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MASTER THESIS

THE POTENTIAL IMPACT OF THE PANDEMIC ON NORTH EUROPE - ASIA CONTAINER TRAFFIC

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ABSTRACT

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The purpose of this master thesis is to study the impact of the new coronavirus infection, which began in 2019, on container flows between two regions: Northern Europe and Asia. The COVID-19 impact is assessed in various aspects, firstly, from the point of view of market changes by modes of transport, secondly, from the adaptation business activities. The coronavirus pandemic is a relatively new disease and is proceeding vastly different from what it was before, such as severe acute respiratory syndrome or national epidemics in Africa like malaria, maternal and infant mortality, etc. The experience of previous studies cannot be fully applied to the coronavirus pandemic, and those studies that have appeared recently do not reflect the specifics of the container business in Northern Europe and future prospects of cargo flows development in different modes of transport.

This research uses a qualitative approach to answer the research questions. The semi-structured interviews method was chosen to perform the answers. During the empirical part of the research, the information was collected and analyzed. Experts from different industries and regions took part of semi-structured interviews. Seven interviews were conducted with eight specialists of different levels to provide a broader assessment of the changes that have occurred and look at the problem from different angles.

The results show that the cargo transported in containers did not undergo severe changes on Northern Europe – Asia route, the cargo's structure remained constant. However, there has been a significant transformation in various modes of transport: a drop in volumes in maritime transport, a strong growth in the volume of rail traffic. Problems in transport efficiency between countries have been identified, which impede the further development of container traffic. It was noticed the reasons and the time bounds when container equipment became unavailable for cargo owners. In the main block of the study, the issues of price policy were considered, and it was found that sea transportation and air transportation increased significantly in price, while the situation in rail transport turned out to be more or less stable. In addition, this research examines the business responses to the pandemic, provides a future vision of why maritime and rail transport will continue to develop and why environmental standards are now playing an essential role in the transport business.

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Tämän tutkielman tarkoituksena on tarkastella uuden vuonna 2019 alkaneen koronavirustartunnan vaikutuksia konttiliikenteeseen Pohjois-Euroopan ja Aasian välillä. COVID-19-vaikutuksia arvioidaan eri näkökulmista, ensinnäkin liikennemuotojen markkinamuutosten näkökulmasta, toiseksi sopeutumisliiketoiminnasta. Koronaviruspandemia on suhteellisen uusi tauti ja etenee huomattavasti eri tavalla kuin aikaisemmat, kuten vakava akuutti hengitystieoireyhtymä tai Afrikan kansalliset epidemiat, esimerkiksi malaria, äiti- ja imeväiskuolleisuus jne. Aikaisempien tutkimusten tuloksia ei voida soveltaa sellaisenaan koronaviruspandemiaan, myös viimeaikaiset tutkimukset eivät vastaa kysymyksiin Pohjois-Euroopan konttiliiketoiminnan erityispiirteistä ja eri liikennemuotojen kauppavirtojen tulevasta kehityksestä.

Tässä tutkimuksessa käytetään kvalitatiivista lähestymistapaa vastaamaan tutkimuskysymyksiin. Vastausten suorittamiseksi valittiin puolirakenteinen haastattelumenetelmä. Tutkimuksen empiirisen osan aikana tiedot kerättiin ja analysoitiin. Eri toimialojen ja alueiden asiantuntijat osallistuivat osittain jäsenneltyihin haastatteluihin. Seitsemän haastattelua tehtiin kahdeksan eritasoisen asiantuntijan kanssa arvioidakseen laajemmin tapahtuneita muutoksia ja tarkastelemalla ongelmaa eri näkökulmista.

Tulokset osoittavat, että konttikuljetuksissa ei ole tapahtunut isoja muutoksia Pohjois-Euroopan ja Aasian välillä, rahdin rakenne pysyi vakiona. Eri liikennemuodoissa on kuitenkin tapahtunut merkittävä muutos: meriliikenteen volyymien lasku ja rautatieliikenteen voimakas kasvu. Maiden välisessä liikenteen tehokkuudessa on tunnistettu ongelmia, jotka estävät konttiliikenteen jatkokehitystä. Havaittiin syyt ja ajankohdat, jolloin konttilaitteet eivät enää olleet saatavilla lastin omistajille. Tutkimuksen pääosiossa tarkasteltiin hintapolitiikkaa ja todettiin, että merikuljetusten ja lentokuljetusten hinnat ovat nousseet huomattavasti, kun taas rautatieliikenteen tilanne pysyi enemmän tai vähemmän vakaana. Lisäksi tässä tutkimuksessa tarkastellaan yritysten reaktioita pandemiaan, tarjotaan tulevaisuuden näkemys siitä, miksi meri- ja rautatieliikenne kehittyy edelleen ja miksi ympäristöstandardit ovat nyt keskeisessä asemassa liikennealalla.

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Maxim Makarov,

17.05.2021 in Lappeenranta.

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ABBREVIATIONS[1]

APEC Asia-Pacific Economic Cooperation

ASEAN Indonesia, Singapore, Vietnam, Malasia, Thailand

B2B Business-to-Business

BRI Belt and Road Initiative

COVID-19 Coronavirus disease

EAEU Eurasian Economic Union

EEAS European External Action Service

ESCAP United Nations Economic and Social Commission for Asia and the Pacific

EU European Union

FBX Freight Baltic Index

FCL Full Container Load

GDP Gross Domestic Product

HQ High Cube

IATA International Air Transport Association

IT Information Technology

JSC Joint Stock Company

LCL Less Container Load

NSR Northern Sea Route

NTAC Northern Trans-Asiatic Corridor

OBOR One Belt and One Road

OSJD Organisation for Cooperation of Railways

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1 Some abbreviations contain companies names: CINIA, CMA, CTM, DHL, DSV, FedEx, HHLA, L&TT, MSC, SF Express, UPS, UTLC, ZOOM

PRC People's Republic of China

RRT Rail and Road Terminal

RZD Russian Railways

SARS Severe Acute Respiratory Syndrome

STAC Southern Trans-Asiatic Corridor

TEU Twenty-foot Equivalent Unit

TRASECA Transport Corridor Europe-Caucasus-Asia

TSR Trans-Siberian Railway

UK United Kingdom

UNIDO United Nations Industrial Development Organization

US United States

USA United States of America

VAT Value-Added Tax

WHO World Health Organization

WTO World Trade Organization

UN United Nations

UNECE United Nations Economic Commission for Europe

UNCTAD United Nations Conference on Trade and Development

USD United States Dollar

1. Introduction

The introduction part of this study consists of the following sections: background, research gap and research questions, and the structure of this master thesis.

1.1. Background

In December 2019, the first news appeared that a new viral infection had appeared, later called COVID-19. Based on the chronology of the virus spread, it can be noticed that already at the end of January 2020, and an emergency regime was introduced in many countries. Then the closure of borders and the cessation of air traffic were followed. About one year after the beginning of the epidemic, more than 77 million infection cases were detected, covering about 200 territories (World Health Organization, 2020).

The world coronavirus epidemic has transformed entire industries and social behaviour. The shift to online shopping can become a deep-rooted trend, as can the transfer of labour staff to a distance work mode. The global economy is more damaged by individuals who are scared of the coronavirus COVID-19 than the disease spread. Social media news and global panic negatively impact global oil and gold prices (Atri *et al.*, 2021). Fear changes society's behaviour; ordinary employees are subject to changes, and the top manager responsible for decision-making. Despite the changes in business and customer activities, comprehensive modification in trade and transportation activities was noticed. Governmental authorities began to apply new rules and standards. These changes are reflected in fluctuations in supply and demand, an integral part of the global economy. The supply chain is stressed by the stoppage of production in the Asian market, reducing global performance. For instance, in 2015, China's segment of the world manufacturing industry was about 27.6% (UNIDO, 2020).

In contrast, this attribute was only 11% (Andreoni and Upadhyaya, 2015) in 2003 when severe acute respiratory syndrome (SARS) was rampant. Today, China is the main contactor in the global supply chain network. Therefore, the People's Republic of China (PRC) shutdown and the decrease in trade activity will seriously cut economic activity globally and influence other companies' productivity in the supply chain.

Depending on the owners' far-sightedness, individual companies are concerned about the volume of reserves, while others have dried up completely. The companies have revised their attitude towards suppliers to normalize the situation, although recent year's trade war between the US and China showed that this takes time.

Much support came from the IT field, which mitigated some of the problems. For example, a certain proportion of employees may work from home. Nevertheless, as the world practice has shown, companies can operate even in strict quarantine conditions by applying existing software solutions, because COVID-19 has slowed down the development of new technologies due to a decline in demand (Jin *et al.*, 2021). This does not reverse the negative result, but it is a method to slow it down.

The fear of pandemic has trimmed the demand for some kind of services. In China, people have interrupted to go shopping malls, public events, etc. The travel demand has dropped worldwide, particularly in China, decreased by 90% from December 2019 to February 2020 (Li, 2020). Despite this, online trading is gradually gaining momentum. Moreover, the demand for online computer games in the PRC raised by 40% year-to-year. Online trading has become a new entertainment and is excellent for people at home with their families. However, the pandemic has become a specific catalyst for online industry growth, and ordinary “brick-and-mortar” stores were already losing customers some time ago. This is a crucial difference from the times of atypical pneumonia.

Because of the increase in online shopping, the epidemic's effect on demand will be lessened. The overall consequence is still negative, but it is less so than before. The impact on a company's market is determined by the products it sells. Luxury goods are suffering the most, because such kind of goods is bought individually in offline stores. This shopping is going like a "vacation" as same as tourism. Offline luxury stores pleasure their buyers by expressing themselves (Scholz, 2014). However, for essential products are much more in a value of 4649 billion euros (World Trade Organization, 2020) comparing with the luxury sector in 281 billion euros (statista.com, 2019), the move to online shopping could be a stable trend because of some government restrictions.

For emerging markets, the outcome of the pandemic is to lessen the demand for resources (Butt, 2021). The weaker demand for raw materials as copper could win back losses as production recovers to the previous capacity. This accumulated demand can support prices in the long-term perspective. However, with energy resources, everything is more complicated. The cancelled flight cannot be returned. For example, during 2020, Russian Railways introduced several restrictions on the loading of goods to China's consignees, shown in Table 1. The reason for these restrictions is the refusal to accept the goods by the PRC.

Table 1. Approximate volume of cargo rejected by China at land border crossings with Russia. Source: email client notifications from JCS “RZD”.

Grodekovo - Suifenhe	Zabaikaikalsk - Manzhouli	Kamishovaya - Hunchunnan
Number of restriction: 19 Average duration: 7 days Type of cargo: mostly wood and coal, other Capacity: 900 wagon / day Net weight per wagon: 60-69 tonnes Lost volumes: more than 7.8 million tonnes	Number of restriction: 17 Average duration: 10 days Type of cargo: mostly coal, other Capacity: 1474 wagon / day Net weight per wagon: 60-69 tonnes Lost volumes: more than 16.3 million tonnes	Number of restriction: 5 Average duration: 10 days Type of cargo: mostly coal, other Capacity: 185 wagon / day Net weight per wagon: 60-69 tonnes Lost volumes: more than 0.6 million tonnes

China is the largest consumer of raw materials globally (Worldbank, 2018b), but not the most efficient one. A decline in China's GDP by $1 per capita has a much more dire impact on global resource demand than other countries. On the one hand, the demand for commodities transported traditionally in gondola and box wagons is decreasing. On the other hand, interstate interaction between the markets of Europe and Asia is expanding, and the volume of containerized goods transported by rail is growing (Hilmola *et al.*, 2018). The question about how the situation will develop further is open.

This is also important in terms of global inflation. In the beginning, the global inflation rate is predicted to fall as a result of the epidemic. This is due to the fact that reduced demand for raw materials results in lower prices. Less demand for services (e.g., touristic) would almost certainly result in lower costs, at least in the nearest time. Supply chain problems can theoretically drive up the prices of finished goods. However, businesses are generally in no rush to boost commodity prices if supply troubles are temporary. If the company believes the recession will last for one or two months, it is unlikely to raise prices for such a short period. The coronavirus could make lasting changes in the economy, and there are several possible continuing takeaways.

Firstly, there was a weakness in global supply chains. Technological advances and the potential of sustainability have already pushed production towards localization (Mcivor and Bals, 2021). The factory in New York, which employs robots, replaces the factory in Shanghai, employing staff. In addition to this, when production is located closer to consumers, harmful pollution is reduced. This localization process was already taking place naturally. Eventually, supply chain disruption, coupled with the uncertainty in trade tariffs, could accelerate this process. This means that after a COVID-19 epidemic, the investment can launch to pick up as supply lines readjust.

Secondly, people who have had to work distantly may like this. Besides, companies surprisingly find that workers are working well at home. Changes in daily behaviour and daily lifestyles can be constant, so the demand for transport, technology, and real estate will be different.

The third continuing effect is expanding in e-com shopping. It has already occurred in the majority of countries around the world. However, people who have become used to shopping online during an epidemic do not want to return to the previous shopping manner after the epidemic has passed. The critical point here is that the economic statistics may not reflect this. Consumer spending may appear to be lower than it is if data understates online sales.

Fourth, long-term exposure to the coronavirus can affect the final product price for the consumer. For instance, with continued government restrictions, air transport suffers due to a lack of passengers, port infrastructure, where many workers are involved, the circulation of cargo flows, money and overall supply might slow down, and prices for the final consumer increase. With such an outcome, inflation may occur in different regions.

