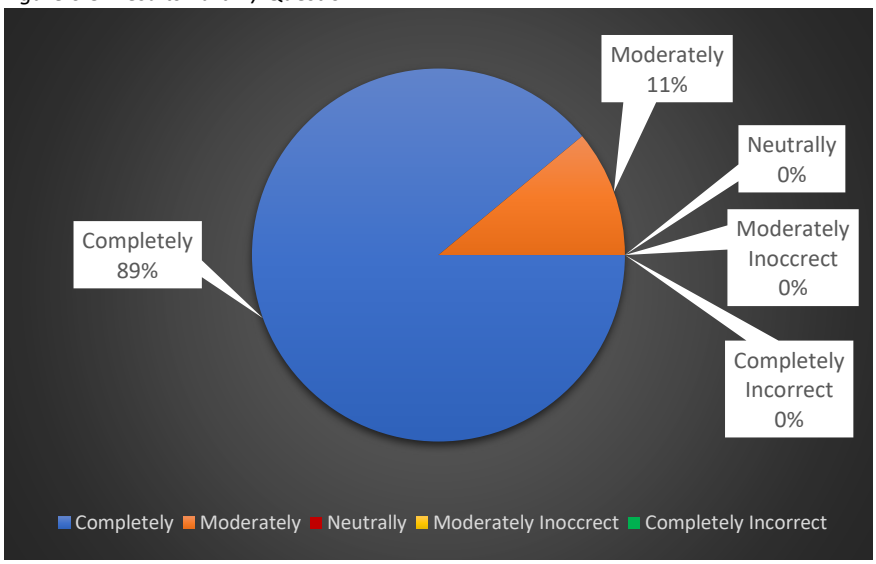
6.4 PART B of the Questionnaire (Current problems and opportunities for the improvement within the industry)

This section of the Questionnaire comprised seven questions.

The five-scale answer option was offered in question (Part B/Question 1.) about whether the NBM design process has successfully defined (and therefore the NBM as the artefact is based on) all relevant problems generating the evident inefficiency of the industry as a whole. Two of the offered answer options were on the positive spectrum of the opinion statement (i.e. „Completely" and „Moderately"), two answer options were on the negative spectrum of the opinion statement (i.e. „Moderately Incorrect" and „Completely Incorrect"), with the option for the neutral opinion offered as fifth possible answer (i.e. „Neutrally" – meaning that listed issues do not adequately depict the major problems, nor they are incorrectly specified).

All experts have provided answer from the positive opinion spectrum with the 89% to 11% split respectively, between the answers „Moderately “and „Completely “.

Figure 6-3: Results Part B / Question 1



Source: Author

In order to better interpret these answers, we investigate them in further level of the detail. Further explanation about scope of the opinion captured in the subjected definitions was included in the Questionnaire, namely definition “All issues of crucial influence are listed” was added to the answer option “Completely”, and definition “Major crucial issues listed but some, with equal degree of relevance, are omitted” was specified with the answer “Moderately”. Furthermore, the option to specify the additional issues of equal degree of the relevance was provided in the Questionnaire and experts have specified following issues:

- Economies of scale: immediate cause of the overcapacity
- Concentration: needs to increase to achieve market stability
- Globally/geopolitically unstable conditions
- New shipping regulations
- State/Government involvement in carriers’ activities which create unfair level playing fields
- The shipping industry is facing disruption from technology start-ups like Freightos, Flexport, 300cubits which are asset light, have a lower or more efficient cost of operations per unit revenue and are plugged into the larger transportation network (air freight, sea freight, land transport) providing more flexibility and reliability for customers.
- “Digitization” and ‘big data’ management e.g. block chain.
- Sustainability/Decarbonization: Awareness that the shipping industry in due course needs to become CO2 Neutral (see commitment Maersk start 2030 / done 2050)
- Security: Number of parties involved in supply chains is high which is considered a risk
- Forecasting: Difficulty in improving predictability of goods flows, bookings on sailings and market demand
- Lack of Infrastructure: Ships continue to grow; difficulty to receive these vessels will lead to congestion, especially an issue in developing areas, incl. India/Bangladesh, China
- Industry has the “zero sum” nature (practically, any improvements/savings achieved by Carriers are passed on to Shippers).

- Industry is not purely driven by the economic rationale, some companies are including state policies in their strategies (e.g. Cosco, HMM).
- Excess capacity driven by pursuit of economies of scale in ordering large vessels
- Failure to grasp opportunities to provide an integrated supply chain service to cargo owners leading to commoditization of liner product

We shortly reflect upon the list of additional issues specified by experts. Along the research work required for the definition of major issues causing the inefficiency within the industry, the focus was placed on the issues that simultaneously contain the improvement potential and would thus yield the more efficient business model for the Container Liner Industry. Moreover, in line with the requirements arising from the Relevance and Rigor Cycle of the Design Science Research, the design science activities need to be grounded in contextual environment (Problems and Opportunities; Requirements) and knowledge base (Scientific foundations, Experience, and Expertise) of the research project. Therefore, the research activities included the knowledge base of all major industry stakeholders, with subsequent definition of Problems & Opportunities based on the discovered evidence and argumentation (see Chapter 3). Majority of the additional issues specified by the experts were not, either frequently or at all, encountered during the research work as the items of crucial influence on the industry's inefficiency and therefore not included in the list of the major Problems and Opportunities.

Analysis of the additional issues specified by experts, leads to the following categorization:

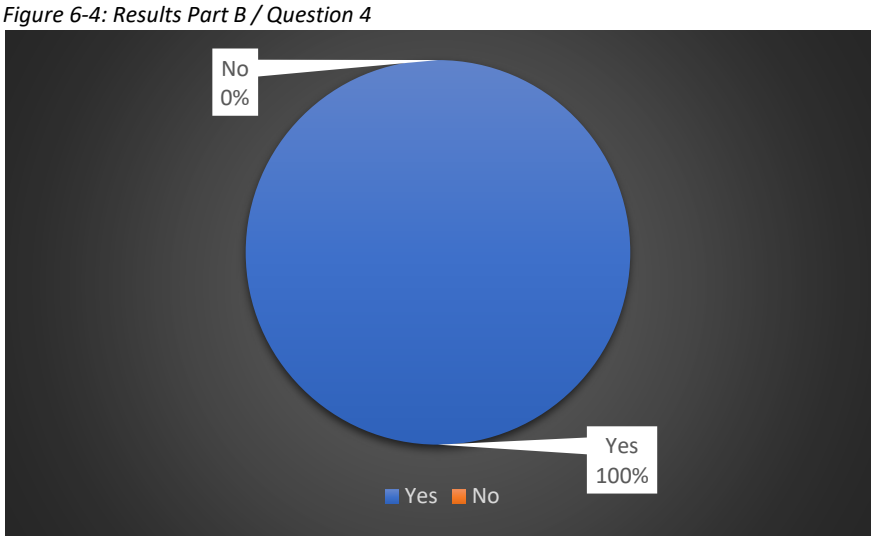
- Additional problems that are impossible to mitigate only within the realm of the economic theory or activity (e.g. State/Government involvement in Carrier's activities; Industry not being purely driven by the economic rationale; Global/Geopolitical instability; continuity of the temptations arising from the Economies of Scale; "zero sum" nature of the industry)
- Problems that are already mentioned in the list of the Problems & Opportunities (e.g. Overcapacity; Concentration; Sustainability; Forecasting; Service commoditization;)
- Problems that are addressed by the NBM but separately as the arising issues for the industry and therefore not listed in the major list of Problems and Opportunities (e.g. New shipping regulations; Digitization and derived effects)

In conclusive remark we can infer that for the additional problems specified by the experts, there was no evidence (either at all or significant) found during the research of the knowledge base to justify the additional enclosure of those issues in the list of major Problems and Opportunities. However, they provide the valuable insight of more nuanced perception of the industry by the experts, for which the correlation with the NBM features can be looked at in further details in subsequent work to this study.

We proceed with presentation of answers to further questions of major relevance within the second section of the Questionnaire:

The binary answer (Yes/No) was offered for the question (Part B/ Question 4.) about whether the experts perceive the reduced demand for the container shipping capacities to be the "New Normal" growth rate (i.e. average 3,8% annual demand growth as opposed to double digit (>10%) annual demand growth before year 2008). Experts have uniformly expressed their opinion (100% answered "Yes") that significantly reduced demand growth features the new landscape in which the industry needs to operate.

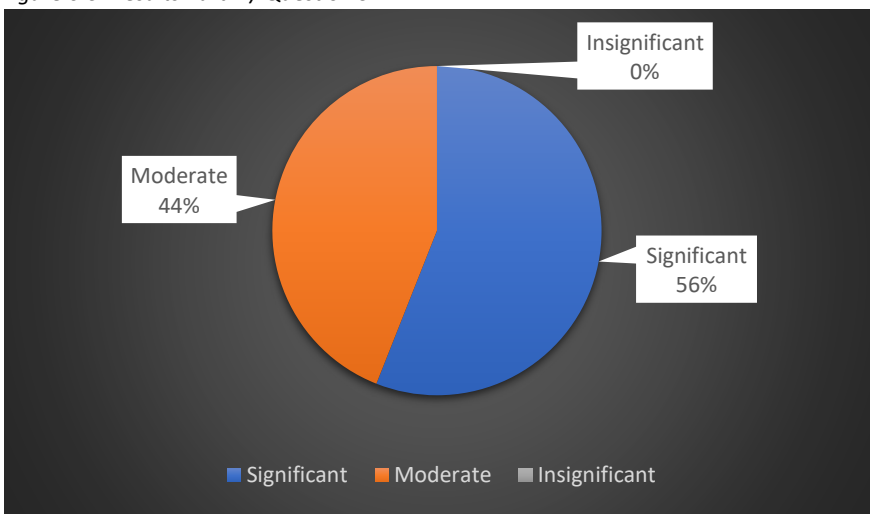
Figure 6-4: Results Part B / Question 4



Source: Author

In answers to question (Part B/ Question 5.) about what degree of influence the experts would allocate to such unprecedented demand growth reduction, three options were offered (Significant/Moderate/Insignificant), where the majority of the experts (56%) have depicted that influence to be significant (one of the quintessential factors affecting the efficiency of the existing BM of Carries), against the 44% of the experts depicting it to be moderate.