1.2. Research gap

Containerization of cargo flows is gaining momentum. Numerous studies about this are reflected in the works (Bookbinder, 2013) and (Kacprzyk, 2018). Various public and private initiatives are proposed to increase container flows and the development of world trade, which are described in the works (Hilmola *et al.*, 2018; Sárvári and Szeidovitz, 2017; Vinokurov and Tsukarev, 2017). There have been no profound changes, so people's behaviour and the price framework were more or less stable, and the most popular directions of transportation were calculated many times, for example, at work Seo *et al.* (2017).

However, it so happened that the COVID-19 greatly rebuilt the world economy, financial and, at the same time, transport flows. The delicate balance was broken, and shippers, transport companies, consumers were forced to accept the new market conditions. The general picture of the changes that have occurred has not yet been fully studied since too little time has passed. Additionally, the previous research works (Zhong *et al.*, 2003; Bookbinder, 2013) can not be entirely applied due to the smaller scale of the disease spread and lack of market analysis. Another deep analysis have been done in the research of Butt (2021). The study provides a broad view of how companies responded to the COVID-19 challenge and evaluates risk strategies, but it does not consider the local features of the North Europe market. For instance, it does not respond to the question of what local problems raised in the Nordic region, what kind of alternative routes can be used in that region, what kind of help was suggested from governmental organizations or what the business can expect in the future.

This study aims to research and describe in detail the phenomena that caused the change in container flows in the direction of Northern Europe – Asia by different transport modes.

1.3. Research questions

Research questions chapter is needed to make the work understandable for the reader, reflect a brief content and essence, clearly define the study's boundaries and objectives, and allow the author to build the correct structure. Thus, three main questions were formulated.

Question 1. How does COVID-19 change the container transportation market?

In 2020, a completely different structure of container cargo flows appeared. Numerous news stories are full of information about the cancellation of many flights, maritime services cannot cope with the increasing demand, and railways are gaining more popularity due to many factors. From a business point of view, it is essential to take these factors into account, consider and predict changes, and adapt to new conditions. From the point of view of Government regulators, it is necessary to understand the causes of the problems that arise, make timely decisions to minimize the consequences, and also hear the opinions of participants involved in trade relations and the supply chain because they can affect the economic situation. It is critically necessary to systematize and accumulate the acquired knowledge and experience for transmission to the public.

Question 2. Why exactly has rail transport shown strong growth compared to sea, road or air mode of transport?

It so happened that 2020 became a record year for railway workers in terms of transit freight traffic between Europe and Asia. This was facilitated by several factors, such as increased throughput, optimization of freight flows, government organizations' support, a stable tariff policy, and others. The origin of such record traffic has not yet been thoroughly studied and requires additional answers.

Question 3. How companies adapt to new conditions, and what trends to expect in the future?

Market participants faced many difficulties. Someone could not resist them, and someone was even able to earn and benefit. Businesses need to be able to adapt to be effective. What have the companies been able to do? How should the business manage to survive under challenging conditions? What difficulties did have been raised? What will be in the future? The purpose of this work is to answer these questions and capture the conclusions.

1.4. Structure of the thesis

The general structure of the master's thesis consists of six main parts. The first part is an introduction, which describes the current events, highlights emerging problems, and asks questions about these problems' causes. The introduction sets further logic of all work and determines what information may be required to study the questions.

The second part is devoted to a review of academic literature. In this part of the study, the author introduces the reader to the context of his research. The author explains what studies and conclusions have already been carried out before him, preferably from different views on the existing problem. The literature review is the basis for academic research and must, therefore, be well-founded.

The third part of the work is devoted to the methodology by which the research is carried out, i.e., studying the questions asked in the first part of the work. The methodology should be separated into two parts. The first methodology part is theoretical, which shows an ideal picture of solving the problem posed, describes the advantages and disadvantages of one way or another of researching the problem. The second part of the methodology is the applied part. It focuses on solving practical problems, adapts the chosen method for a specific task, sets the correct logic, and sets the correct interpretation of the results.

The central chapter of this work is the empirical part. Based on his theories, the author verifies their veracity by conducting a semi-structured interview with participants in the container transportation market, different in their role. The study is expected to conduct 10 interviews with a duration of 45 minutes. The interview format may vary depending on the overall environment. It is described in the practical part of the methodology. The questions themselves are prepared for participants in such a way as to answer the key questions posed in the introduction. Based on the answers received, the author in the last chapter of the work prepares an analysis and his conclusion on the identified problems in the presence of statistical information, tests hypotheses, and suggests options for applying the knowledge gained.

2. Literature review

To conduct this study, firstly regions of Asia and North Europe must be determined. According to (European Parliament, 2016) Asia region includes South Korea, India, Japan, ASEAN (Indonesia, Singapore, Vietnam, Malasia, Thailand), China, Australia, and New Zealand. Moreover, looking at (UN, 2021) classification, we can say that Northern Europe consists of 19 geographical territories (Channel Islands, Denmark, Estonia, Faeroe Islands, Finland, Iceland, Ireland, Isle of Man, Latvia, Lithuania, Norway, Sweden, United Kingdom of Great Britain and Northern Ireland, Aland Islands, Jersey, Svalbard and Jan Mayen Islands).

According to the data provided by (European Parliament, 2016), the Asian market is the most dynamic market for mercantile trade; in the 21st century, Asia has become the leading global growth engine. The development of Asian GDP is 5.4% per year, and the South-East Asian region is rising by 5.9% between 2006 and 2016. The main trading activity is concentrated between the APEC countries, where the USA, Japan, and China play the most significant role. They account for 2/3 of the total trade. At the same time, China accounts for 22% of intraregional exports and 17% of intraregional imports, and it is becoming a central player in the market. According to forecast data, the growth will continue with possible drops until 2030. As a result, the demand for goods and services increased worldwide, especially for goods with high value-added in advanced economies.

We should consider that Asia's most crucial commodity partner in terms of value-added products is the European market that goes after the East local market – East Asia and Pacific. EU equally plays the same role as North America, with around 21% of China export (Worldbank, 2018a). On the other hand, China is the first cargo supplier for the European Union (EU) in general. That is why some strategic initiatives were developed, such as China's accession to the WTO in 2001, the One Belt and One Road (OBOR) initiative (Hilmola *et al.*, 2018) EU-China 2020 Strategic Agenda for Cooperation 2020.

For the last initiative, both sides are interested in double-size cooperation that includes improvements in two sectors that are important for this survey: The first sector is trade and investment connected with free trading relationships, investment in product markets and development of related infrastructure, clear government policies, enhancement in communication mechanisms and supply chain security, the stability of financial markets, etc. The second sector is transport and infrastructure involved in civil aviation development, the modernization of transport systems and supply chains in all modes of transport, safety, energy efficiency policy, equal role in

infrastructure projects, co-financing, coordination, and operation. Thus, EU-China 2020 Strategic Agenda could be one of the milestone in future Europe – Asia collaboration (EEAS, 2013).

Economic growth and sustainable development in Europe and Asia are possible with close trade cooperation between both regions. Creating cross-border trade requires the provision of reliable supply chains between regions. According to (The World Bank, 2017), there are three main export centers for finished products. For Asia it is China, Germany for the European market, and the USA for the countries of North and South America. Therefore, this work will consider possible options for delivering goods between two main points: Asia and North Europe.

Historically, it should be mentioned that sea transport has the most significant role in the overall trade flow. Despite the cheaper cost of shipping goods by sea, there are possible alternative options for delivering goods from China to Europe and back. The main reasons for developing alternative delivery routes are the difficulty in accessing port facilities due to ports' overstocked situation and long delivery times for goods to consumers. Alternative cargo delivery options include rail, air, and truck service.

2.1. Sea Transportation Mode

Historically, sea transport has played the most significant role in the overall flow of goods. It carries around 97.2% of cargo in tonnes (UNECE, 2018), while 1.8% is via air and 1% via rail transport. The reason is apparent – the sea cost transportation is the cheapest. To understand this difference's value, we can take case study of Seo *et al.* (2017), where there were six different routes for laptop delivery from Chongqing to Rotterdam. As a result, inland water – maritime transportation cost was 2,354 US dollars per one 40'HQ container that less than air transportation in 3.8 times and 1.89 times less than direct rail transportation. However, in addition to shipping costs, other factors must be considered: delivery time, loss of cargo value over time, environmental pollution, reliability of transportation and cargo safety. This was the reason, why the authors consider introducing an additional index of delivery quality that calls the Confident Index. Numerous participants in the transport market were interviewed. As a result, it turned out that air transportation is the most reliable 3.7, followed by rail 3.5, and sea transport is far behind 1.9. For this objective, in this work, it was decided to consider other modes of transport.

2.1.1. Main Maritime Routes

To determine the options for cargo delivery by sea between these regions, study by Zhang et al. (2016) can and Notteboom (2012) be referred. According to these studies, there are three options for delivering containerized cargo by sea between Asia and Europe. The first route passes around Africa through the Suez Canal, while the second route (Arctic) passes through the northern sea

route (NSR), and the third passes through the Ngqura (Cape Route). Research results show that all options are viable, and they are shown in Figure 1.

The price difference between Suez Route and NSR is insignificant and amounts to about 2% per tonne of the vessel's specific weight. The first variant, through the Suez Canal, is cheaper and has some non-economic advantages like better weather condition and infrastructure facilities (Zhang *et al.*, 2016). Then it necessary to consider transportation cost between Suez Route and Cape Route. The price difference between them is 14% in the advantage of the Suez Canal; however, in the future decade author predicts equal prices for both routes Notteboom (2012). For best price reasons, the Suez Canal looks more attractive before COVID-19 time.

However, depending on the market situation (demand for delivery, availability of the infrastructure of ports and canals, fuel prices, transit dues, port dues, the cost of escorting ice on the vessel, the cost of ship management, maintenance) and governmental regulation, the general situation can change in different directions.

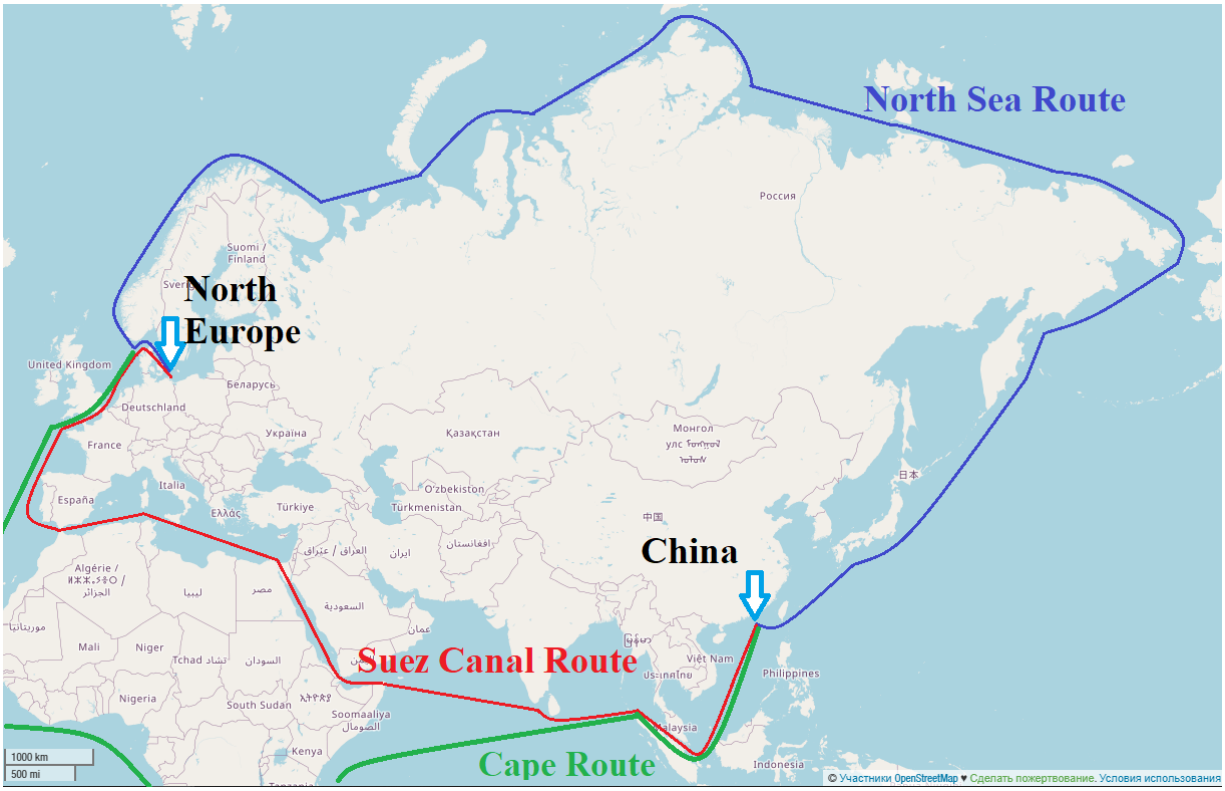

Figure 1. Possible variants containers ship delivery Europe – Asia (maps source: www.openstreetmap.org).

For example, on the date of 5th March 2020 Russian President approved the foundations of the state policy of the Russian Federation in the Arctic for the period up to 2035 (Government of the Russian Federation, 2020b). According to these statements, now of 2020 Russia provided:

- conditions for the implementation in the Arctic zone of the Russian Federation of large economic projects to increase trade attractiveness;
- the beginning of work on the creation of an integrated infrastructure of the Northern Sea Route, a system of hydro-meteorological, hydrographic, and navigation support of navigation in its water area, modernization of the icebreaker fleet;
- expanding the use of special regimes for nature management and environmental protection in the Arctic zone of the Russian Federation;
- creation of an actively functioning coast guard system of the Federal Security Service of the Russian Federation in the Arctic zone.

All of these factors should support the delivery of cargo through NSR. To show that the current situation around NSR is not so optimistic because the transit traffic is still low. According to official public statistics in Russia at the channel (fedstat.ru, 2021), the number of transit traffic equals 1.281 million tonnes that cannot correspond to Suez Canal above 631 million tonnes (suezcanal.gov.eg, 2020), around 0.2%.

Despite this, in the opinion of Zhang *et al.* (2018), this route can be an excellent alternative to the Suez Canal to transport transit cargo to Northern Europe. First, the Nordic countries are few in number, which means that their domestic markets and economies are not significant. Secondly, united by a common geographic location, they have a common interest in strengthening trade ties with the Asian region. This openness and trade-oriented attitude of the Nordic countries enables the Asian market to establish trade relations and strengthen its position in the Arctic. In particular, China's interest in the Arctic is due to the presence of a large number of energy resources, which may allow it to diversify energy imports to domestic regions. The Nordic countries have accumulated extensive expertise in the scientific projects, operation, and extraction of energy resources in the Arctic, so cooperation for China in this matter can be beneficial. This cooperation will continue to grow because it provides investment initiatives in Scandinavian technology companies, for instance, in Volvo, CINIA, Awilco, and others.

These conclusions are confirmed by (Bookbinder, 2013) in the previous research, where the Oresund region is considered. According to the author, this region is attractive from the point of view of the demand for logistics services, since it has almost the best purchasing power of the population, and innovation-driven economies support logistics efficiency. These data are confirmed by a high assessment of the efficiency of the logistics sector in the Nordic countries (statista.com, 2018).

For this research work, it means that NSR can be operated, but its influence on world traffic is insignificant. The research (Verny and Grigentin, 2009) confirms existing drawbacks at NSR. First, there are no linked ports between the Bering Strait and the port of Murmansk. Secondly, container flux cannot be optimized due to a lack of ports. Thirdly, extreme weather conditions could make problems for vessels that cannot be fixed quickly, but also, these climatic hazards raise insurance premiums. Fourthly, Russian's authority produces administrative obstacles for international trade on NSR. The last but not the least significant obstacle is the Sannikov Strait, limiting the draft of vessels to 13 meters, limiting the movement of vessels over 4000 TEU. Therefore, this route will most likely be transported more frequently by 2024 when the Russian Government completes all necessary work, or the market will change the rules, and Asia vessels will be ready for operation in harsh Arctic conditions.

2.1.2. Economy situation

The maritime container shipping market situation depends mainly on the global economic situation and other factors, such as social unrest, sanctions, natural consequences, demand for oil, etc. The most intense unrest in recent years was the global financial crisis of 2008-2009 and the COVID-19 that began in 2019. These events reduced the values of maritime trade to negative indicators. In the figure below is the data on container traffic for the last six years.

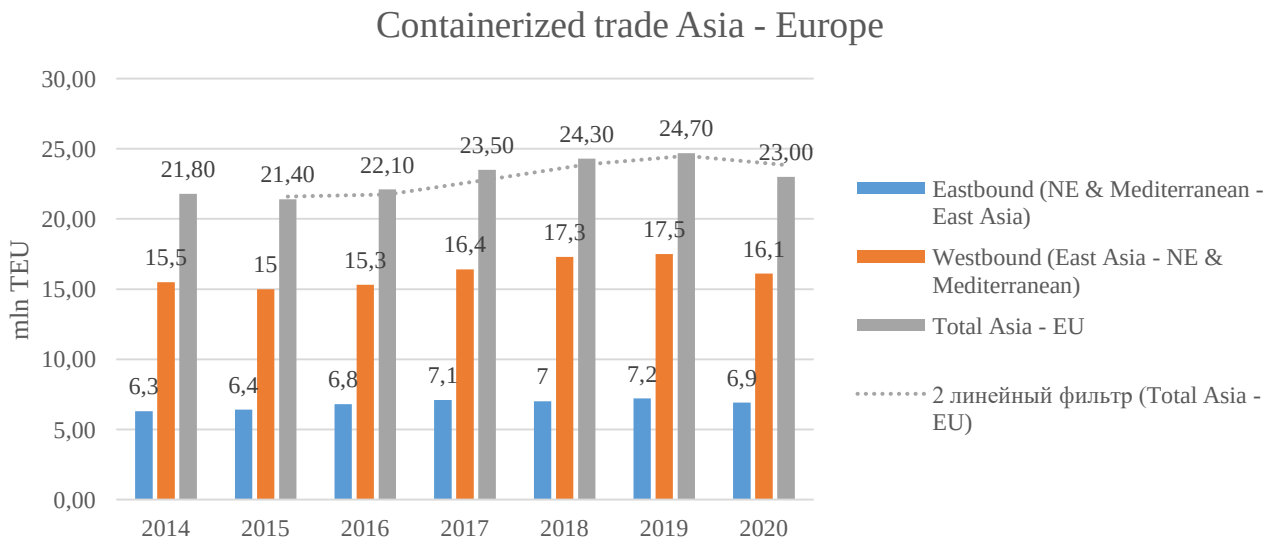

Figure 2. Containerized maritime trade Asia – Europe from 2014 to 2020. Source (UNCTAD, 2020d).

These figures indicate that since 2019, the growth rate of container traffic in the Europe-Asia direction has slowed down, and in 2020 slipped to negative indicators of -6.9%. In other directions, Trans-Pacific and Transatlantic, we have a similar decline in -6.6% and -5.6%, respectively (UNCTAD, 2020d).

The pandemic has severely impacted the shipping sector due to the restrictions placed on ships and crews in many ports. There was a shortage of labour, travel bans, and other operational problems were imposed. All these measures led to changes in the regular routes of ships, changes in the ship's crew's composition, the excessive workload of storage facilities, unproductive downtime of machinery and equipment, and disruptions in communication with internal communications. Blank sailings and cancellations of port call adversely affect the global maritime supply chain.

The pricing policy in this sector turned out to be unstable due to the circumstances. According to the data provided by (en.sse.net.cn, 2020), the price for the cargo transportation in the route China – Europe (ports Hamburg / Rotterdam / Antwerp / Felixstowe / Le Havre) of TEU has almost doubled, from 850 USD/TEU to 1500 USD/TEU at the beginning of 2020. This increase in the level of rates can be explained by the increasing demand for sea transportation, confirmed by the data (UNCTAD, 2020c). The growing number of ship calls at the ports of Northern Europe increased from 430 to 470 from 25 to 31 week of 2020.

This unstable situation has created new difficulties at the end of December 2020. In that time, some sea carriers cannot cope with demand during the peak pre-holiday days of December, when the sales market is on the rise. Therefore, according to (joc.com, 2020c), one of the leading sea lines even stopped booking lines in the direction from Asia to Northern Europe due to the lack of containers in Asian ports, and the price on this direction rose to $2,945 per TEU.

2.2. Air transportation

Air transport has been used between Europe and Asia due to the development of the e-commerce market since 2000. According to (UNECE, 2018) it estimates 6.4% of growth annually in this transportation segment from 1995 to 2015. The main driver of growth in this mode was the constant improvement in the fuel efficiency of transport vehicles, which significantly increased cargo owners' attractiveness. Although the volume of air transport in tonnage seems insignificant at about 2% of the trade volumes, it accounts for about 35% of the value of the goods flow. Therefore, it is expected in 2015 that with the growth of global GDP and population demand for goods with higher added value, this segment of transportation will continue to develop further.

The direction from Europe to Asia consists of 90% perishable cargo, documents and electrical equipment, chemical products, office equipment, and textile. This flow is approximately equal to 2.7 million tonnes. According to (Boeing, 2018) report, an airflow in this direction has an optimistic forecast of 4.8% growth per year in the next 20 years.

The flow is almost the same to the opposite direction – 2.7 million tonnes with a growth of 4.5% per year. In 86%, it includes such categories of goods as office equipment, machinery, documents, textile, and chemical products. (Boeing, 2018)

Thus, air transport is essential for commodity markets for which speed and reliability of delivery are of paramount importance. Freight owners tend to rely on air transport for high unit value goods such as machinery or electrical equipment.

This work focuses primarily on Northern Europe. In it, things are a little different due to high environmental responsibility. The study by Tungul (2008) talks about Nordic countries' unique role in environmental protection matters. The focus on sustainable development leads the Nordic industry to seek better growth, rational solutions, and innovative ways. According to the articles of Larsson *et al.* (2018; 2019), aviation produces large amounts of CO_2 emission that affect global climate and ecological situation. Therefore, it is essential to find new alternatives. For example, the article of Larsson *et al.* (2019) explained the possibility of using electric batteries instead of jet fuel or produce more optimal aircraft models for transporting goods as in the research by Baxter *et al.* (2018).

It is necessary to identify the main transport hubs in both regions further to explore the air transport market, Asia and Europe. Research carried out in 2007 by Matsumoto (2007) suggests the top five main Asian cargo points at the airport Hong Kong, Tokyo, Singapore, Seoul, Taipei, and the top five European airports of London, Paris, Frankfurt, Amsterdam, and Brussels. Over ten years, the situation is the same, except that Shanghai's airport replaced Singapore's airport. Noticeably that North European airports are corresponded to the third tie, because of the low cargo traffic. The representation of the leading cargo airports shown in Table 2.

Table 2. Main Cargo hubs Asia and Europe (aci.aero, 2017).

Rank	**City (Airport)**	**Loaded and unloaded freight and mail in metric tonnes 2017**
1	HONG KONG, HK (HKG)	5 049 898
3	SHANGHAI, CN (PVG)	3 824 280
4	INCHEON, KR (ICN)	2 921 691
6	DUBAI, AE (DXB)	2 654 494
8	TOKYO, JP (NRT)	2 336 427
9	TAIPEI, TW (TPE)	2 269 585
10	PARIS, FR (CDG)	2 195 229
11	FRANKFURT, DE (FRA)	2 194 056
12	SINGAPORE, SG (SIN)	2 164 700
15	BEIJING, CN (PEK)	2 029 584

16	DOHA, QA (DOH)	2 020 942
17	LONDON, GB (LHR)	1 794 276
18	GUANGZHOU, CN (CAN)	1 780 423
19	AMSTERDAM, NL (AMS)	1 778 382

The primary cargo transporters are DHL, FedEx, UPS, and SF Express (UNECE, 2020) and (Bookbinder, 2013) supports the fact that there are only just four all-cargo international carries.

The coronavirus's impact on passenger air travel's overall dynamics can be clearly seen in the report of WTO (2020). From January 2020 to April 2020, the number of flights decreased significantly by about 3.6 times. For transport and logistics companies, it means reducing the available number of air vehicles for transporting cargo luggage because a significant part of the commercial cargo is transported together with passenger luggage and increasing cargo transportation rates.

2.3. Land transportation

The mainland transport routes that connect Europe and Asia pass through the Eurasian Economic Union (EAEU) countries. Due to their geographic location, the EAEU countries have great transport potential.

However, according to (UNECE, 2018) the land transportation have not a great demand among cargo owners. It says that 1% of cargo is transported by rail, and road transportation mode is very insignificant in volumes.

The EAEU Treaty provides a coordinated transport policy to create a unified transport space based on the principles of competition, openness, safety, reliability, accessibility, and environmental friendliness. It is assumed that the completion of the creation of a single transport space between the members of the EAEU will be completed by 2025.

The main cargo land roads, which can be used as a basement for rail and truck services (Kacprzyk, 2018):

- Trans-Siberian Railway (TSR)
- Northern Trans-Asiatic Corridor (NTAC)
- Southern Trans-Asiatic Corridor (STAC)
- Transport Corridor Europe-Caucasus-Asia (TRASECA)
- Organisation for Cooperation of Railways (OSJD) railway corridors (no 1-13)

2.3.1. Road transportation

Growing traffic volumes, a shortage of containers for carrying out cargo, increased air freight rates, and limited railway capacity is forcing Chinese shippers to look for alternative channels to supply their products to the European market. This turned out to road transport services. Historically, its use on such long routes has been negligible for the following reasons (Joc.com, 2020a; theloadstar.com, 2020; xinhuanet.com, 2020): firstly delivery by road is more expensive than railway transport, and secondly, the delivery duration by road is 15-20 days, while the railway transport delivers goods in 11-14 days.

There were also no global surveys of truck used in the Europe - China route, because it is quite a new alternative. Chinese shippers were the first to respond to market changes, and international logistics providers like DHL, DSV, and Ceva offered their services. However, there is no information for customers about prices and regularity of these services. According to Markus Panhauser (Head of Ocean Freight Europe in DHL Global Forwarding), their truck transportation service provides 50 trucks per week (theloadstar.com, 2020). However, at the beginning of 2021, different sources provide different numbers, and there is no precise statistics with an accurate number of trucks launched and trustable tariff rates.

2.3.2. Rail transportation

A new era of container transport by rail between Europe and Asia began in 2006 when the Trans-Siberian Railway (TSR) was the main branch linking the two regions. It was during this period, according to (Tsuji, 2007), when the Russian Government decided to provide efficient international container cargo supply. At that time, the container transportation market was going through hard times as the government raised tariffs for transportation from the entire renewal of the freight wagons fleet. However, the increase in tariffs did not solve the problem of attracting new volumes of cargo to the railways and old rolling stock. On the contrary, at that moment, the tariff for Deep Sea route transportation was $2,600 - $2,900/40ft instead of $6500/40ft using TSR on the path from Japan to St Petersburg (Tsuji, 2007). In a period between 2001 and 2002, Russian railways, with the Government's participation, carried out a large-scale reform, which provides liberalization of rolling stock. Thus, private companies were able to operate and buy rail cars. Thus, Russian Railways found a source of funding for its main function - the provision of services for the transportation of goods without providing wagons. Hereafter, new players like Fesco, Russian Troika, and TransContainer appeared on the Russian market. From July of 2006, the new service of block trains was launched that connected Nagoya, Japan, with St. Petersburg, Russia. At that time, the Trans-Siberian Railway's main advantage was the high speed of delivery and the

predictability of the tariff policy, without significant jumps in seasonality, as concerning sea transportation.