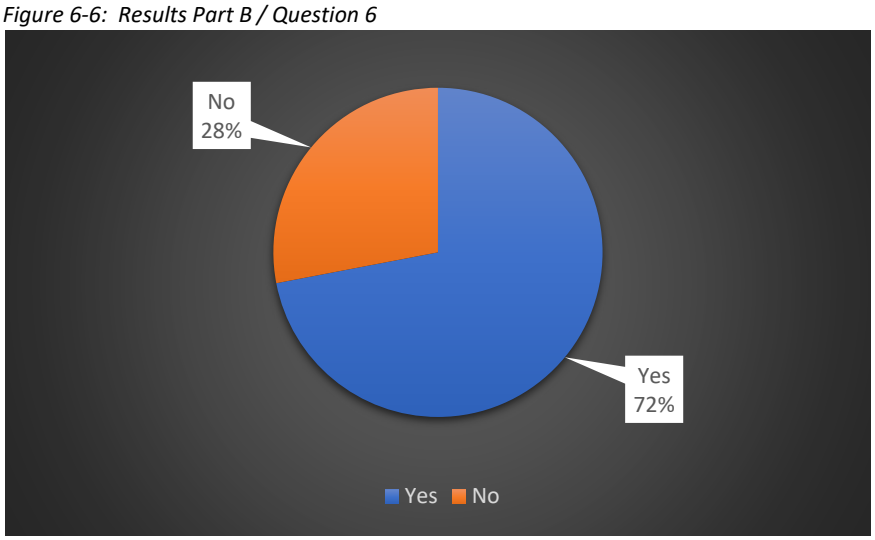
Figure 6-5: Results Part B / Question 5



Source: Author

Question (Part B/ Question 6.) about whether the existing business model of the Container Liner Industry will need to be redesigned (in order to resolve detected problems and achieve long term stabilisation of the industry), offered binary answer option to experts. Percentage of confirmative answers was 78%, while 22% of the experts have expressed the opinion that redesign of the existing business model will not be required.

Figure 6-6: Results Part B / Question 6



Source: Author

Experts were offered possibility to provide additional information about how the long-term stabilization of the industry can be achieved within the existing business model of the Carriers, and following statements were specified:

- State related subsidies/support to carriers should be removed for carriers to make decision based on commercial merits. Then the natural system of demand and supply will regulate the up and down of the industry.
- Economies of scale must run out, that will reduce overcapacity
- Industry concentration: Needs to continue until we have 5 -6 mega-Carriers

6.5 Conclusion about the PART B of the Questionnaire (Current problems and opportunities for the improvement within the industry)

The goal of this section of the evaluation process was to establish whether the research activities of the Design process have correctly defined the major problems generating the inefficiencies across the industry and which, simultaneously, represent the opportunity for the efficiency improvement.

With the 100% of the expert's responses placed in the positive spectrum of the possible range of answers (with 89% to 11% split between the moderate and complete degree of the definition), we infer that appropriate and correct definition of the Problems and Opportunities has been confirmed by the Expert Panel. Since the results of the research work in a form of the Problems and Opportunities were the underlying foundations for the artefact design, we also infer that required conditions for the appropriate conduct of the Design Cycle (as the integral part of the Design Science Research), were achieved.

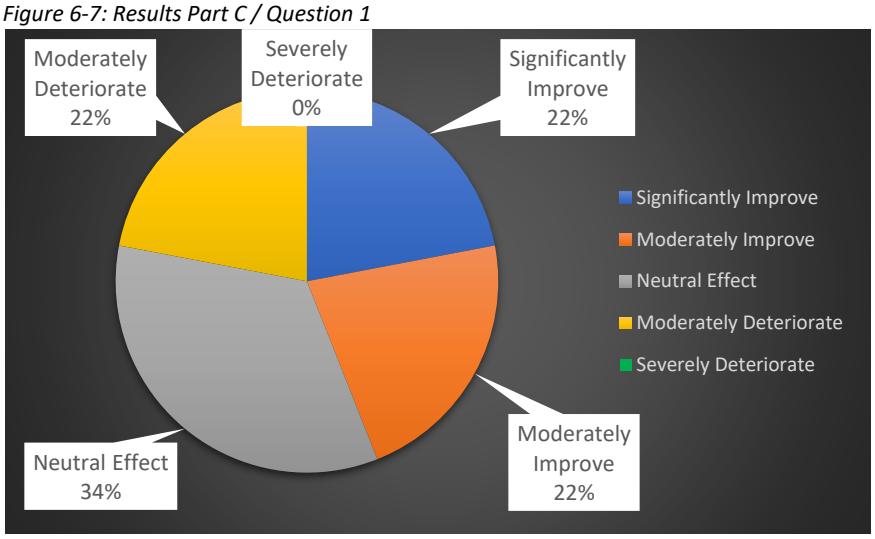
From this part of the Questionnaire we derive further conclusions, namely the expert's opinion about the need for the redesign of the existing business model of the Container Liner Industry in order to achieve the long-term stabilization, as well as their opinion about changed operational landscape of the industry, that has been significantly influenced by the reduced demand growth.

6.6 Questionnaire Part C (Impact and implementation potential of the NBM)

This section of the Questionnaire comprised ten questions. Herewith we present and analyse the most relevant findings.

Question (Part C / Question 1) about whether the cumulative characteristics of the NBM will effectively improve/mitigate defined problems that industry is facing, offered five scale answer option. Percentage of Expert answers in the positive opinion spectrum was 45% (with 50% - 50% split between the answers "Significantly Improve" and "Moderately Improve"), where 33% of experts have selected the neutral answer ("Neutral effect"), and 22% responses displayed the opinion in the negative spectrum of the answer range (i.e. "Moderately Deteriorate" while the occurrence of the answer "Significantly Deteriorate" was not registered).

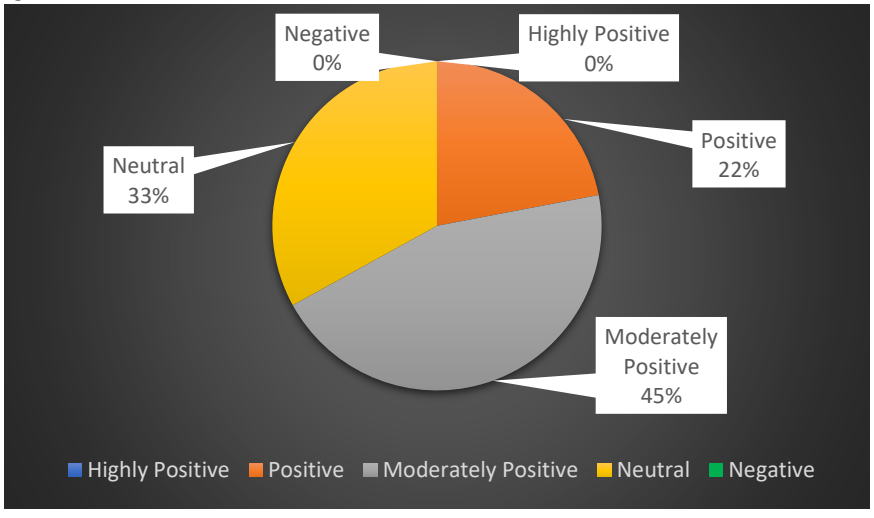
Figure 6-7: Results Part C / Question 1



Source: Author

Opinion about the overall impact of the NBM on the existing Business Model of the Container Liner Industry and its performance results was also sought (Part C / Question 3). Five scale answer option was offered, with 67% of answers in the positive opinion spectrum and 33% of experts displaying the neutral opinion (i.e. selecting the answer stipulating that there will be no effective change). Occurrence of the answers in the negative spectrum of the opinion was not registered.

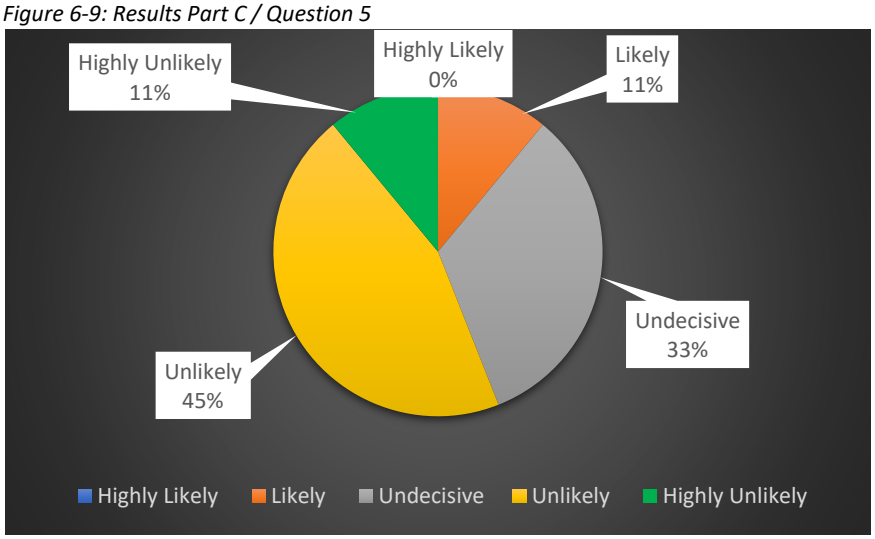
Figure 6-8: Results Part C / Question 3



Source: Author

Two questions (with five scale answer option) sought expert's assessment about the potential of the NBM to be accepted by the Primary Customers Segment (Part C / Question 5) and Secondary Customers Segment (Part C /Question 6). For the Primary Customer Segment, 56% of the answers were in the negative opinion spectrum (with 45% to 11% split, respectively, between answers "Unlikely" and "Highly unlikely"), with 33% undecisive answers (i.e. "Impossible to predict") and 11% of answers in the positive spectrum (i.e. "Likely").

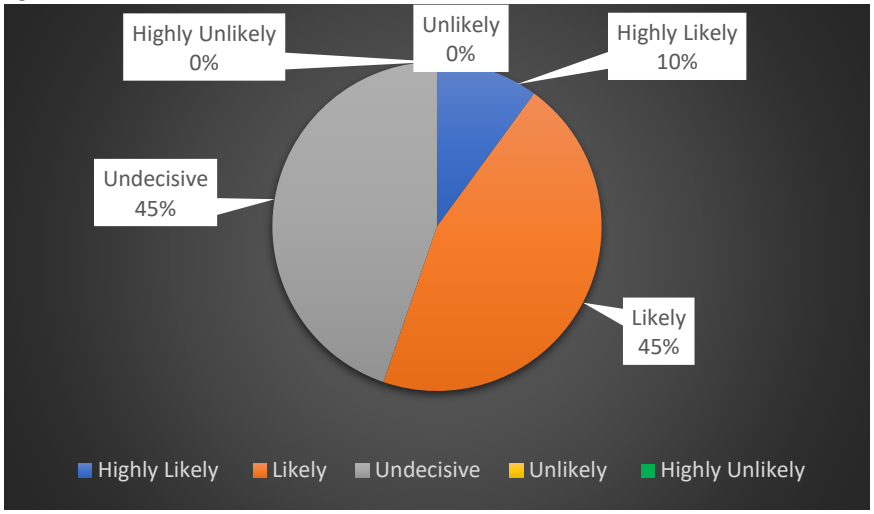
Figure 6-9: Results Part C / Question 5



Source: Author

With regard to the Secondary Customers Segment, 55% of answers were in positive opinion spectrum, with 45% undecisive answers and none of the answers in the negative spectrum of the opinion (i.e. "Unlikely" or "Highly unlikely").