However, the period of the rise in transit traffic was not long. According to Schramm and Zhang (2018) study, traffic until 2011 was negligible. This is due to the dire consequences of the global economic recovery after the 2009 crisis. Notiable that during 2006-2008 traditional trade production was unstable and dropped heavily in 2009 (The World Bank, 2017). The research of one of the key operators of the container fleet in Russia confirms this information. In the current conditions, it was accepted to optimize the fleet's structure and improve the quality indicators of the use of rolling stock. At the same time, sea carriers began to withdraw part of the container fleet from circulation, use the economy mode, reduce the number of calls at additional ports to ensure a complete load, and change routes to decrease transportation costs. After that time and during the period from 2012 to 2014, the world economy was in the recovery stage, so the usage of transportations carried out by rail was insignificant.

The way out of the current recession was the initiative proposed Belt and Road Initiative (BRI) by Chinese President Xi Jinping in October 2013 (Li and Hilmola, 2019). This action's central idea was creating sustainable economic development in six main economic corridors connecting China with Mongolia, Russia, European countries, Central and West Asia, Pakistan, India, and Indochina. China's Belt and Road Initiative planned to create infrastructure facilities (solutions) to help China's products enter other countries' markets in the long-term perspective and develop the West part of its' region (Sárvári and Szeidovitz, 2017). As a part of our research, it is crucial to highlight this project's specific objectives, which involve developing railway infrastructure for multimodal transportation, including strengthening places at the approaches to ports and other road facilities.

The main rail transport corridors, which lead containers to flow from/to the North Europe and Baltic Republics, go through the Russian Federation area with key hubs at Saint Petersburg at the West and Vladivostok Vostochniy ports at the East border (Vinokurov and Tsukarev, 2017). On the other hand, authors Bulis and Skapars (2014) found that the seaport of Riga in Latvia could be an alternative hub at the Westbound.

The railway transport sector in the Russian economy has a primary role and belongs to strategically important industries. In these prospects, the Russian Government is making constant changes in laws. According to Hilmola et al. (2018), as of September 2018, it was difficult to transport perishable goods across the Russian Federation's territory. However, the new Law No. 66 was presented on 4 March 2019 (Ministry of Transport of the Russian Federation, 2019). The railway

carrier relaxes the conditions for the carriage of perishable goods, except for meat and fish. Another idea that authors suggest goes to tariffs politics, thus possible incensement in the number of shipments between countries with a more favourable tariff policy for shippers. The Russian Government pays attention to the situation around the transport sector. Seeing that 98% of cargo is transported by sea, the Russian economy misses the opportunity to replenish the budget through transit traffic. At the level of the Government of the Russian Federation, on the 10th, subsidies were allocated to JSC “Russian Railways” (Government of the Russian Federation, 2020a), the purpose of which was to increase the tariff attractiveness of rail transport relative to sea transport.

To find information about the last changes in the container transportation sector at the gauge 1520, we used the CTM search engine (CTM, 2020), with the following search queries:

- Date of search [' 13.12.2020'],
- Period of search ['after 31.12.2017'],
- Document title has ['container'].

Duration of the search engine – 1.4 seconds, number of results – 474 (462 of them still valid), which includes:

- 116 stations on the territory of the Russian Federation open work with containers
- 55 tariff and rates changes for rail operating and companies services
- 46 results of changes in local loading schemes
- Others non-classified changes

According to this, it was found the most valuable in terms of quality and cost of transportation statements:

- Order of JSC "Russian Railways" No. 2054 from 17th of September, 2019 “About the approval of the operating technology of the railway units in the automatic registration of transportation documents for the transportation of container block trains” (JSC ‘Russian Railways’, 2019a).
- Federal Law from September 29, 2019 No. 322-FZ “About amendments to Articles 164 and 165 of the Tax Code of the Russian Federation regarding the application of the 0 per cent VAT rate” for the transit of empty railway rolling stock or containers (The Government of the Russian Federation, 2019). There was 20% of VAT before.
- Telegram of JSC "Russian Railways" No. 10869 of the 17th of June, 2019 “About allowances to include refrigerated and insulated containers in container trains in order to organize the transportation of goods” (JSC ‘Russian Railways’, 2019b).

All of these changes in government regulation make great support for railway container traffic between Europe and Asia. That is a correspondent with a current situation at the end of December 2020. As a consequence of the measures taken, the container transport market is showing unprecedented growth. According to the forecasts that have been published (Eurasian Development Bank, 2018) for 2020, the container traffic will increase to 400 – 500,000 TEU. Nevertheless, this assumption turned out to be correct because, from the last news, we can hear that on the 7th of December, only UTLC company carried 500 thousand containers in twenty-foot equivalent have carried between China and Europe in eleven months. As mentioned in Russia's web news sources, the COVID-19 pandemic was the critical factor of this increase from 333 thousand TEU in 2019 (rzd.ru, 2020).

3. Methodology

The literature review provides an essential insight into the transport market's state in the perspective of past times. It reflects and analyzes information from recent years. The most recent scientific publications reflect the historical chronicle of events for two years or more. Therefore, the reader receives information late. That could be confirmed by the opinion, mentioned in Hilmola (2018) that publication may delay six or even twelve months due to the review process and final editing. However, the transport market is primarily dependent on trading markets, which are quite volatile. This means that the situation can change dramatically in a few days. Therefore, it is crucial to collect the latest relevant information on the problem under study.

COVID-19 pandemic is an atypical phenomenon that did not exist before. In the research (Eisenhardt and Graebner, 2007), authors say that interviews are a highly effective way of gathering information in episodic (or unique and/or special) events. Therefore, this master's thesis will use the interview method to collect data, build the theory, and then answer the topic's central questions. Interviews will help receive the participants' opinions about current trade relations and service providers, creating transport links to reflect and show the most recent trends and the historical chronicle to assess the latest possible changes in the transport sector.

3.1. Building the framework

Since this study belongs to the category of studies where qualitative information is collected, it is necessary to determine the appropriate framework for building the basic concept. In the work of Eisenhardt (1989), many examples are considered, based on which the theory is built, and the construction of the central concept is proposed, which consist of several steps listed below.

Definition of the research question. The definition of the problem is significant, and the research begins with it.

Case study. Usually, it aims to study historical reports, solve similar problems, and extract the experience already gained. At this stage, a theory arises that training to explain the problem of research.

Crafting tools and protocols. At this step, it is determined what information will be collected next; what tools will be used for searching and collecting empirical data. Survey questionnaires and interview guidelines are created.

Data analysis. Quite often, data analysis and data collection overlap each other, and it can be helpful in many cases. Primarily it gives adjustments in data collection instruments, such as

additional questions in the protocol to have a more deep observation in the problem, because each interview case has its attributes. For that reason, a new line of thinking may arise.

Pattern Search. While data is collected, finding and generalization of patterns is beginning across interview cases by accelerating cross-case comparison. However, it is wrong to draw premature conclusions, until all the information has been processed and considered from various perspectives. There are three ways to do this:

- The first way is to search for categories and dimensions and further search for intragroup standard features and differences.
- The second way is needed for more fine-tuning and consists of selecting case interview pairs and searching for similarities and differences, which leads to a more sophisticated understanding.
- The third way is to divide the data by data type when during the survey, multiple sources are used, such as observations, interviews, questionnaires, and others. In general, this way works in the separation of materials in qualitative and quantitative data. The conclusion becomes more valid when data from another source corroborate patterns from one source.

The method of pattern selection will be determined later in the research, depending on the nature of the interview process's information.

Making Hypotheses. The next step in building a framework is to create a hypothesis based on the identified patterns. The evidence base for the theory will be the confirmed facts collected during the research. In general, hypothesis building is based on the search and confirmation of relationships between constructs.

Enfolding literature. Confirmation of a hypothesis or theory is not based solely on links to facts. In this work, qualitative information is collected, so it cannot be verified by statistical methods (t-test, z-test, and others). An essential aspect of testing a hypothesis based on qualitative information is also its relationship with existing theories. At this step, it is required to understand whether the found theory does not contradict the already existing constructions. At this stage, if necessary, adjustments are made to the new hypothesis.

Reaching closure. This step describes a situation when the author should stop looking for new data. This happens when the research is saturated with information, and new data make minimal improvements.

Comparison with other literature. The work should be unique and bring new ideas to society, so it is essential to find and highlight its features compared to previous studies.

Finding strength and weaknesses. Depending on the chosen research method, certain advantages and disadvantages appear. As a rule, studies that include qualitative information are new and extensive in content. However, extensiveness can also be a disadvantage, because simplicity and conciseness are also crucial in research work.

Evaluation and conclusion. At the end of the study, the work is still being checked by experts. Edits or changes are made as necessary.

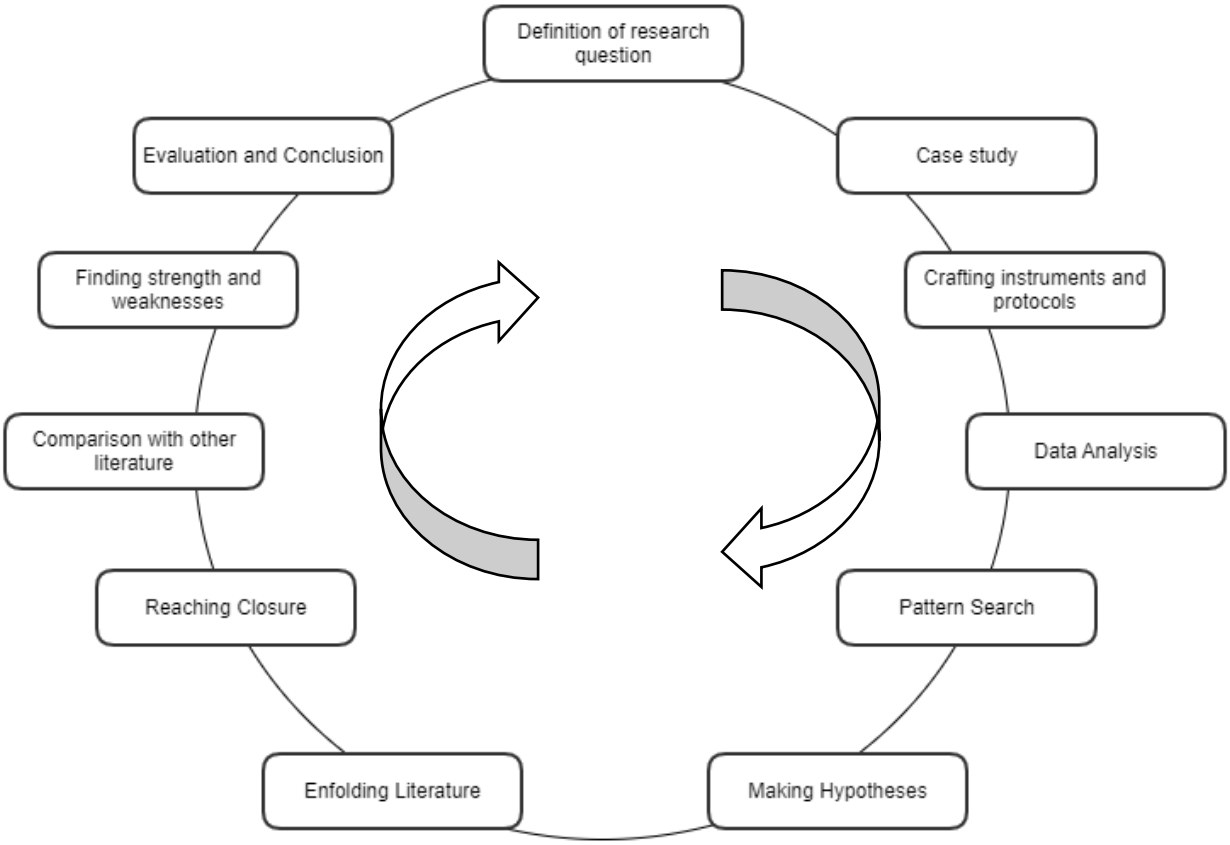

Figure 3. A framework of research wheel.

All the stages or current research work can be explained in Figure 3.

3.2. Crafting tools and protocols for data gathering

As mentioned earlier, the collection of empirical data will be conducted through interviews. To begin with, identification types of interviews are available and choose the most suitable one for this research. According to (Wilson, 2013) five interview methods can be shown in Figure 4.

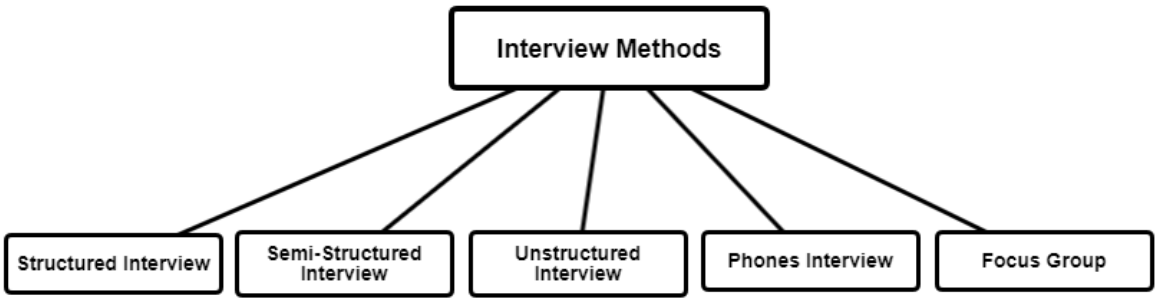

Figure 4. Interview Methods that can be implemented for information gathering.