Figure 6-10: Results Part C / Question 6



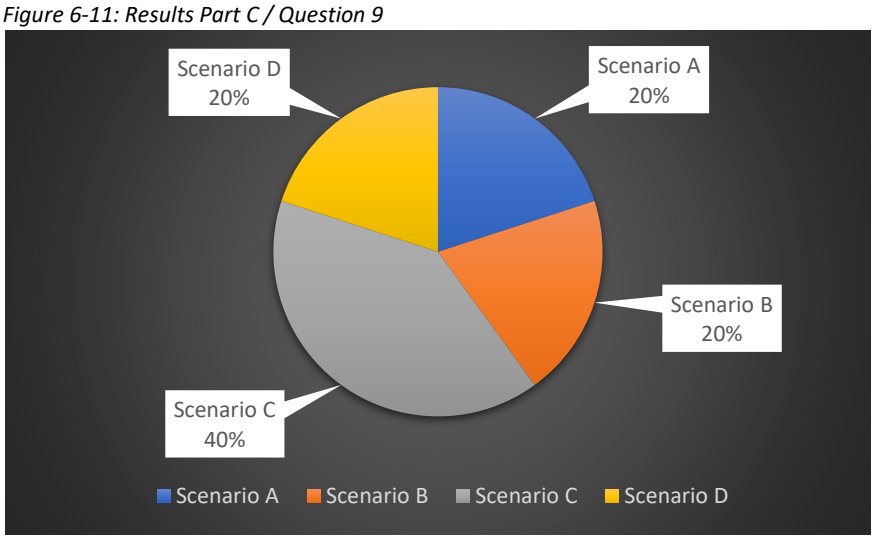
Source: Author

Four different scenarios depicting options how the NBM could be implemented as per different relationship modalities with Primary and Secondary Customers Segment, have been specified in the Questionnaire (Part C/Question 9). Experts were asked to rank them as per the probability of their realisation potential, with option to leave certain scenarios unranked if they perceive them to have the zero-realisation probability. Following scenario (Scenario C) was most frequently evaluated by the Expert Panel to have the highest realisation potential, with 40% of the experts ranking it on first place:

„Secondary Customer segment decides to use NBM service and requests Carriers to include NBM slots in Carrier's door-to-door supply chain. NBM has direct relation only with Carriers and containers are carried with Carrier's Bill of the Lading. Carriers maintain exclusive relations with their Customers (Shippers, FF, NVOCCs).“

Each of the remaining three scenarios was ranked to have the highest realisation potential with 22% occurrence.

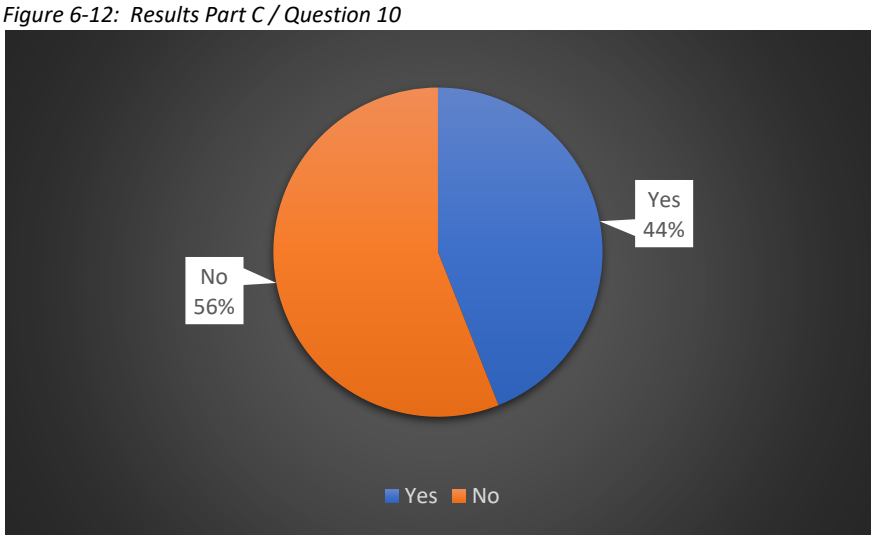
Figure 6-11: Results Part C / Question 9



Source: Author

Binary answer option was offered in question (Part C/ Question 10) about whether the experts find operational characteristics of NBM (as presented in the NBM Canvas) as sufficiently distinctive to consider NBM to be disruptive or innovative business model. 44% of experts provided positive answer, with 56% of negative opinions. Noteworthy opinion was provided by experts with whom the evaluation was performed in a form of an interview and that have selected the negative answer to this particular question. One expert has explained his negative answer with argumentation that main features of NBM have been implemented in the industry before (namely the principles of „shuttle lines“ and „common slot provider“), depicting the NBM to be the „Evolutionary Business Model“. The other expert confirmed this depiction, expressing the opinion about „NBM being the business model industry will eventually need to implement in order to achieve stabilization“.

Figure 6-12: Results Part C / Question 10



Source: Author

6.7 Conclusions about PART C of the Questionnaire (Impact and implementation potential of the NBM)

Task set to achieve in this section of the Questionnaire was to draw conclusions from the expert's evaluation about the impact that the NBM would have on the efficiency and performance of the Container Liner Industry as a whole, as well as to assess its implementation potential.

Based on the answers received from the Expert Panel to a direct question about the impact of the NBM (Positive 67%; Neutral 33%; Negative 0%), we infer that NBM was found to have positive impact on the efficiency and performance of the Container Liner Industry.

Regarding the implementation potential of the NBM, we infer conclusion that experts anticipate difficulties with the implementation activities. The evaluation is indicating that NBM's acceptance by Primary Customers Segment (Carriers) is perceived by the Expert Panel as challenging task. This conclusion is in line with author's anticipation of the Carrier's reluctance towards revision of their existing business model (see Ch 4.2.1, Stage 3, Customer Relationships). We further infer that scenario in which the NBM would be implemented in initial cooperation with Secondary Customer Segment (Shippers, FFs, NVOCCs) for the joint approach to Carriers with invitation to implement NBM in their operations, is perceived to have the highest realisation potential.

6.8 Analysis of the alignment with Design Science Research Guidelines

Chapter 2 (see Table 2-3) provides seven guidelines with the information about how to conduct, evaluate and present effective Design Science Research. We shortly elaborate how each of these seven guidelines has been addressed along the Design process of the artefact (NBM).

Table 6-1: Information about how the DSR Guidelines were addressed by the NBM

Guideline	Information about how the DSR guidelines were addressed by NBM
Guideline 1: Design as an artefact	Design Science Research produced artefact in the form of New Business Model for the Container Liner Industry.
Guideline 2: Problem Relevance	Design artefact developed conceptual solution for the improvement of highly relevant problems related to the evident inefficiency of the Container Liner Industry as a whole.
Guideline 3: Design Evaluation	Evaluation of the Design artefact was performed by the Expert Panel consisting of the experts with evident professional acumen.
Guideline 4: Research Contributions	Design science research produced new business model with a unique set of value propositions.
Guideline 5: Research Rigor	Construction of the design artefact was based on the knowledge base collected within the domain of both the scientific and industry specific expertise. Evaluation rigor was achieved with the definition of the requirements for the appropriate composition of the Expert Panel that has performed the evaluation of the design artefact (minimum panel size, participation of different stakeholders, evident industry experience and expertise, reassurance of the appropriate understanding of the design artefact).
Guideline 6: Design as a Search Process	Wide expert knowledge base (scientific and professional literature, market reports published across the stakeholder's spectrum, meetings with

	professionals with different experience and position within the industry) was used along the Design Science Research, thus utilizing the most actual/relevant problems of the industry for the construct of the design artefact. The applicability of the design artefact within the existing environment of the industry, was considered to be one of the key features to be achieved with new artefact, and therefore addressed in the design.
Guideline 7: Communication of Research	The results of the Design Science Research will be presented to the Expert Panel participants, with invitation for further interaction. As an academic paper, it will be made accessible to the interested audience. Study will also be disseminated among industry professionals as part of the argumentation material in the initial stage of the invitation to undertake further research in cooperative manner.

Source: Author

7 Conclusions

In this section we firstly define the answers to our Research Questions, and then the limitations of the study and recommendations for further research.

7.1 Research Questions and Conclusions

The research work performed in this study was driven by the main research question of how the current operational practices of the container liners can be changed to yield the new business model of improved efficiency for the industry as a whole.

Arising from the nature of the required research, the Design Science Research methodology was applied. It prescribes addressing of important unsolved problems in innovative way with task to generate more efficient artefact. In order to comply with the cycles (Relevance, Design, Rigor) and guidelines specified by the DSR for the effective design science research, we have additionally structured set of four research sub-questions.

First sub-question addressed the definition of main problems faced by the industry stakeholders. We defined two major stakeholder groups, namely the service providers and service takers, with Carriers and Shippers being the representative entities of each group, respectively. In line with DSR requirements, an extensive and diversified knowledge base was consulted and following set of eight problems was determined: *Market Concentration, Service Quality, Carrier's Financial Stability, Relationship Dynamics, Overcapacity, Competition Authorities, Service Commoditization, Transparency & Visibility*. Along the problem selection procedure, the aspect of the opportunity potential was taken in account, in sense that the problem simultaneously needed to represent the opportunity to improve performance efficiency of the industry.

Second sub-question sought information about performance indicators of relevance for the assessment of the logistic network efficiency from the perspective of each stakeholder. Findings of the research work indicate strong interconnection between the stakeholders, leading to the conclusion that it would be impractical to make such differentiation on the level of each stakeholder. Indicative example is the performance feature related to the financial performance of the Carriers. While this is, expectedly, on the top of the list from the perspective of the Carriers, the Shippers, simultaneously, refer to it as a highly important indicator. This is stemming from their concerns that poor financial status of the Carriers would incur profoundly damaging effects across the supply chains, (e.g. alike the setbacks experienced during the Hanjin's bankruptcy). Therefore, we concluded that answers to the second sub-question are best captured in the answers already provided in previous sub-question.

Third sub-question aimed to define the set of changes that can be introduced in order to benefit the stakeholders and increase overall business model efficiency. In accordance with procedures defined in the relevant scientific and management literature, we implemented the Prototyping technique for the design of the new business model. In the second stage of the prototyping process, we generated set of possible changes, which are explained in Section 4.2.1 and outlined by the following list: *Independent service provider, Shuttle Line service, Limited scope of activities, Limited market share capture, Service commoditization, Digitalization, New Gas Emission Rules.* These possible changes were taken as the input for the design process of the new artefact, which has subsequently yielded

the New Business Model for the Container Liner Industry (summarized in the form of the New Business Model Canvas in Section 4.3).

The fourth sub-question was generated to assess the implementation impact of the new business model. An attempt to assess the impact in a quantitative analysis in cooperation with Carriers has turned to be a non-doable option. Therefore, the qualitative analysis about the impact of the new business model was obtained from the Expert Panel, who expressed the opinion about positive impact of the new business model on the efficiency and performance of the industry.

Research work on answers to sub-questions, coupled with design process of the new artefact (the NBM) and findings collected during the evaluation process performed by the Expert Panel, enabled us to determine the answer to our Main Research Question. According to the results of this study, revision of the existing business model of the Container Liner Industry in accordance with the presented features of the design artefact (New Business Model), would yield operational landscape of improved efficiency for all stakeholders and the industry as a whole.

Therefore, the overarching conclusion we infer from this study is that implementation of the New Business Model, as set out in this study, would have positive impact on the performance and long-term stabilization of the Container Liner Industry.

7.2 Limitations and Recommendations

In this section we specify the limitations encountered in the study, as well as the recommendations for the further research work.

Evaluation process was performed by the Expert Panel of a limited size, namely nine experts. Moreover, the opinion of all stakeholders was not represented in the evaluation process since some of them did not accept to participate in the Expert Panel. Expert panel of a larger size, that would also collect the opinion of experts across the entire spectrum of stakeholders, would further increase the relevance of the study results.

Opinion of the experts expressed in the Evaluation process represented their private opinion, not the opinion of the companies or institutions they are related to. For further development of the NBM towards the implementation stage (as the ultimate goal of the DSR), the interaction with relevant stakeholders will need to be elevated to the level of corporative nature of their engagement.

Another noteworthy limitation is related to the fact that evaluation of the design artefact needed to be performed as a qualitative analysis, instead of the quantitative analysis as the originally preferred option. Reason for such preference was due to anticipation of highly engaged involvement of the key stakeholders (Carriers) with the activities related to the evaluation of the design artefact. Providing the positive findings of the evaluation process, that would yield high degree of interest among Carriers to undertake further steps towards the implementation of the NBM in their operations. Furthermore, we anticipated that results of the quantitative analysis will be perceived as more tangible by stakeholders, and therefore more efficient in subsequent interactions with them. Therefore, we recommend that pursuit to achieve conditions required for the efficient application of the quantitative analysis of the NBM (in cooperation with crucial stakeholders), is maintained in further work.

Results of the study well substantiate the hypothesis about positive impact (on the conceptual level) of the NBM on operational efficiency of the Container Liner Industry. Arising from that conclusion, we recommend further research work to be conducted. Notably, we propose dissemination of the study results among stakeholders, followed by the invitation to jointly launch further study work. Due to the

stakeholder's focus on business aspects of their activities, we propose to further structure NBM as a Business Case which is to be assessed by the joint Task Team (independent task team to be set up with each stakeholder or corporation). Special attention should be dedicated to the establishment of such cooperation with Carriers, as the Primary Customer Segment determined in this study. Given the positive results of the Business Case analysis, and their detailed insight in the NBM features collected during such activity, the NBM could quickly progress towards the realisation stage. Lessons learned along the work on this study should be well taken in account, namely, the reluctance of the Carriers (both anticipated and confirmed by the Expert Panel) to change existing business model. Therefore, further research activities are to include the scenario evaluated to have the highest realisation potential, which means to initially establish cooperation with Secondary Customers Segment and then jointly approach Carriers for the service launch in collaborative manner. Direct interaction (meetings, joint task teams etc.) with experts and corporations. is highly recommended approach, because the experience collected during evaluation process indicate that intricacy of the New Business Model will be better comprehended and more positively evaluated in case of such more engaging interaction.

Potential to further develop NBM in cooperation with Tonnage Providers requires equal degree of attention. New accounting rules (IFRS16) have introduced changes in traditional relationship dynamics between Tonnage Providers and Carriers, which creates opportunities for the NBM to be implemented in cooperation with Tonnage Providers. With NBM being, quintessentially, the operating platform, and Tonnage Providers acting purely in the asset domain, there is no overlap between the two, meaning that in combined effort, both parties can deliver all elements required for the launch of the NBM service.

Since further activities would dominantly be conducted under the realm of the business domain, we end the study by allocating the distinguished name to the proposed Business Case, namely the ***Clean Air Bridges - CABS***. Underlying logic is for such name to capture the crucial features of the NBM. In this case the “Clean Air“ part indicates best performing service in terms of gas emissions (as the increasingly important service feature). The part „Bridges“, depicts the NBM's shuttle service principle which directly connects two hub ports (effectively acting as Sea-Bridges), in similar way as bridges provide the shortest connection between two particular landmarks. Moreover, bridges enable access to the transportation service to all willing to use them, which resembles the principle of the „independent common slot providing service“ incorporated in the features of the NBM.

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Appendices

I. Questionnaire Sample

QUESTIONNAIRE

The purpose of this Questionnaire is to evaluate the Design Artefact of this study (New Business Model for the Container Liner Industry) as part of the process prescribed by the selected research methodology, i.e. the Design Science Research.

CONFIDENTIALITY

Please note that all data and information collected from experts in this evaluation process will be treated with confidentiality and will not be disclosed to third parties or used beyond the scope of the academic work related to this thesis. Furthermore, information and opinions expressed by the participants will be considered to be their personal opinion, not the opinion of the company or institution that experts are currently engaged with (through employment or in any other way).

PART A: Participant details

1. **Name:**

_____

2. **Please indicate whether you are:**

1. Carrier	☐
2. Shipper	☐
3. Freight forwarder	☐
4. NVOCC	☐
5. Consultant	☐
6. Tonnage Supplier	☐
7. Other (please specify)	☐

3. **Please indicate number of years of your professional experience in the container shipping industry:**

_____

4. **Which company or institution are you currently engaged with within container shipping industry?**
Note: In case you are currently not actively engaged with the container liner industry (e.g. retirement, change of shipping sector, professional exit from shipping industry etc.), please specify most significant company or institution you were engaged with in the past.
Company/Institution details:

_____

5. **What is your current position within that Company/Institution?**
Note: In case of currently non-existing relation with container shipping industry, please indicate your most significant position in the past:

PART B: Current problems and opportunities for the improvement within the industry

Study has detected pool of eight major Problems within the container shipping industry that simultaneously represent the Opportunity in terms of the improvement potential. Table listing detected Problems and Opportunities (P&O) is herewith repeated:

SEGMENT	P&O
MARKET CONCENTRATION	Oligopolization / Market concentration
	Absence of independent service providers
SERVICE QUALITY	Reduced frequency
	Increased transit times
	Reduced reliability
	Reduced predicability
	Increased holding stocks
CARRIER's FINANCIAL STABILITY	Poor financial results (EBITDA)
	Highly leveraged carriers
	Poor shareholders returns
	Exposure to asset impairment
RELATIONSHIP DYNAMICS	No show
	Overbooking
OVERCAPACITY	Overcapacity persistance
	Orders driven by contestability
COMPETITION AUTHORITIES	Increased scrutiny of carriers
	Limited potential for further consolidation & cooperation
SERVICE COMMODITIZATION	Increased service commoditization
	Decreased potential for service differentiation
TRANSPARENCY & VISIBILITY	Reliability of bookings and access to booked slots
	Freight rate definition visibility

1. **How well do you think this pool of problems describes the issues industry is currently facing (mind that search was focused on problems that simultaneously represent the opportunity in terms of the improvement potential)?**

a. Completely (all issues of crucial influence are listed)	☐
b. Moderately (major crucial issues listed but some, with equal degree of relevance, are omitted)	☐
c. Neutrally (listed issues do not adequately depict the major problems, nor they are incorrectly specified)	☐
d. Moderately Incorrect (few of the listed problems are of relevance but most of the problems are irrelevant)	☐
e. Completely Incorrect (none of problems listed is of crucial relevance for the performance of the industry)	☐

2. **Do you think that additional problems (with similar degree of influence) should be added to the list?**

Yes	No
☐	☐

If Yes please explain:

3. **Do you think that current problems within the industry can be explained with usual dynamics of the shipping cycles (meaning that identified problems would be eventually resolved on their own with cycle upturn), yielding the stabilization of the industry within the existing business model of the container liner companies?**

Yes	No
☐	☐

4. **Would you agree that reduced demand for the container shipping capacities registered over the course of last decade (average 3,8% annual demand growth as opposed to double digit (>10%) annual demand growth before year 2008) represents the "New Normal" growth rate?**

Yes	No
☐	☐

5. **Which degree of the influence do you think that such unprecedent reduction of the demand growth has on the existing Business Model of the Container Liner Industry?**

a. Significant (it is one of the quintessential factors affecting the efficiency of the existing BM of Carries)	☐
b. Moderate (it is diminishing the efficiency of the existing BM but not crucially)	☐
c. Insignificant (it is not affecting the efficiency of the existing BM)	☐

6. **Do you think that existing business model of the container liner industry will need to be redesigned in order to resolve detected problems and achieve long term stabilisation of the industry?**

Yes	No
☐	☐

If "No", please describe shortly how the long-term stabilization of the industry would best be achieved within the existing BM:

7. **Besides the problems defined in the table (see above), thesis defines some of the arising issues the industry is facing (namely: Digitization, New Accounting Rules IFRS 16, and New Gas Emission Rules), which are also indicating the need for the revision of the existing business model.**
   a) **Do you find it justified to include these additional issues in the design process of the New Business Model?**

Yes	No
☐	☐

If No, please specify which additional issue should not be included:

   b) **Do you think that some further issues (not specified above) are of such relevance for the future of the industry that they should be added to that list of arising items?**

Yes	No
☐	☐

If yes, please specify which:

PART C: Impact and implementation potential of the NBM

NBM was designed as the artefact of this research and its characteristics are presented in NBM Canvas (attached to this questionnaire). NBM features are also explained in Chapter 4.2.1 and herewith is added the short outline explaining how NBM addresses the particular P&O detected. (For more detailed explanation of NBM's features please see Chapter 4.2.1. Protoyping).

SEGMENT	P&O	NBM FEATURES
MARKET CONCENTRATION	Oligopolization / Market concentration Absence of independent service providers	➢ Independent common service provider; ➢ No Alliance membership or VSAs; ➢ Captured market share will reduce existing market concetration levels;
SERVICE QUALITY	Reduced frequency Increased transit times Reduced reliability Reduced predicability Increased holding stocks	➢ Shuttle line service (with conveyer belt principle) between pair of hub ports ➢ Shortest possible route with shortest transit time, reduced holding stocks and increased service quality (reliability, predictability) ➢ Reduced voyage complexity (no multi-port calls, no restowes, no blank sailings)
CARRIER's FINANCIAL STABILITY	Poor financial results (EBITDA) Highly leveraged carriers Poor shareholders returns Exposure to asset impairment	➢ NBM's tonnage enables asset lighter operations of Carriers ➢ Deleveraged balance sheet of Carriers ➢ Improved financial results, credit rankings and shareholder's returns ➢ Risk of asset impairments transferred to NBM entity
RELATIONSHIP DYNAMICS	No show Overbooking	➢ Guaranteed slot position for booked slots ➢ Possibilty to further trade (or swap) booked slots ➢ Contract flexibility allowing for adjustment of actual quantity of slots used per voyage ➢ Digital booking platform based on Yield Management pricing
OVERCAPACITY	Overcapacity persistance Orders driven by contestability	➢ NBM operates independent fleet of ULCS vessels ➢ Enables access to capacities of lowest unit cost to all Carriers at equal terms ➢ Establishes ordering discipline among Carriers, reduces contestability
COMPETITION AUTHORITIES	Increased scrutiny of carriers Limited potential for further consolidation & cooperation	➢ Independent operator ➢ Reduced market concetration decreases scrutiny ➢ Generates potential for further consolidation among Carriers (M&A)
SERVICE COMMODITIZATION	Increased service commoditization Decreased potential for service differentiation	➢ Maximized service simplification (deep-sea shuttle service between two ports) further increases degree of the service commoditization ➢ Use of NBM's capacities will enable Carriers to focus on service differentiation (and service quality delivered to their customers) in other segments of their door-to-door supply chain
TRANSPARENCY & VISIBILITY	Reliability of bookings and access to booked slots Freight rate definition visibility	➢ Full visibility about slot availability (booked/available) will be provided through Digital Booking Platform (in real time) ➢ Precise slot position allocation (and access to the same) will be guaranteed to customer ➢ Transparent/algorithmic determination of the service pricing (pegged to a route specific indices and fuel prices) will be visible on booking platform