In the following is considered each of the methods, highlighting the advantages and disadvantages, and determining the areas of use.

Structured Interviews

Structured questions are typically used when the researcher is aware of the underlying issues and wants to gather detailed and exact information about the issue. A structured interview follows a predefined scenario and can be conducted by phone, chat, or other forms. As a rule, the respondent answers a specific problem according to a fixed set of possible answers. Structured interviews can last from a few minutes to several hours, depending on the required research detail. A structured interview usually follows an unstructured or semi-structured interview.

Unstructured Interviews

Non-structured interviews are interviews in which only the agenda is defined, but there is no prepared format or questions. The purpose of this interview is to obtain data on the interlocutor's experience without imposing restrictions on the answers. Non-structured interviews also require preparation and an understanding of the boundaries and topics of the questions. This type of interview is used when it is crucial to collect information on general topics, give some kind of assessment impression, understand a new area, etc. As a rule, such interviews are lengthy and take from one and a half to two hours, so the participants' circle is very limited. This type of interview allows collecting a large amount of qualitative data, and its analysis takes significant amounts of time.

Semi-Structured Interviews

Semi-structured interviews are a combination of structured interviews and non-structured interviews. They have a structure and a guide from structural as well as open-ended questions from non-structural interviews. The purpose of this interview is to collect structured information on the

research topic, and if additional questions arise, get timely answers. Interview data is used, when a specific piece of information has already been obtained, and clarification of details is required to complete the study. The interviewer can independently choose the number and order of questions and exclude unnecessary, thus possible deviations from the previously planned scenario. The responses provide both quantitative and qualitative data. Semi-structured interviews help to uncover previously unknown problems, provide logic throughout the interview while allowing flexibility. However, analyzing the information received can also take much time, as in non-structural interviews.

Phone Interviews

Telephone interviews are used, as a rule, in semi-structural or structural research methods and involve a remote format of interaction. They are used primarily, when direct contact with the interviewee is not possible due to cost, safety, or other reasons. This research format allows quickly to collect information, regardless of the location of the participants. Despite this, telephone interviews usually have a prepared script in advance because conversation time is limited.

Focus Groups

This is a qualitative research method in which the moderator selects a group of participants and conducts a survey on a given topic at a comfortable stop. As a rule, focus groups are assembled to develop a product or service to establish the quality characteristics of a particular product or compare it with competitors. Focus groups are good at identifying research problems, but have complex interpretations of results. With this type of survey, one participant can add others' opinions, affecting the results.

Conclusion

An interview is one of the methods of collecting qualitative information that allows one to explain the problem from different points of view and provides an understanding of complex phenomena and processes that cannot be explained by quantitative data (Eisenhardt and Graebner, 2007). Summarized information about interview types obtained in Table 3 to conduct an assessment and then choose the correct research method.

According to the table, two options for conducting an interview are preferable: a semi-structured interview or a telephone interview. The main difference between them is that there is no visual accompaniment during a telephone conversation, making the conversation less comfortable for the interlocutor, so the moderator follows a pre-planned guideline.

Table 3. The comparison of interview methods.

Type of interview	Define the problem	Share experience	Make assessment	Gather information	Strict guide	Can be used first	Evident conclusion
Structured	No	No	Yes	Yes	Yes	No	Yes
Unstructured	Yes	Yes	Yes	No	No	Yes	Yes
Semi-Structured	Yes	Yes	Yes	Yes	No	Yes	Yes
Phones Interview	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Focus Group	Yes	Yes	Yes	No	No	Yes	No

However, more than six years have passed since the (Wilson, 2013) publication, technology has significantly advanced, so the boundaries between a personal meeting and video communication have almost disappeared. People have adapted to new conditions.

In other interview methods, serious shortcomings were found, in which their use is not valuable. Firstly, structured interviews do not identify causes and problems; they will not help answer how COVID-19 affected the container shipping market. Secondly, unstructured interviews do not allow for the necessary collection of information, but aim to discuss and identify problems. In non-structured interviews, it is essential to contact the participant, which is unsafe to do in a pandemic. Thirdly, the focus group did not fit for security reasons and the difficulty of obtaining a result. The difficulty of obtaining the result is explained by the leader's possible suppression of other group members.

That is why semi-structured interviews are the preferred method for gathering information for this research work.

3.3. Consideration of practical aspects

The next stage begins after the method of conducting the interview has been chosen. This is the practical and methodological part. It aims to work out the interview objectives, build a guideline, create a list of questions, select participants, choose methods for analyzing the information collected, and study-related information. According to Galletta (2013) there are three primary stages shown in Table 4 in a semi-structured interview.

Table 4. Main stages of a semi-structured interview (Galletta, 2013).

Stage I. Interview preparation: • Literature review • Research questions • Building the plan for data analysis • Finding and recruiting participants for interviews • Find contact with members • Creating questions protocol
Stage II. Gathering and analyzing qualitative information • Interviewing process • Data collection • Data processing and analysis
Stage III. Generalization and interpretation of research results • Patterns finding and theory building • Search for irregularities • Correcting errors and building theory

Stage I. Interview preparation.

The first stage of the interview is preparatory. At the preparatory stage, the literature is studied, the existing materials are investigated, the gaps that need to be closed for a qualitative study are clarified, as well as formulates the central questions of the research. Research questions form a vector that can be guided during the interview. It forms an analytical tool for collecting and further information processing. After the motion vector is set, a plan must be prepared for data collection. The interview can occur according to several scenarios depending on time, cost, safety, and other aspects.

Scenario 1. The interlocutor cannot attend the interview but can answer the questions in writing form. In this scenario, a survey form must be prepared with two options:

- Option 1 - standard document form in MS Word type.
- Option 2 - Google questionnaire.

Option 2 is preferable, because it has advanced functionality for analyzing the collected information and frees the interlocutor from preparing a document and sending it to the author of the study.

Scenario 2. The interlocutor may attend a face-to-face interview. In this case, the author of the study needs to take notes of the data received in any possible way and, with the participant's consent, make an audio/video recording of the conversation.

Scenario 3. The interlocutor can be present on an audio/video call. In this case, the author of the study also needs to take notes of the conversation, and upon receipt of consent, record an audio/video signal.

At the first preparatory stage of the interview, it is necessary to make a recruitment process to decide which participant is necessary to contact with. This process is essential, as it directly affects the collection of information and subsequent conclusions. The central research questions help to define the selection criteria for participants. It is required to survey various retrospectives to comprehensively approach the answers to the question (Eisenhardt and Graebner, 2007). Participants are drawn from different organizations and different levels or roles of interaction in the supply chain.

- Parameter 1: participants are divided by geographic location and representatives of Northern Europe, Asia, and transit territories.
- Parameter 2: Participants should represent different in their role: shippers, government regulators, logistics service providers, and recipients.

Thus, multiple case studies provide a wide range of theory building. Multiple answers also make the theory more robust, as these conclusions are based on considerable empirical evidence. (Eisenhardt and Graebner, 2007). The target is twelve participants, each role for every territory of shipments. The recruiting process begins with requests for participation and ends after the target number of interviews has been reached.

The final step in the preparatory process is drawing up an interview protocol. Usually, the protocol is segmented into sections. Segmentation allows moving smoothly from one topic to another. In the first segment of the protocol, there are questions about the participant and his experience. They allow the person to open up, feel comfortable, involve in conversation, and lead to the exploration's main body. The second segment is placed in the middle of a semi-structured interview and designed to pursue the topic of study in more depth with the interviewee. It includes more specific questions that ensure the research work is adequately explored. The conclusion part of the protocol summarizes all of the above in the interview, clarifies the details, broadens the meaning, finds contradictions, and raises questions that indirectly affect the research topic.

Stage II. Gathering and analyzing qualitative information

The second stage is connected to the interview process. There are different types of rules, which the interviewer must comply with to achieve maximum effectiveness. The primary technique for conducting an interview is the researcher's attention to the interviewee's story. It is essential for the researcher to anticipate possible answers to open-ended questions and not interrupt the participant. During the interview, it is also important not to pay too much attention to converging and diverging facts, but to focus on the subject of the study and find out the main point, after which it will be possible to clarify the details. Since semi-structured interviews combine empirical and theoretical questions, there is great potential when a researcher can involve the interlocutor in thinking about the causes of problems, the concept of deep meaning based on the experience of the interlocutor. To summarize the ideas, the researcher needs to complete two tasks during the interview: the first is to listen carefully to the interlocutor to understand the central meaning; the second is to find critical details that require clarification.

Depending on the situation (the availability of participants, their workload, and other factors), the interview can take place in two variations, with breaks for the analysis of the information received or without breaks.

This study assumes a survey of organizations' management, since these people receive information from the organization's employees, based on which management decisions are made. It is these people who have the most complete and broad picture of the problem under study. Therefore, it is supposed to conduct interviews without interruptions for analysis and reflection. Later the data is collected, it will be sent to the participant for verification and confirmation.

After storing and verifying the information, its organization process follows, reduction to a single form. This means that a part of the information will be organized in the form of notes, audio recordings, and video recordings in the course of semi-structured interviews. Simultaneous work with all these sources is impossible. Therefore, both authors Galletta (2013) and Ghauri (2010) propose that analytical activities such as codes serve to label, separate, and compile for the organized storage of information. For that reason will be using the code framework represented in

Depending on the information gathered, it could be transformed into a more appropriate form.

Code name Meaning Exemplar / Most clear or compelling example of this code Other instances Relationship to other codes (if any) Ongoing status of code in the analysis

Figure 5. Code framework (Galletta, 2013).

The entire encoding operation is done with the necessary level of accuracy to accurately reflect the data in the course of which the code itself arose and its relationship with other objects. Investing in data organization and record-keeping provides an excellent return in simplifying data access and following the analytic chain as it changes.

Stage III. Generalization and interpretation of research results

As the analysis of the collected information progresses, similar code constructs will also appear. Blocks of code with similar parameters, characteristics, or attributes are grouped into clusters by category. The connection between clusters can arise based on previously studied literature. Clusters are similar blocks of elements united by a standard feature; thus, patterns are formed. Patterns form features characteristic of a particular theory, which can answer research questions. Theory building can go along with the use of tools such as visualization, reflective writing, and critics' assessment. The latter tool is vital, as it helps to find gaps in the study, and then refine the theory to its logical conclusion.

At the same time, this study cannot rely only on the case study. Triangulation is required to improve the accuracy of judgments and conclusions drawn, various methods to explain a similar phenomenon (Ghauri, 2010). It can also be receiving confirmation information about the object from another source (the company's annual report, another employee or company auditor). It is possible that triangulation will not lead to similar results, but it will give a better understanding or new questions for the research topic.

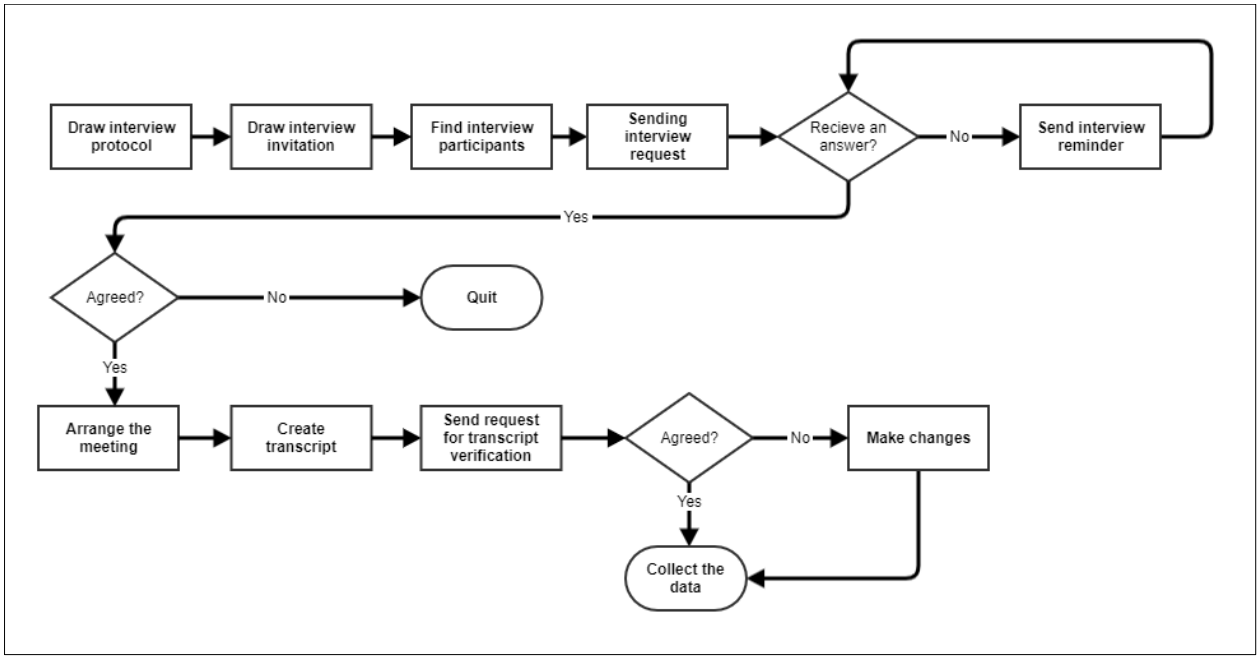

Figure 6. Empirical data gathering process.

4. Empirical part: analyzing the results of semi-structured interviews

This section of research work is the central part of the master's thesis. It answers the main research questions raised at the beginning of the study. It shows the main results proved by open sources of facts obtained during semi-structural interviews according to the research methodology.