1. **Do you think that cumulative characteristics of the NBM will effectively improve/mitigate defined problems that industry is facing?**
   (1) Significantly improve / (2) Moderately improve / (3) Neutral effect / (4) Moderately deteriorate / (5) Severely deteriorate

(1)	(2)	(3)	(4)	(5)
☐	☐	☐	☐	☐

2. **Do you think that some of detected problems will not be effectively improved by the implementation of the NBM?**

Yes	No
☐	☐

If yes, please specify which problem(s) and shortly explain why not:

3. **Providing the efficient operational implementation of the NBM, how would you assess the overall impact of the NBM on the existing Business Model of the Container Liner Industry and its performance results?**
(1) Highly positive/ (2) Positive/ (3) Moderately positive/ (4) Neutral (no effective change)/ (5) Negative

(1)	(2)	(3)	(4)	(5)
☐	☐	☐	☐	☐

If offered answers do not (sufficiently or at all) represent your opinion, please explain the NBM's impact on existing business model in your own words:

4. **NBM Canvas is attached to this questionnaire. Do you find NBM Canvas to be sustainable?**
(1) Sustainable / (2) Moderately sustainable / (3) Neutrally / (4) Moderately unsustainable / (5) Unsustainable

(1)	(2)	(3)	(4)	(5)
☐	☐	☐	☐	☐

5. **How would you assess the potential of the NBM service to be accepted by the Primary Customers Segment (Carriers)?**
(1) Highly likely / (2) Likely / (3) Undecisive (imposible to predict) / (4) Unlikely / (5) Highly unlikely

(1)	(2)	(3)	(4)	(5)
☐	☐	☐	☐	☐

6. **How would you assess the potential of the NBM to be implemented by the Secondary Customers Segment (Shippers, Freight Forwarders, NVOCCs)?**
   (1) Highly likely / (2) Likely / (3) Undecisive (imposible to predict) / (4) Unlikely / (5) Highly unlikely

(1)	(2)	(3)	(4)	(5)
☐	☐	☐	☐	☐

7. **If your unswers to questions C5 and C6 include responses „Unlikely" and Highly unlikely", can you detect the major obstacles due to which the NBM will be difficult for Customers to accept?**

Yes	No
☐	☐

If yes, please specify and explain:

8. *Scenario in which Carriers would implement NBM may be anticipated to be the optimal way to launch the NBM service. Besides overall benefits (as presented in Canvas, table in question C1 of this questionnaire and Chapter 4.2.1.), NBM also encompasses additional features that are deliberately incorporated to distinct NBM's Value Proposition from the one offered by Carriers, namely:*

- *Limited scope of services (only deep-sea service, no containers are owned, leased or operated by NBM entity)*
- *Limited market capture (arbitrary set target in range of 10% - 20% market share; Carriers still operate own fleets but in asset-lighter mode)*
- *Carriers maintain direct relation with their customers (they can carry containers under their own Bill of Lading on the NBM slots used)*
- *Carriers provide the entire scope of international door-to door supply chain directly to their customers (by deep sea service with NBM slots or own fleet + bundle of other (20+) logistics services with higher margins than in sea transportation part)*
- *Coopetition principle applied - Cooperation with Carriers instead of Competition*

Do you find all combined benefits of the NBM to be sufficiently attractive for Carriers to implement NBM in their operations and start using its service?

Yes	No
☐	☐

If your answer is „No“, could you define what additional features may be implemented within the NBM to increase its attractivness and achieve Carrier's acceptance?:

9. There are four different scenarios specifed below. Please rank them as per the probablity of their realization potential.
   (Note: Number 1 depicts the highest realization probablity, 4 the lowest, if you think that any particular scenario has zero realization probablitiy, please insert „0“ next to it and adjust accordingly the order number for the lower probabbility scenarios, e.g. if one scenario is marked with „0“, the lowest rank could be 3 etc.).

   a) **Carriers implement NBM in their opeations and are served as exclusive Customer Segment by the NBM (NBM has exclusive relation with Carriers who maintain direct relation with their customers – Shippers, FFs, NVOCCs)**

(0)	(1)	(2)	(3)	(4)
☐	☐	☐	☐	☐

   b) **Secondary Customer segment (Shippers, FFs, NVOCCs) uses NBM service as exclusive customer segment (direct relation between NBM entity and Secondary Customer segment (NBM issues its own Bill of Lading, Secondary Customers use 3PL/4PL/Carriers for other services in door-to-door supply chain except for the NBM slots on deep-sea routes).**

(0)	(1)	(2)	(3)	(4)
☐	☐	☐	☐	☐

   c) **Secondary Customer segment decides to use NBM service and requests from Carriers to include NBM slots in Carrier's door-to-door supply chain. NBM has direct relation only with Carriers and containers are carried with Carrier's Bill of the Lading. Carriers maintain exclusive relations with their Customers (Shippers, FF, NVOCCs).**

(0)	(1)	(2)	(3)	(4)
☐	☐	☐	☐	☐

   d) **Simultaneous and separate use of NBM's service (deep-sea slots) by Primary and Secondary Customer Segment (NBM entity has direct and separate relation with Carriers and Secondary Customer segment, Carriers and Secondary Customers segment may independently cooperate on other services required within door-to-door supply chain).**

(0)	(1)	(2)	(3)	(4)
☐	☐	☐	☐	☐

10. Do you find operational characteristics of NBM (as presented in the NBM Canvas) to be sufficiently distinctive to consider NBM to be disruptive or innovative business model?

Yes	No
☐	☐

Thank you!

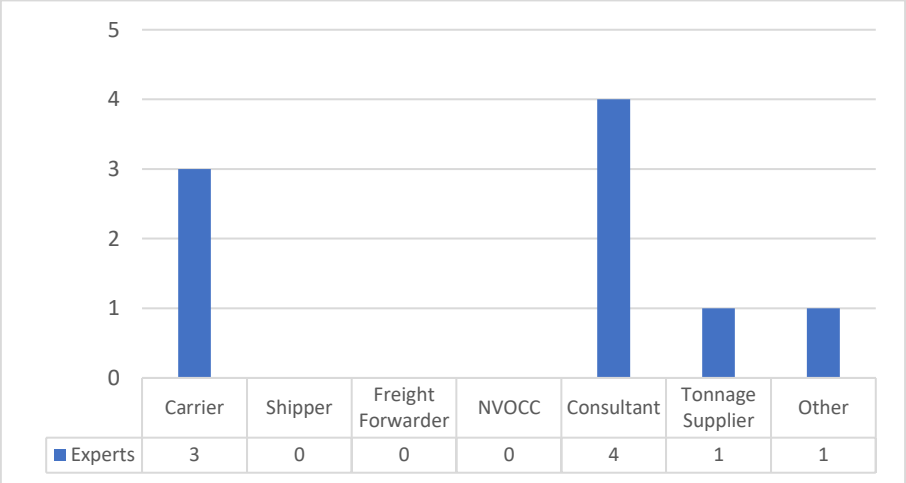
Please indicate whether you would like to receive the report about results of the evaluation procedure performed by the Expert Panel.* ***If yes kindly provide a contact email:*

Please indicate whether you would like to receive copy of the completed thesis.* ***If yes kindly provide a contact email:*

II. Results of the Expert Panel Evaluation

PART A: Participant details

2. Please indicate whether you are: Carrier, Shipper, Freight forwarder, NVOCC, Consultant, Tonnage supplier, Other



Notes:

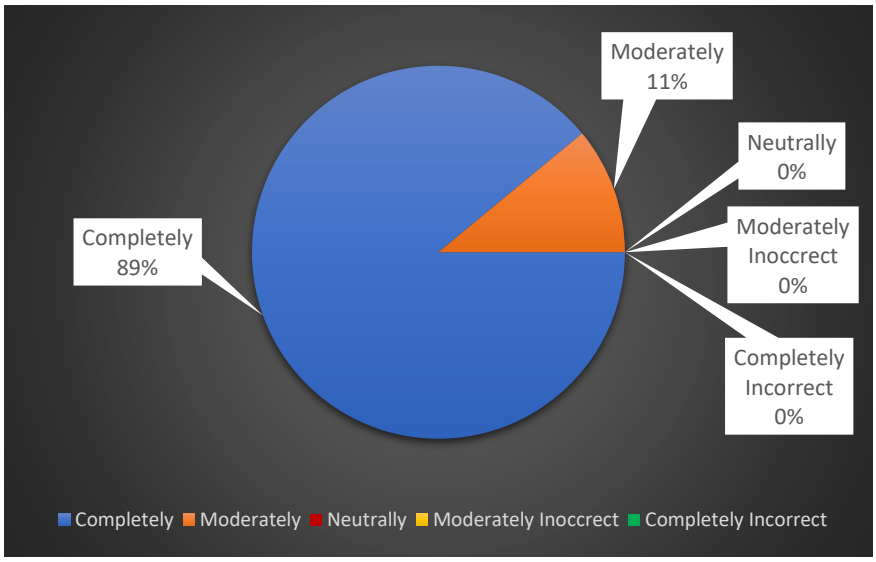
3. *The expert who has selected the category "Other" has defined himself as "End-to-end Logistics Solution Provider", due to his position with the specialised Logistics unit owned and operated as the integral part within the corporate structure of one of the major Carriers.*
4. *One of the experts had both the experience of the Carrier and Tonnage Supplier, since the former prevails in terms of employment experience, he has identified as Carrier.*

3. Please indicate number of years of your professional experience in the container shipping industry:

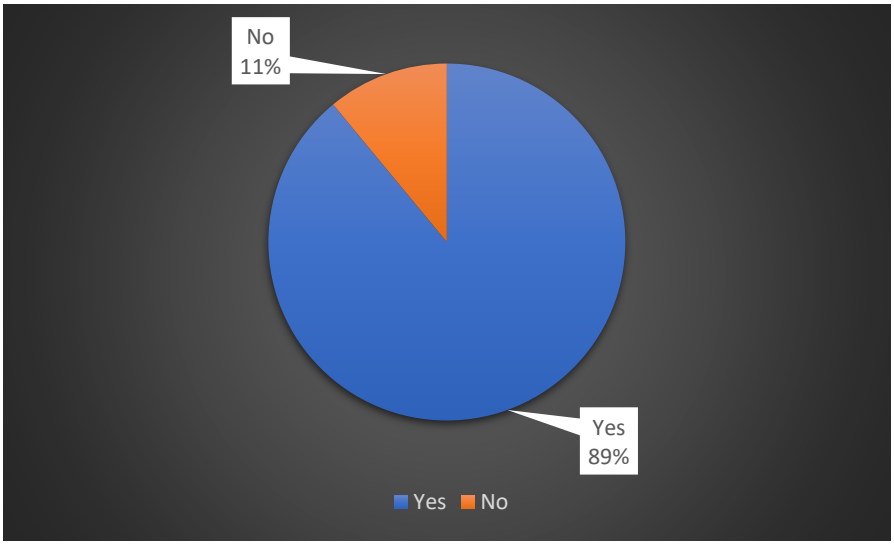
Average experience in the Container Liner Industry of the Expert Panel participant: **22,8 years**