4.1. Empirical interview gathering process

The empirical process began with a search for companies involved in the transport industry. The selection of companies participating in the interview was based on the accumulated experience of interaction between Kouvola Unit of the Lappeenranta-Lahti University of Technology and the business sector in the regions of Northern Europe and Russia, which grown based on previous studies, as well as search and monitor of companies that participate in international exhibitions, such as TransRussia which was carried out in previous years. According to official information, 398 companies from 29 countries of the world took part in this exhibition in 2019. All of these companies openly describe their services to potential clients. All these companies are, to some extent, competing companies that have a similar list of services, so the behaviour of company employees to provide information to external sources could be characterized as cautious. The process of selection of transport companies followed after primary sources with existing transport companies data found. The critical selection factors were companies that operate with containerized cargo companies in the research regions. Selected companies were included in the list of potential interviewees. This list mainly contained information about 31 companies and 33 potential contact persons.

The next step was to prepare an official request for mailing to the company for an interview. This request explained the purpose of the research, possible topics for interview questions and the invitation itself. In some cases, a detailed list of questions was attached to the request so that participants could assess the company's relevance to participate in the interview and prepare in advance for the survey. Preliminary preparation also helped to increase the quality of the information received from participants. A total of 39 requests were sent. The number of requests turned out to be more than the number of companies, because some companies received requests more than once. The second request was sent since companies do not always respond to additional external requests due to the absence of a responsible person or high workload, because the requests were directed mainly to people with a high level of responsibility and awareness of the current situation. As a result, seven companies confirmed their participation, eight companies refused to

participate in the interview, and twenty-four requests remained unanswered. Eventually, 22.5% of the respondents agreed to participate in the research on the condition of anonymity.

4.2. Interview questions and topics

Before starting the interview process, a questionnaire template in two languages English and Russian, for the participants was prepared and placed in Appendix III, Appendix IV. The list of questions has four main sections.

The first section is called «General Information». It consists of two blocks. The first block contains basic information about the interviewee (company, role, position and area of responsibility), the second block contains five general questions about the company and the environment in which it operates.

The second section is called «The state of the transport market». This section consists of two questions aimed at studying the transport sector's current situation in Northern Europe, Asia, and transit countries regarding transport modes and infrastructure facilities.

Section three is central; it contains questions that help to find an answer to the research topic. It is called «Container Transportation on the route Northern Europe – Asia». It consists of seven blocks with different content, including rail, container sectors, intermodal centres, transport attributes, conditions and adaptation, legal environment and other questions. In total, that section is the biggest, has ten questions, and accordingly has the most extended duration in the interview process.

Section four is the final. It contains two blocks of questions. The first block of questions relates to environmental nature and sustainability issues, and the second block of questions is aimed at finding relevant topics for business and the practical application of the master's thesis.

4.3. Data collection process description

The primary source of information on which this research is based on interviews, mainly with representatives involved in transport and container transportation. In total, there were seven interviews with seven different companies, and eight participants were conducted from 02/14/2021 to 02/25/2021. Three of these companies operate in the Russian Federation, two in Finland, one in Estonia and one in Norway.

Before the beginning of each interview, a summary of the forthcoming interview's content was conducted to more clearly understand the current study's objectives and more accurately answer the questions during the interview process. Six interviews were conducted online using ZOOM and Microsoft Teams platforms, and one meeting was conducted in person using audio recordings of the conversation. Before the start of each interview, permission was requested to record an

audio-video stream to obtain more accurate information collection results. After the interview, the audio-video stream was transcribed and sent to the participant for review and verification. The interviews' duration ranged from 47 minutes to 80 minutes, the median time being 65 minutes. The interviewees are presented in four sectors in descending order of the number of survey participants: science, freight forwarding services, infrastructure services and municipality. Companies doing their business around different kind of logistics services include, more commonly around rail/sea/infrastructure services and, less frequently, road and air services. Some of them have transport assets in operation, and some do not. Some companies are planning to start their activities in the near future. Noticeably, all of them are working or planning to work with rail because this work focuses deeper into rail container transportation between Asia and Northern Europe, or in another way, these companies conduct their activities or have clients who are involved in trade relations with the Asian market, with the market of Northern Europe or transit countries. Therefore, in most cases, participants are aware of current developments in the container transport sector.

The names of the participants in the process and some of the statements were hidden to preserve the anonymity of the process of collecting information and not to influence the activities of companies and participants in the future. For this purpose, each participant was assigned a serial code. General information about participants and interview is shown in Table 4.

Table 4. Semi-structured interviews overview.

Code	Country	Date	Duration of interview
Participaint_1	Estonia	14.01.2021	1:02:37
Participaint_2	Finland	20.01.2021	1:07:39
Participaint_3	Finland	22.01.2021	0:47:27
Participaint_4	Russia	29.01.2021	1:10:29
Participaint_5	Russia	03.02.2021	0:57:05
Participaint_6	Russia	18.02.2021	0:54:43
Participaint_7	Norway	25.02.2021	1:20:26
Participaint_8	Norway	25.02.2021	1:20:26

All representatives have relevant experience and knowledge of the transport sector and container operation. At the time of the survey, the participants held positions of upper management, director / head of department, project manager, key researcher or liaison officer.

4.4. Research results

During interviews, each participant said that the coronavirus pandemic had made changes in the global supply chain. Will consider this situation in more detail. For a more visual representation of the ongoing changes, similar judgments or answers of the respondents were combined into

blocks-mindmaps, in the centre of which the major event was placed. Links between objects were reflected in the form of lines or blocks with subtopics. In this study, the author has not changed the respondents' replies if they met anonymity conditions.

4.4.1. Transport market

In order to understand the transport market in Northern Europe and Asia, the survey participants were asked questions about the types of cargo transported in containers in this direction and what changes have occurred with the advent of coronavirus infection. The answers were presented in Figure 7.

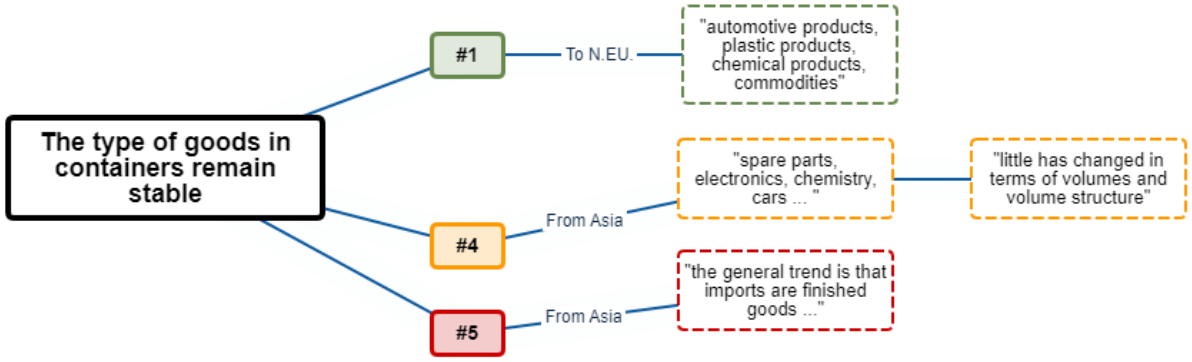

Figure 7. Containerized cargo on the route Northern Europe - Asia.

In most cases, the participants did not notice any severe changes in the structure of transported goods. The participant was the first to comment that mainly automotive products, plastic, chemical products and chemicals are imported to Northern Europe. He also mentioned that e-com type of cargo is still used auto and air transport, here was the reply "*E-commerce is not transported in containers because it is too slow. For E-commerce cargo, consignors use mainly air or auto transport."* The fourth participant noted that various parts, electronics, machines are exported from Asia, and during 2020, there were no significant changes in the structure of traffic flows "*B2B Market. Globally, nothing has changed; there are still spot clients and tender clients.*" The fifth participant even highlighted the general trend in the export of finished products from the Asian region. Thus, COVID-19 did not change the main transport movement in the B2B segment, and consumer behaviour remained unchanged. The types of cargo transported in containers did not undergo significant changes. This corresponds with previous studies on freight structure exported by rail (Lasserre *et al.*, 2020).

For a long time, most of the cargo from Asia has been brought to Northern Europe by traditionally sea transport. Therefore, the survey participants were also asked questions about maritime transport operation during the period of coronavirus infection. During the analysis of changes in

the transport sector, the interviewees noted the availability of port facilities in the North-West region. They described it as follows.

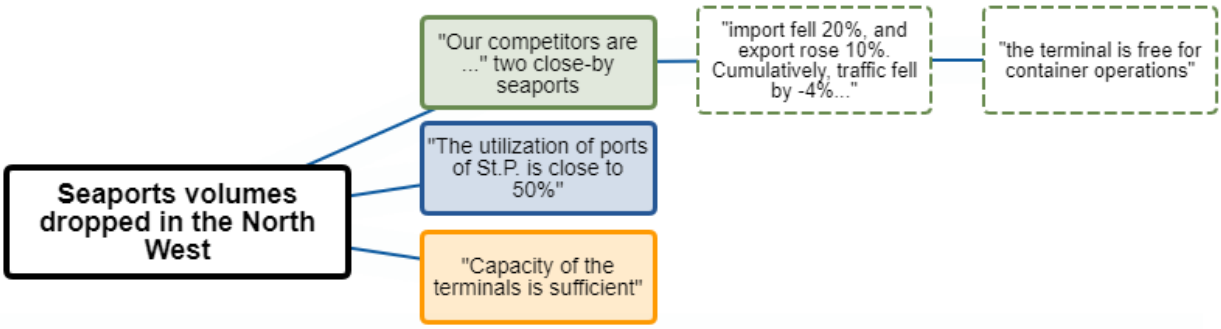

Figure 8. Seaports volumes in the North West region during the COVID-19 period.

The first participant answered that the North-West region is characterized by a highly competitive environment, which means that ports located in the Baltic basin compete with each other and try to attract cargo volumes as much as possible. All ports are in approximately equal conditions. They do not belong to the category of main ports, because they are using feeder vessels. The respondent noted that their imports fell significantly, and the growth in exports in mid-2020 somewhat mitigated the substantial drop of the freight base. Eventually, at the end of 2020, the total traffic volume fell by 4%, although a 20% growth was projected. The second respondent replied that the Russian ports in the St. Petersburg area have a utilization rate close to 50%, indicating the availability of free capacities in this region. The third participant confirms that the infrastructure can receive additional cargo flows, so it can be concluded that the volume of cargo transported by sea transport in the North-West region has dropped with the advent of COVID-2019. Facts support the findings from interviews:

1. Finland.
    a. Port of Helsinki. Total cargo traffic dropped by 8.5%, and containerized cargo traffic dropped by 5% (Port of Helsinki, 2021).
    b. HaminaKotka. Containerized cargo traffic dropped by 8.3% (Port of Hamina Kotka, 2021).
2. Russia, Baltic basin. Overall, containerized cargo traffic dropped by 6.8% (Infranews.ru, 2021).
3. Latvia. Containerized cargo traffic dropped by3.44% (data.stat.gov.lv, 2021).
4. Estonia.
    a. Port of Tallinn Group. The number of TEUs decreased by 9 thousand units (4%) to 214 thousand TEUs (Port of Tallinn, 2021).

b. HHLA Group. Reports that the port of Tallinn and port of Odesa decline by 4.7% to 584 thousand TEU (hhla.de, 2021a).

5. Sweden. The container market in Sweden felt by 2% (Portofgothenburg.com, 2021).

Table 5. Annual changes in container traffic of the Baltic basin in 2020 from public sources.

Finland	**Russia**	**Latvia**	**Estonia**	**Sweden**
Dropped by 5 – 8.3%	Dropped by 6.8%	Dropped by 3.44%	Dropped by 4.7%	Dropped by 2%
Result: in general, there is a decrease in container flow to the ports of the Scandinavia and Baltic basin around by 5.5% (hhla.de, 2021b).				

In addition to maritime transport, alternative options for cargo delivery on route Asia - Northern Europe were considered as well. The survey participants shared their observations below.

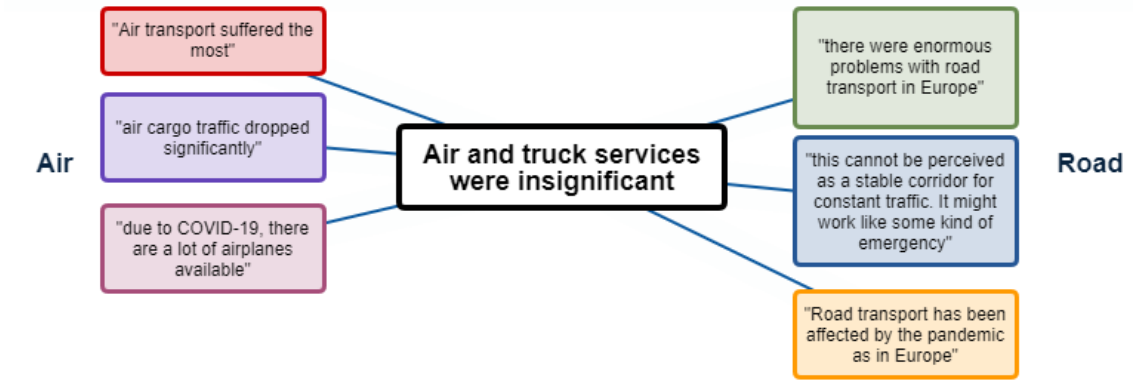

Figure 9. Influence air and road transport during COVID-19.

Two out of eight candidates interviewed noted that the COVID-19 had a significant impact on road transport. This was mainly manifested at the pandemic's initial stage, when states began to close international land borders. "*In the spring of 2020, there were enormous problems with road transport in Europe. Mostly at the borders, when the vehicles stopped and did not know how to proceed.*" This situation continued until the states developed a new border crossing procedure. As the respondents note, the situation continued throughout the spring of 2020. One respondent confirmed that a new truck service was launched to transport containerized cargo from Asia to Europe during the pandemic. This route passes through the territory of the Russian Federation. However, a survey participant noted that this service arose due to a disruption in the global supply chain. Thus, the service will continue to exist as a backup option for delivering goods, such as avoiding production interruptions. He described this cargo supply channel as unstable, as land borders severely limit the possible throughput. "*Borders would quickly become clogged, and this cannot be perceived as a stable corridor for constant traffic. It might work like some kind of emergency, comparable to airfreight.*" Analyzing the responses received, it can be concluded that

COVID-19 temporarily paralyzed road transport due to difficulties at inland borders, and its contribution to the total container flux between regions was insignificant. Road container service has existed in case of an urgent shipment. The weak influence of road transport is also explained by its weak price competitiveness on such a long route (joc.com, 2020b). This has been repeatedly confirmed by research (Seo *et al.*, 2017).

Airfreight has been severely affected by the impact of coronavirus infection. At least three out of eight respondents noticed such changes. As shown in Figure 9, the volume of cargo transported by air has decreased; therefore, free capacities and air transport are underloading. The European Parliament confirms the impact of the pandemic on air transport. It notes that passenger aircraft, which fell by 66% in 2020 compared to 2019, carries about half of the cargo. Also, the European Parliament notes a drop in demand for air cargo transportation by 20% or more (European Parliament, 2020). Air cargo transportation in Asia has also been affected. Research has noted a drop in volumes from 10 to 20%, as well as restrictions on international flights to China (Li, 2020).

The exact opposite situation was observed in the railway sector. Three respondents noticed an increase in the volume of cargo transported in containers by rail. Respondents' answers are visible in Figure 10.

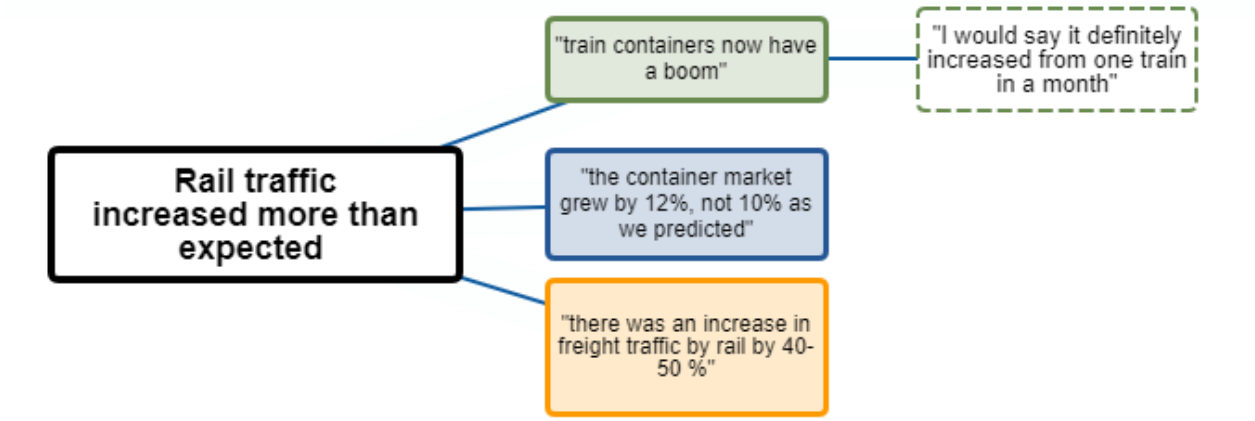

Figure 10. Rail traffic during COVID-19.

Respondents who noticed an increase in the volume of transported goods in 2020 already assumed an increase in the cargo base, but the results were more optimistic than expected at the beginning of 2020. However, one participant has mentioned that even during one year, there were different expectations: "*Expectations have changed dramatically throughout the year. Logistics is highly sensitive to emotional things. COVID-19, for the most part, for the container market in Russia was just such an emotional thing.*" Another participant confirmed that there was a great deal of uncertainty in planning and forecasts throughout the year: "*The thing is nobody can plan more than six months ahead. … Everybody is very cautious about the orders for the next season."*

Nevertheless, if a large group of participants replied about the growing trend of railway container traffic, then the quantitative assessment of traffic growth ranges from 12% to 50%. The spread is relatively high; this is explained by the different regions of the respondents' activity. Take into consideration in details the possible railway routes Northern Europe - China, note the countries involved in railway transportation and see the current information on them in Table 6:

Table 6. Primary rail routes East – West.

1	Asia – TSR (Nakhodka/Vladivostok) – Moscow – St. Petersburg – North Europe
2	Asia – TSR (Nakhodka/Vladivostok) – Moscow – St. Petersburg – Helsinki
3	Asia – TSR (Nakhodka/Vladivostok) – Moscow – Central Europe – North Europe
4	China – Zabaikalsk – Moscow – St. Petersburg – North Europe
5	China – Zabaikalsk – Moscow – St. Petersburg – Helsinki
6	China – Zabaikalsk – Moscow – Central Europe – North Europe
7	China – Naushki – Moscow – St. Petersburg – North Europe
8	China – Naushki – Moscow – St. Petersburg – Helsinki
9	China – Naushki – Moscow – Central Europe – North Europe
10	China – Dostyk – Moscow – St. Petersburg – North Europe
11	China – Dostyk – Moscow – St. Petersburg – Helsinki
12	China – Dostyk – Moscow – Central Europe – North Europe

Therefore, the following countries are accepted as a key entry and exit points for container flow: China, Russia, Kazakhstan, Finland, Belarus. Changes to container flows will reflect a presentational picture. Container flows to/from Estonia were excluded due to their insignificance "*As soon as relations between Russia and Estonia deteriorated, the traffic volumes began to fall*". Statistical data required to understand the situation, in reality, could be seen in Table 7.

Table 7. Rail container transit transportation, main figures.

Finland	**Russia**	**China**	**Kazakhstan**	**Belarus**
"Nurminen Logistics' Chinese container train traffic volumes have tripled during 2020". (nurminenlogistics.com)	Growth by 51.2% and reached 757 150 TEU (infranews.ru)	Growth by 56% and reached 1.4 million TEU (xinhuanet.com)	546 900 TEU (utlc.com) in 2020 333 000 TEU in 2019. Growth by 64.2%	550 000 TEU (rw.by) in 2020. Growth by 60%.

However, as noted by the survey participants, the increase in container traffic could be even more significant. For example, one respondent indicated that "*Furthermore, there would be more if there were enough containers. In addition, there are significant problems on the Belarus-Poland border due to high traffic volumes. If not for these bottlenecks, growth would have been higher.*" One of the leading container operators in Finland also reports in its annual report that COVID-19 has slowed down the development of container transport for the supply of food and other temperature

cargo. In particular, the slowdown in ground handling of goods in China affected, and the removal of restrictions related to COVID-19 will help the further development of container traffic (Nurminen Logistics Plc, 2020).

The respondents explain such high growth rates by the good performance of railway transport during the pandemic.

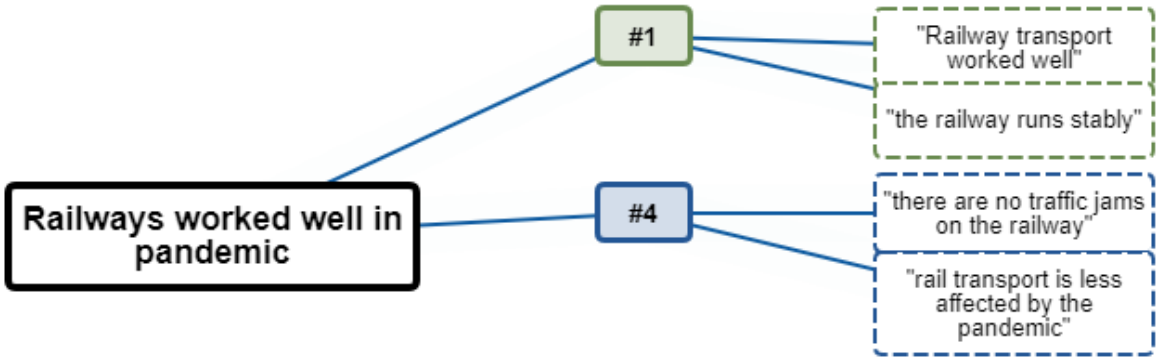

Figure 11. Characteristics of railway transport during a pandemic.

As can be seen in Figure 11, the interviewee with code 1 replied that during the pandemic, rail transport works well and stably, and the interviewee with code 4 replied that container transport on rail transport is not affected by congestions and was also less affected by the COVID-19 pandemic. This is how one of the participants described the situation: "*Traffic jams were formed at the automobile border checkpoint Kamyshovaya - Hunchun. Vehicles with temperature cargo could not pass through. Railway transport correctly substituted road transport in this situation. There were not the same restrictions on railway transport. Therefore, railway transport has won to a greater extent.*" Another participant close to the Russian rail sector also confirmed that *"In my opinion, nothing has changed. Railway transport during the pandemic worked like clockwork."* These observations of business participants are confirmed by the ESCAP report, which confirms that rail transport during the pandemic provided a reliable connection between Europe and Asia despite the restrictions imposed, and the closure of state borders only affected the passenger rail sector (unescap, 2020). As far as the pandemic is still ongoing in 2021, rail traffic growth is still gaining momentum. For instance, Global Times news reported about 96% growth in rail freight flow on the China - Europe route in January – February 2021 (Globaltimes.cn, 2021).

In the process of studying the state of the transport market for the transport of goods between Europe and Asia, the participants noted some features and disadvantages. Figure 11 highlights the shortcomings faced by companies. These shortcomings limit the possibilities for increasing freight traffic between states.

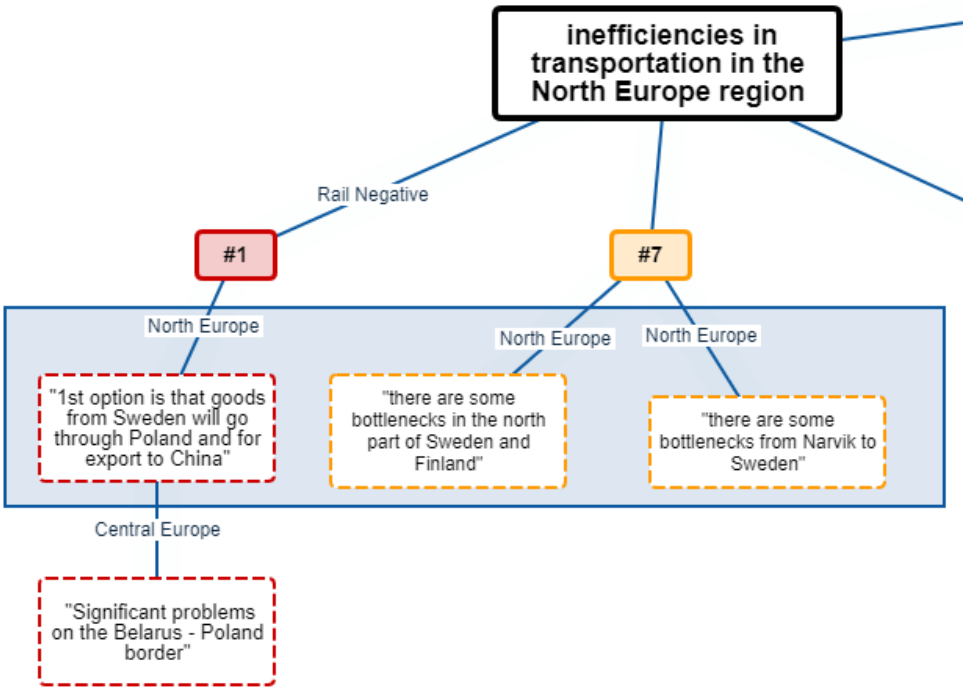

Figure 12. Inefficiencies in transportation, part 1.

The first difficulty that a business faces when moving goods is the limitation of the infrastructure's capacity. More than 80% of goods follow rail to central Europe (Velesco *et al.*, 2021). Participant 1 notes that the border between Belarus and Poland is currently a bottleneck that needs modernization since Central Europe is not always the endpoint of the supply chain, and in the future, goods can be sent to Northern Europe, for example, along the route Poland - Sweden and vice versa. The bandwidth limitations have also been confirmed by recent research. At the same time, according to the author, the situation should improve due to the attraction of investments for the development and expansion of capacity (Velesco *et al.*, 2021). Participant 7 also confirmed the existence of infrastructural restrictions between states, but already between the Nordic countries. He noted the difficulties of crossing the borders between Norway and Sweden and between Sweden and Finland. Here were the comments regarding these issues: "*Today there are some bottlenecks from Norway to Sweden. It is a single-track line; there are some capacity issues. I suppose that there are some bottlenecks in the north part of Sweden and Finland as well.*" These facts are also in line with the recent news that Norway, Sweden and Finland are working together to develop the Nordic Silk Road. Norway's interests include the export of fish products to China, as well as the use of a deep-water port for transit cargo flows, Sweden's automotive production depends on Chinese goods, and Finland borders on Russia, which gives it the ability to form trains of the required weight and length for through-going through Russia. However, at the moment, there are difficulties in the following places:

1) Kiruna – Narvik single-track line should be renovated to pass both freight and passenger trains (RailFreight.com, 2020).
2) Finland and Sweden border should be upgraded from both sides. It has lacked electrification, reloading facilities and equipment for changing axle width or wagons bogies (RailFreight.com, 2020).

Participant 2 and Participant 5 also mentioned the current difficulties in the transportation process in Finland, Russia and China. Their comments are displayed in Figure 13.