PART B: Current problems and opportunities for the improvement within the industry

1. **How well do you think this pool of problems describes the issues industry is currently facing (mind that search was focused on problems that simultaneously represent the opportunity in terms of the improvement potential)?**



2. **Do you think that additional problems (with similar degree of influence) should be added to the list?**



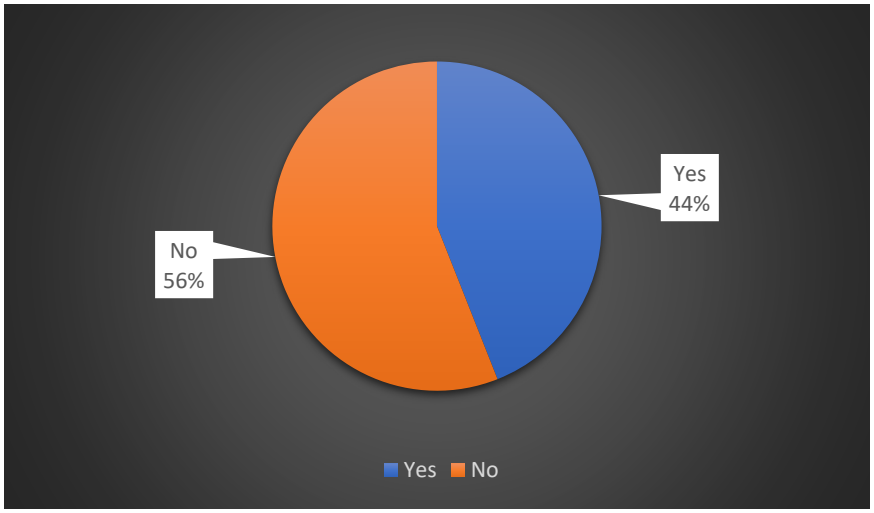
If Yes please explain:

- Economies of scale: immediate cause of the overcapacity
- Concentration: needs to increase to achieve market stability
- Globally/geopolitically unstable conditions
- New shipping regulations
- State/Government involvement in carriers' activities which create unfair level playing fields
- The shipping industry is facing disruption from technology start-ups like Freightos, Flexport, 300cubits which are asset light, have a lower or more efficient cost of operations per unit

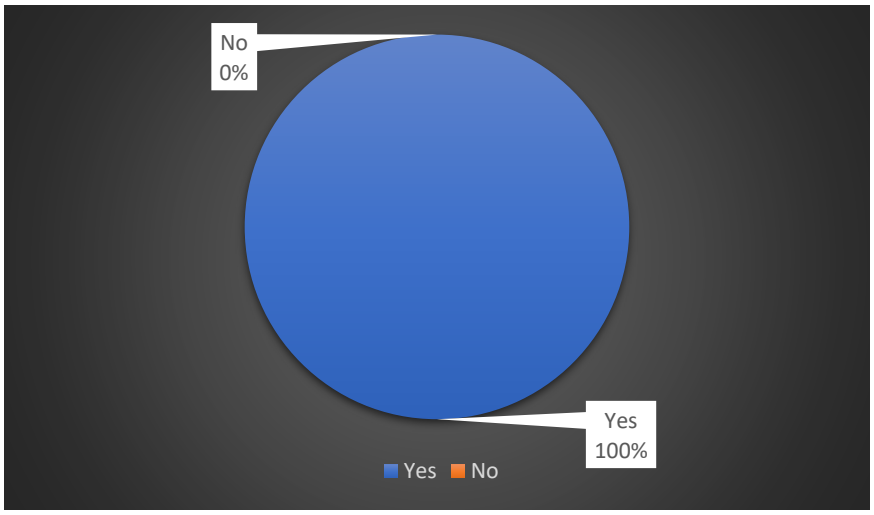
revenue and are plugged into the larger transportation network (air freight, sea freight, land transport) providing more flexibility and reliability for customers.

- "Digitization" and 'big data' management e.g. block chain.
- Sustainability/Decarbonization: Awareness that the shipping industry in due course needs to become CO2 Neutral (see commitment Maersk start 2030 / done 2050)
- Security: Number of parties involved in supply chains is high which is considered a risk
- Forecasting: Difficulty in improving predictability of goods flows, bookings on sailings and market demand
- Lack of Infrastructure: Ships continue to grow; difficulty to receive these vessels will lead to congestion, especially an issue in developing areas, incl. India/Bangladesh, China
- Industry has the "zero sum" nature (practically, any improvements/savings achieved by Carriers are passed on to Shippers).
- Industry is not purely driven by the economic rationale, some companies are including state policies in their strategies (e.g. Cosco, HMM).
- Excess capacity driven by pursuit of economies of scale in ordering large vessels
- Failure to grasp opportunities to provide an integrated supply chain service to cargo owners leading to commoditization of liner product

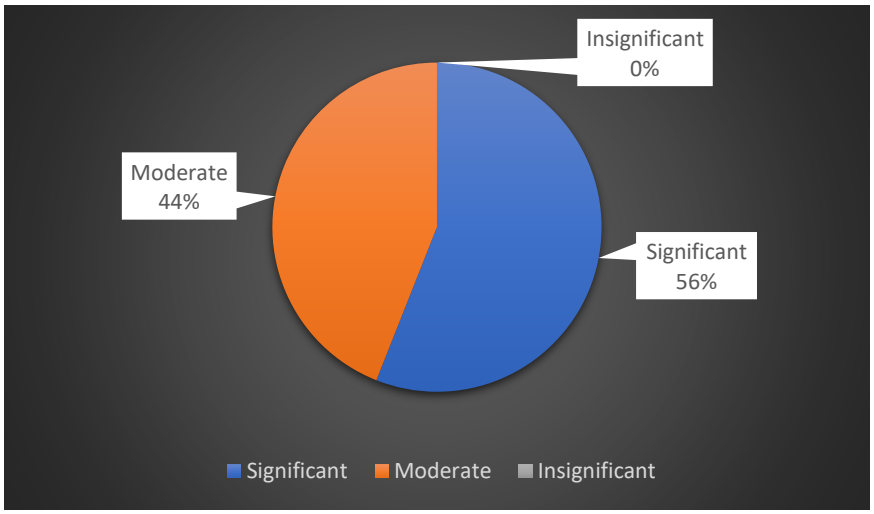
3. **Do you think that current problems within the industry can be explained with usual dynamics of the shipping cycles (meaning that identified problems would be eventually resolved on their own with cycle upturn), yielding the stabilization of the industry within the existing business model of the container liner companies?**



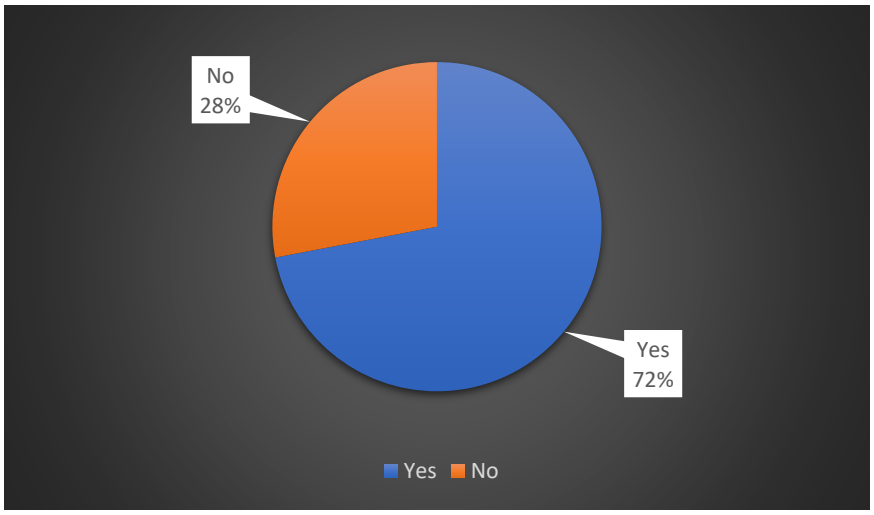
4. **Would you agree that reduced demand for the container shipping capacities registered over the course of last decade (average 3,8% annual demand growth as opposed to double digit (>10%) annual demand growth before year 2008) represents the "New Normal" growth rate?**



5. **Which degree of the influence do you think that such unprecedent reduction of the demand growth has on the existing Business Model of the Container Liner Industry?**



6. **Do you think that existing business model of the container liner industry will need to be redesigned in order to resolve detected problems and achieve long term stabilisation of the industry?**

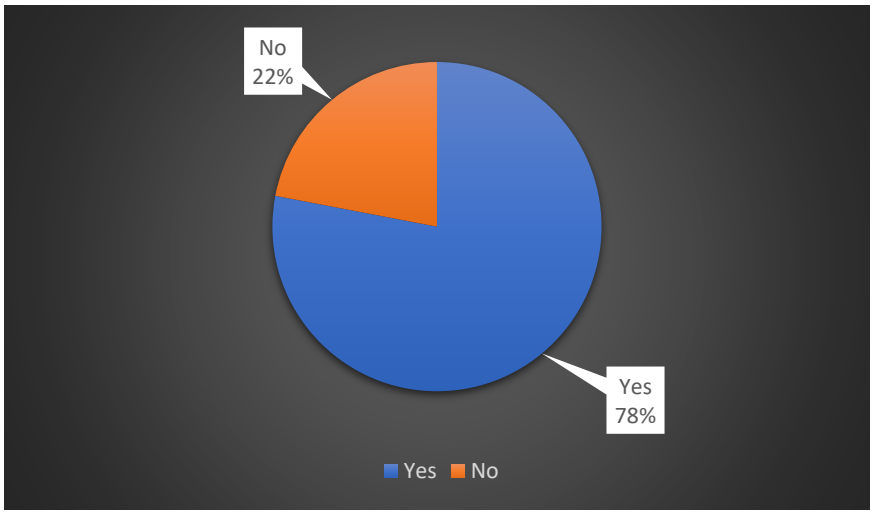


If "No", please describe shortly how the long-term stabilization of the industry would best be achieved within the existing BM:

- State related subsidies/support to carriers should be remove for carriers to make decision based on commercial merits. Then the natural system of demand and supply will regulate the up and down of the industry.
- Difficult to give a yes/no answer to this.
  Within the present business model, long term stabilization is only likely to be achieved with a highly concentrated industry, which delivers a commoditized product at lowest cost – the value added side of the business is left to asset light supply chain service providers which capture the value added part of the logistics business. The alternative is that container operators change their business model to pursue a more integrated product – as Maersk and CMA CGM appear to be attempting.
  Which is the likely or preferable outcome is unclear at present
- Two key factors:
  Economies of scale: Must run out, will reduce overcapacity
  Industry concentration: Need to continue until we have 5-6 mega Carriers

7. **Besides the problems defined in the table (see above), thesis defines some of the arising issues the industry is facing (namely: Digitization, New Accounting Rules IFRS 16, and New Gas Emission Rules), which are also indicating the need for the revision of the existing business model.**

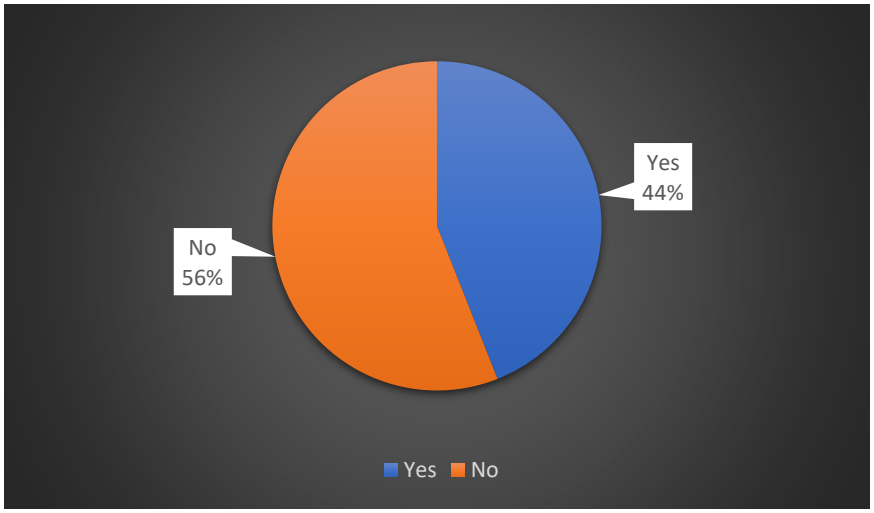
a) **Do you find it justified to include these additional issues in the design process of the New Business Model?**



If No, please specify which additional issue should not be included:

- New Accounting rules and New Gas Emission rules as they apply to all carriers.
- New Accounting Rules IFRS 16 should be excluded (low degree of influence).
- I have my doubts about new gas emission rules, if this is intended to cover IMO2020 – this has an impact on cost, but is hardly a game changer – it will have a short term impact on costs, but the industry has coped with high bunker prices before without changing the business model – but see my comment below on CO2 emissions – which not covered by IMO 2020

b) **Do you think that some further issues (not specified above) are of such relevance for the future of the industry that they should be added to that list of arising items?**



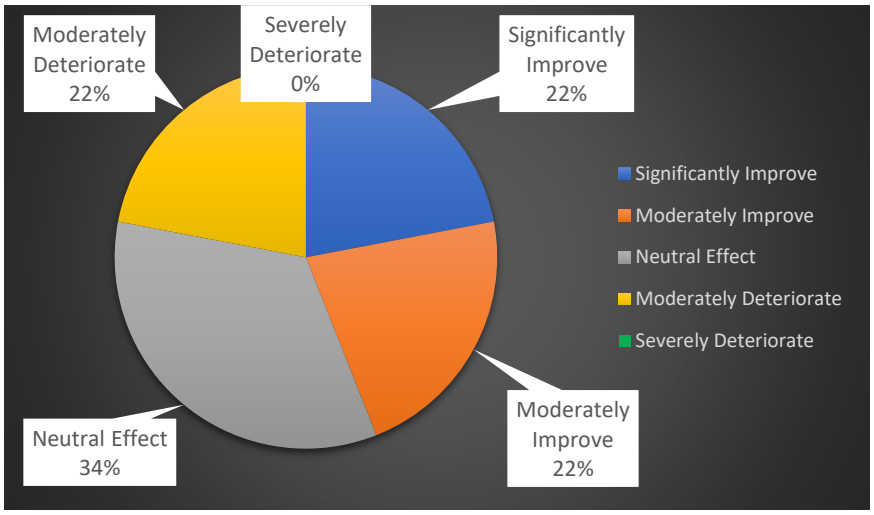
If yes, please specify which:

- Terminal Operators should be involved so that NBM efficiently service them as well.

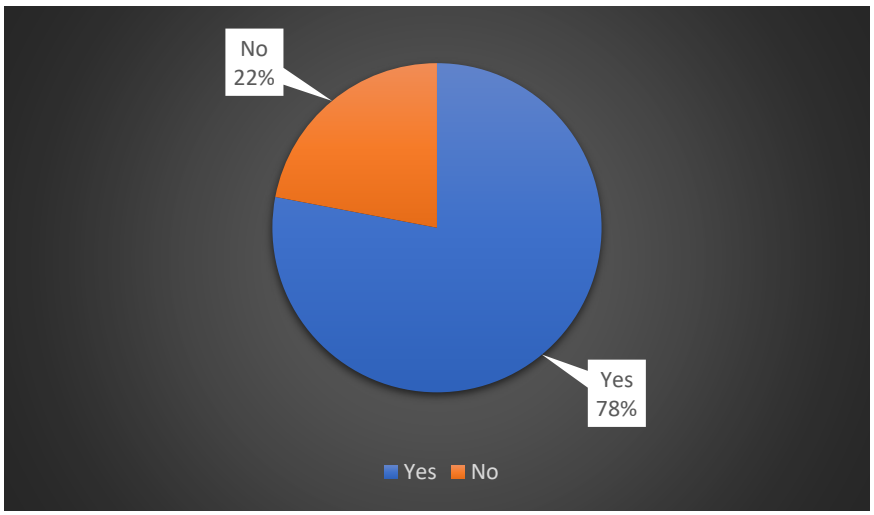
- Request from shippers / consignees for more transparency and predictability, lower transit times and more choice in sailings
- Influence of political drivers on business strategies of certain stakeholders.
- Increasing volume of Carriers' involvement with other activities, i.e. logistics and terminal business.
- Eventually the industry will have to face up to the need to significantly reduce CO2 emissions, if it is not to be branded as an industry which is failing to contribute to Paris Agreement goals. This will require more significant changes, both technologically, but also how supply chains are managed. Port to port liner services burning fossil fuel will not fit into a model which is aligned with Paris Agreement goals

PART C: Impact and implementation potential of the NBM

1. **Do you think that cumulative characteristics of the NBM will effectively improve/mitigate defined problems that industry is facing?**



2. **Do you think that some of detected problems will not be effectively improved by the implementation of the NBM?**

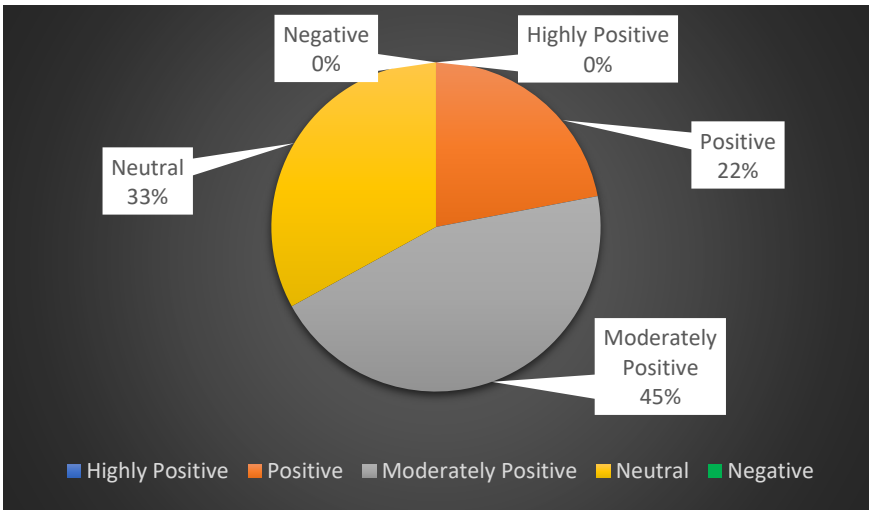


If yes, please specify which problem(s) and shortly explain why not:

- Overcapacity – providing that NBM does not need to order new fleet.

- There will be carriers who will not want to give up controls the main traffic sectors.
- There is an imbalance between strings coming from Asia to Europe/USA and the return string. Question is if this imbalance allows for feasible operation of the service
- Overcapacity – new fleet for NBM service, where and how to deploy existing vessels?
- If the NBM runs alongside the existing Alliance structure, it is not clear how it will reduce overcapacity, or improve service parameters. Lines will find it hard to manage sourcing their capacity through two channels. Relationship dynamics unlikely to be improved (but also not worsened) – this depends on the willingness of carriers and their customers to develop new contractual models, and cannot see how the NBM will help or hinder this
- Overcapacity: How the new independent service provider will not add capacity?
- Increased T/T: Carriers already have bullet service (only hub callings)
- Limited potential for consolidation: How will this change?
- Concertation: Needs to increase
- Overcapacity: Might increase

3. **Providing the efficient operational implementation of the NBM, how would you assess the overall impact of the NBM on the existing Business Model of the Container Liner Industry and its performance results?**



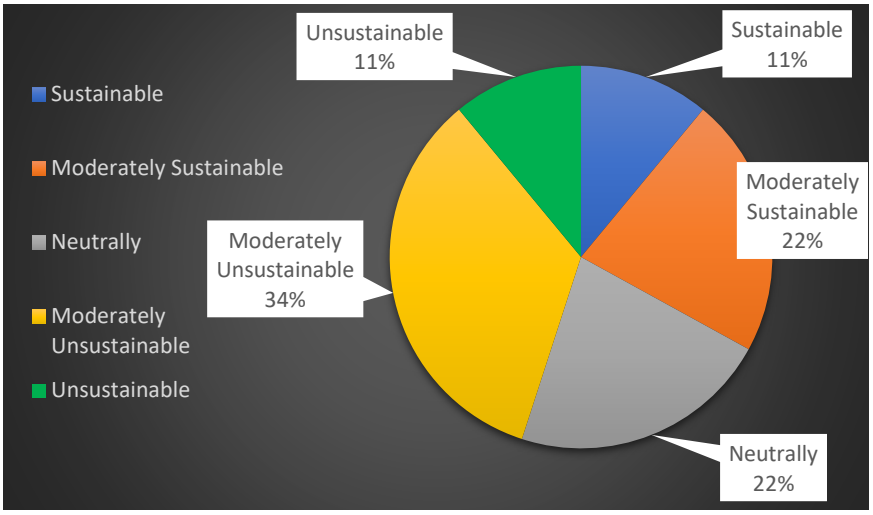
If offered answers do not (sufficiently or at all) represent your opinion, please explain the NBM's impact on existing business model in your own words:

- Carriers who do not subscribe to the NBM will see NBM as another competitor. And therefore, do not necessary remove the competitive forces that has gotten to its current issues.
- There will be higher positive impact for Carriers that would use NBM and less for those who would not use it, so moderately positive in average.
- As I see it, the difficulty with the NBM is that it doesn't replace the current 'Alliance' model but sits alongside it. It therefore increases complexity for the lines, and it is hard to see why they would take this route. There is an intellectual argument for using the NBM to completely replace the current three Alliance structure. There would be a single service provider which would provide lowest cost/highest frequency services, and the liner companies would then essentially become NVOCCs -buying space and focusing on the value added business. The difficulties with this are:

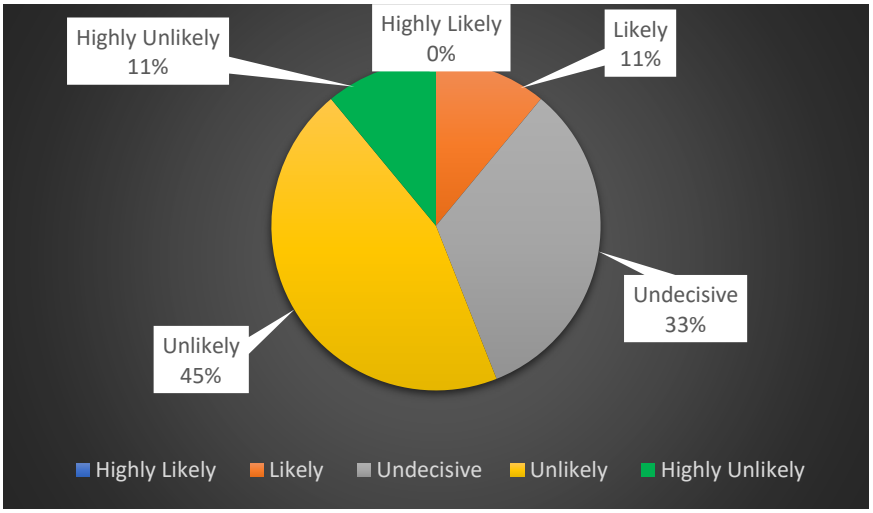
It would be an anathema to competition authorities, who seem determined to maintain the three Alliance structure.
It is unclear the shippers would think that the benefits of a higher frequency services would outweigh the risks of a monopoly service provider (remember that shippers didn't buy into the benefits of 'daily Maersk')
The liner companies themselves are structured as asset owners/providers – it would take a mindset change for them to want to divest their assets and become another Kuehne and Nagel – and arguably they lack the organization and management skills to make the change (which is probably when CMA CGM are investing in CEVA as part of their business integration strategy – but they are not leaving the liner business side of their business behind.)

- NMB can only provide partial coverage of deep-sea capacity. Alliances will have to continue. Hub to hub services are not enough. Port ranges have not declined as vessel sizes have risen.

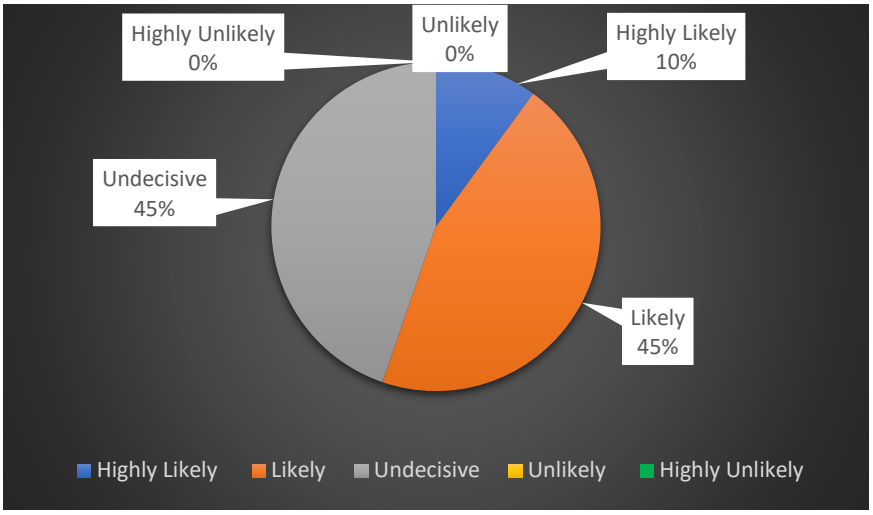
4. NBM Canvas is attached to this questionnaire. Do you find NBM Canvas to be sustainable?



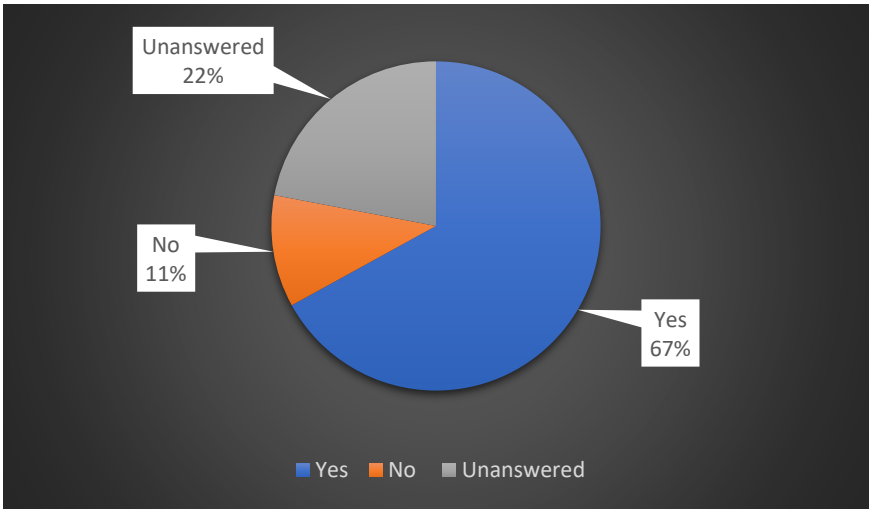
5. How would you assess the potential of the NBM service to be accepted by the Primary Customers Segment (Carriers)?



6. **How would you assess the potential of the NBM to be implemented by the Secondary Customers Segment (Shippers, Freight Forwarders, NVOCCs)?**



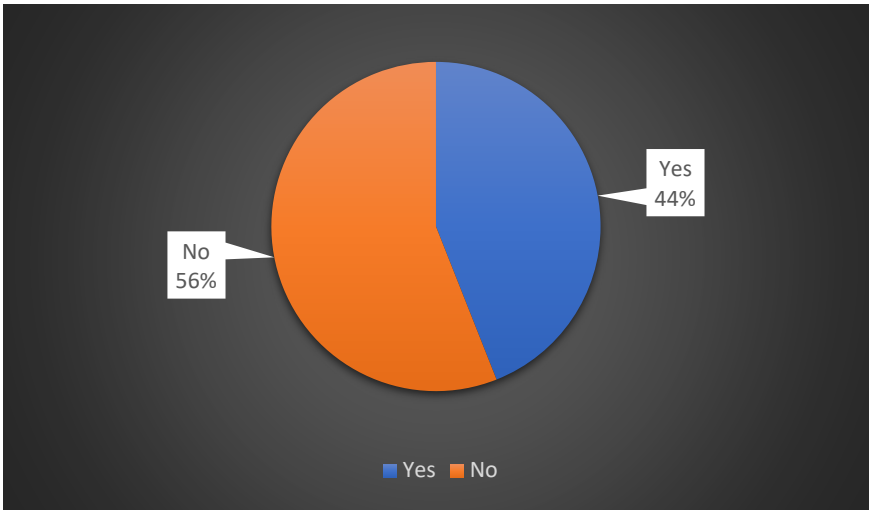
7. **If your unswers to questions C5 and C6 include responses „Unlikely“ and Highly unlikely“, can you detect the major obstacles due to which the NBM will be difficult for Customers to accept?**



If yes, please specify and explain:

- Carriers will likely see NBM as a competitor.
- Vested interest in current ships and carriers not willing to give up the mainhaul carriage
- What would Carriers do with existing vessels?
- Reasons why carriers unlikely to accept is that it is not clear where they would see the benefits of buying space from an NBM alongside their present VSA /Alliances. Secondary Customers are harder to predict; cargo owners could see an alternative channel as being disruptive if the NBM was prepared to offer rates to BCOs, rather than just selling to lines; NVOCCs could see this as an opportunity to take liner operators right out of the value-added business. But first the NBM has to get liners' buy in, and not clear to me how this will happen.
- NVOCCs will have to manage their own box fleets.
- It seems highly optimistic that the NBM can facilitate the "needs" and different mentalities of Carriers under the same vessel. It will be too hard to get them onboard and have smooth operations.

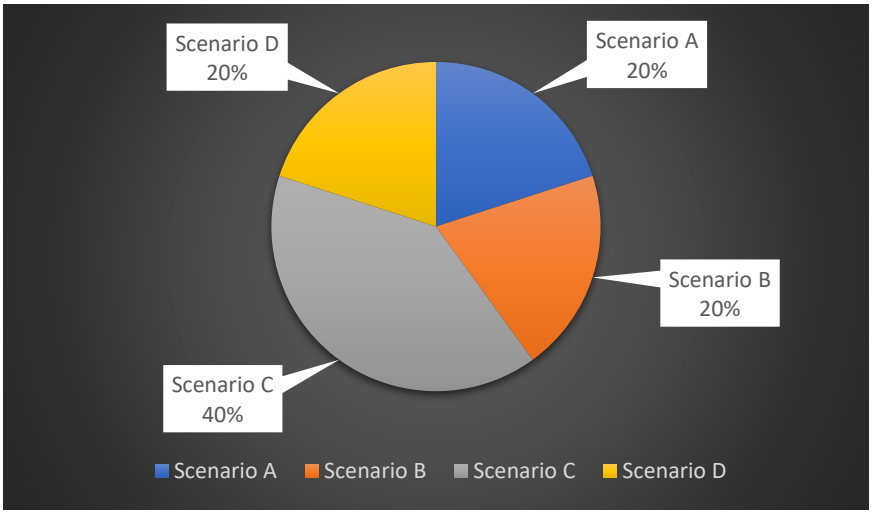
8. **Do you find all combined benefits of the NBM to be sufficiently attractive for Carriers to implement NBM in their operations and start using its service?**



If your answer is „No“, could you define what additional features may be implemented within the NBM to increase its attractivness and achieve Carrier's acceptance? :

- This model basically brings the carriers closer to being a forwarder.
- Geo-political issues e.g. China’s view on production + logistics instead of production alone.
- Though Carriers will be economically better off, answer “No” is selected because there are additional drivers involved, e.g. similar to feeder services in EU, despite higher efficiency of feeder service provided by 3rd parties, Carriers would like to self-operate vessels in order to be able to better control their future.
- I’m unconvinced as to why carriers will prefer buying space from an NBM rather than sourcing through an Alliance which they control themselves.

9. **There are four different scenarios specifed below. Please rank them as per the probablity of their realization potential.**



10. Do you find operational characteristics of NBM (as presented in the NBM Canvas) to be sufficiently distinctive to consider NBM to be disruptive or innovative business model?