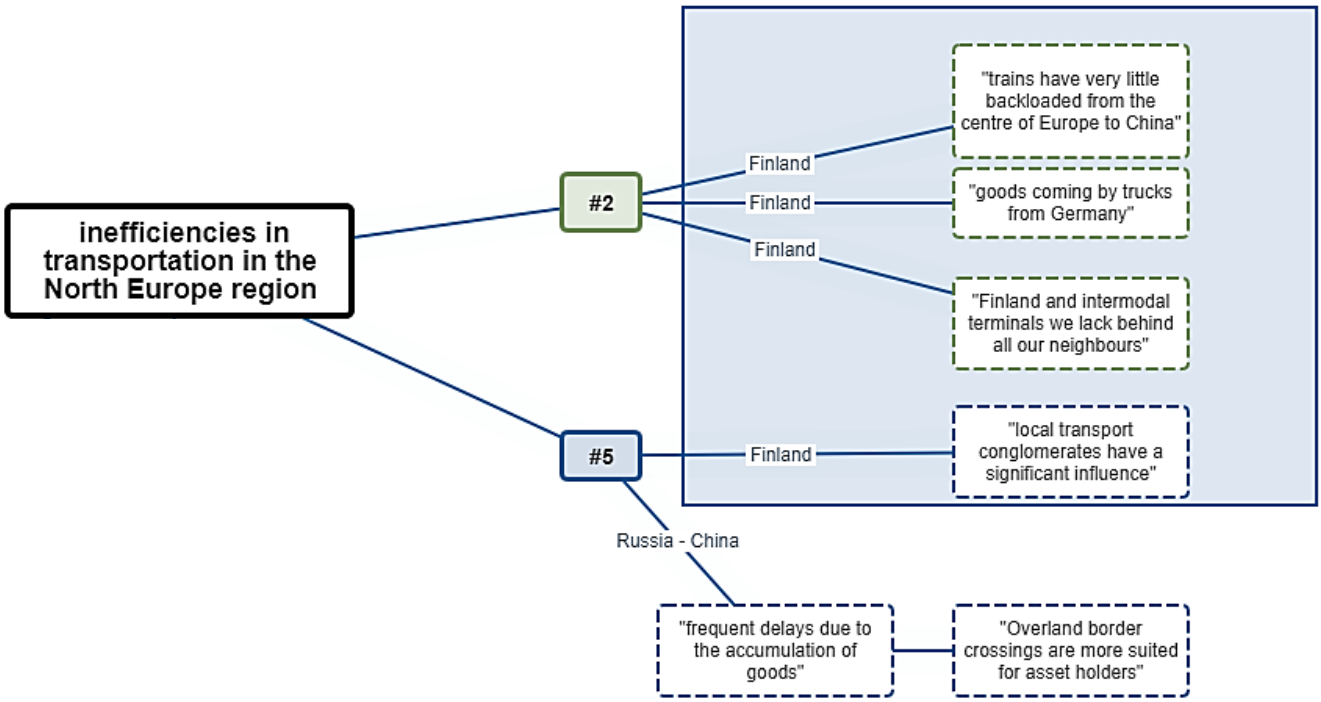

Figure 13. Inefficiencies in transportation, part 2.

In the beginning, consider Russia – China region. The respondent with code 5 notices that there were frequent delays at the Russia – China border. He complained that inland border crossings are monopolized by prominent players, creating difficulties in the price struggle and additional services for the customer. "*It becomes impossible to give a competitive offer from the perspective of pricing policy due to the lack of competition in this area. Hence the marginality is relatively meagre.*" However, the regular restrictions continue in 2021 on the loading of goods through land border crossings and seaports. The information was collected from official information notices of Russian Railways for its clients. All the orders in 2021 on the date 07.04.2021 were placed in Appendix V. Two graphs have been made in Figure 14, based on that data.

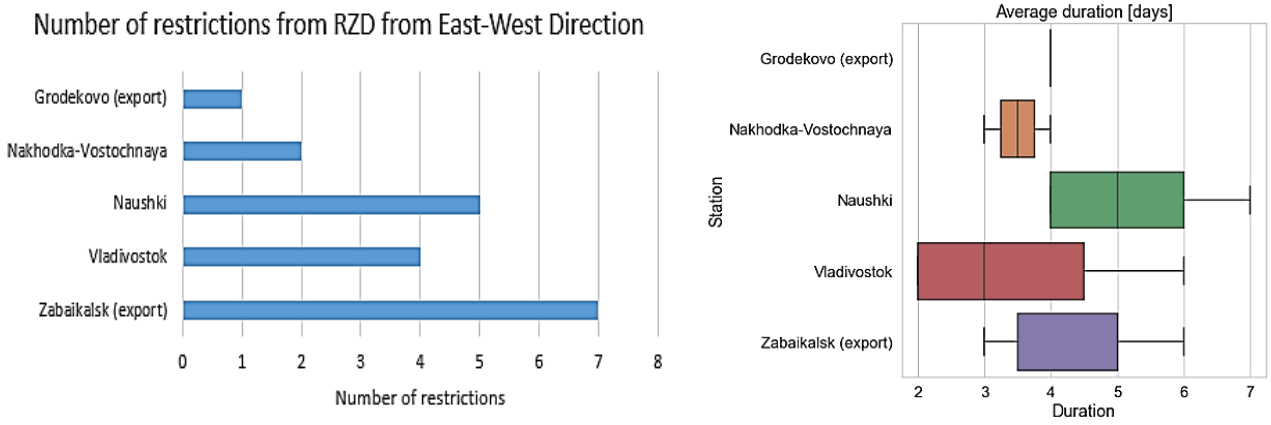

Figure 14. The number and duration of restrictions made by RZD during 01.01.2021 – 07.04.2021.

The total number of restrictions was 19 (six restrictions per month at the median level based on the first quarter of 2021), of which six restrictions were imposed on the eastern ports of the Russian Federation and 13 on land border crossings. The main reasons were the restrictions on trains' reception by the Chinese railways or the limitation of the port's capacity. The number of trains set aside from traffic ranges from 5 to 38. The median duration of the restrictions was four days. However, this does not mean that the road through the Grodekovo-Suifenhe border crossing is the most reliable in delivery on time. This is one of the alternative corridors; at the moment, it is not as popular as Zabaikalsk or Naushki (rzd-partner.ru, 2020).

Another part of the issues is related to the eastern borders of the Northern Europe region. The participant with code 5 indicated the weak presence of international transport and logistics companies in Finland, and the participant with code 2 mentioned the following three problems:

- The lack of a freight base for the backload cargo to China.
- The lack of a sufficient number of intermodal centers for receiving and dispatching goods by different modes of transport.
- The availability of delivery of goods by road from Germany to Finland.

News sources mentioned the problems associated with the Finnish side of transportation. The return loading of trains must be observed with regular departures. Therefore, the intervals usually regulate the speed of cargo accumulation at the departure points. According to (railfreight.com, 2019), the companies are trying to support backloading from the Finland side. Noticeably, in May 2019, the regularity of the dispatch of the train on the China-Northern Europe route was one train every two weeks.

4.4.2. Price policy

Another issue that companies faced while working in the context of the COVID-19 pandemic is the change in the price level. Four out of eight participants noticed a dramatic change in sea freight. Simultaneously, all participants are involved in transporting goods or providing appropriate services, so the participants' opinion can be named reliable. The survey of participants showed that the cost of sea transportation had increased dramatically. Their responses can be seen in Figure 15.

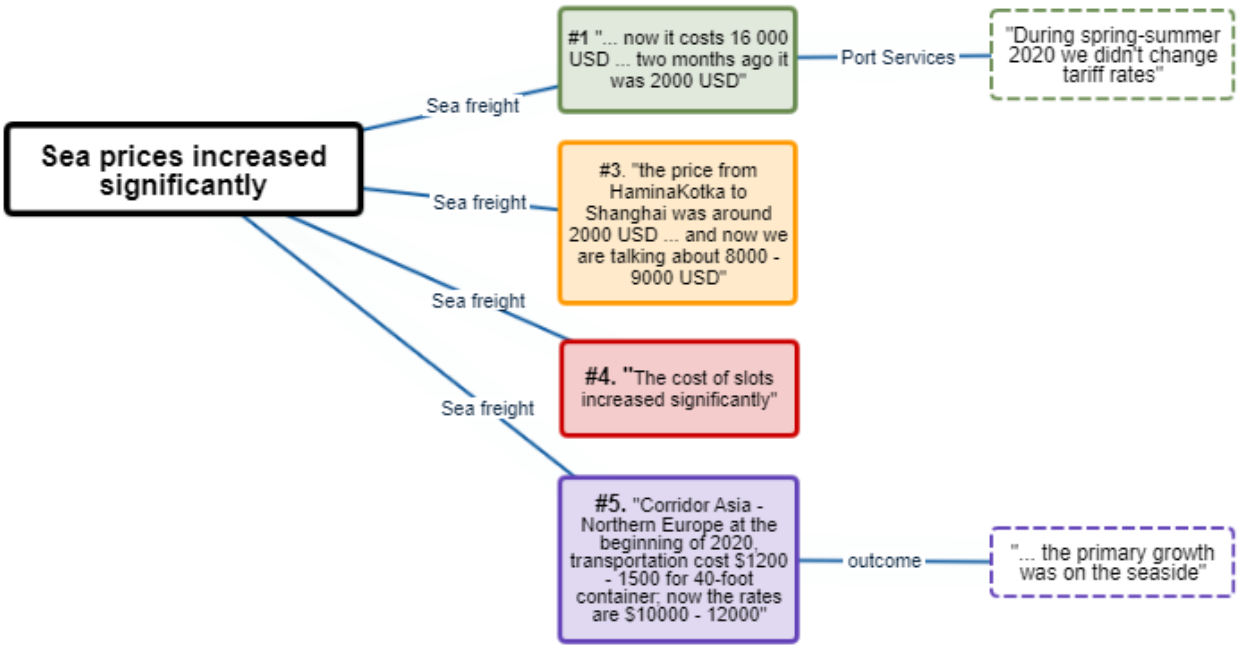

Figure 15. Sea price policy during the pandemic.

The respondents' replies showed that before the coronavirus pandemic, the price of sea freight on the Asia-North Europe route for an ordinary forty-foot container was at the level of USD 1,500 - 2,000. During the pandemic, transportation cost increased to $ 8,000 - $ 16,000, depending on the final port of departure and final port of destination. Simultaneously, the noticeable increase in sea transportation prices is associated with sea freight. The cost of port operations and dues has not undergone significant changes. "*The pandemic has had a very negative impact on us because we are a little outport. For example, … furniture manufacturers have experienced problems importing materials from China. Transport costs increased eight times.*" Respondents' opinions match those of fbx.freightos.com and en.sse.net.cn indices. Evident changes in the rise in sea freight prices are depicted in Figure 16.

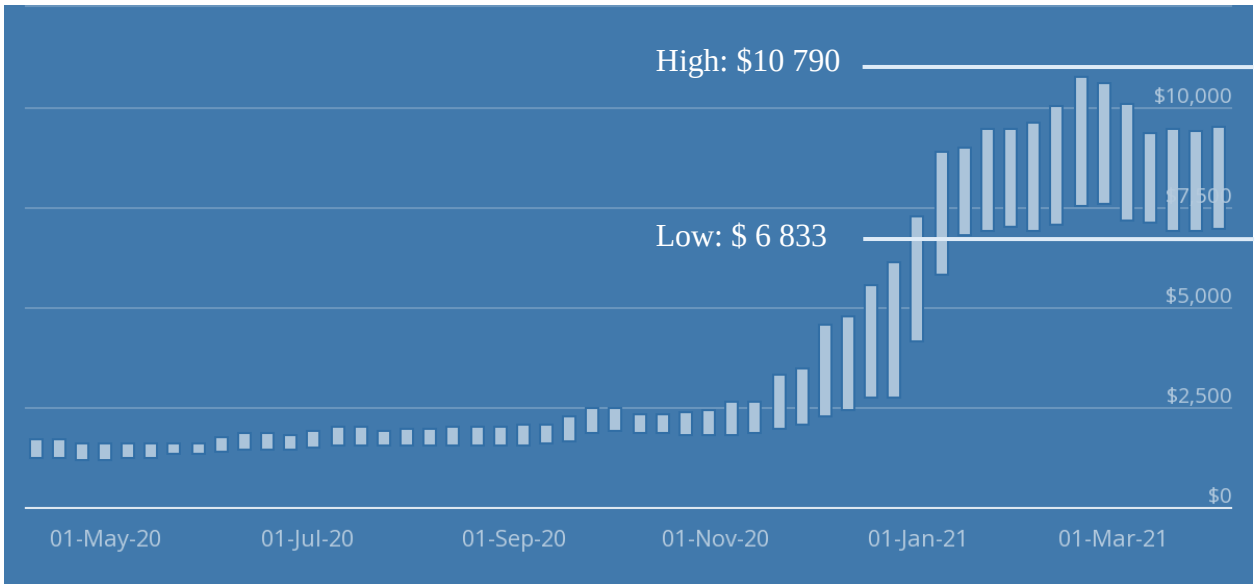

Figure 16. Freight Baltic Index (FBX). Price range: China/East Asia – North Europe (02-Apr-21). Source: fbx.freightos.com.

However, the change in pricing policy affected not only maritime transport. According to representatives with code 4 and code 5, there were also changes in the railway transport in Figure 17, but less significantly. As the interviewees answered, the price for container transportation increased from 10% to 30%. The price for railway transportation consists of two factors: the railway infrastructure tariff and the cost of booking a railway platform with a container. The infrastructure component of rail transportation partially changed as annual indexation, as planned. The Russian Federation's territory amounted to 3.7% and export premium to 8% (rzd.ru, 2021). The participant with code 4 said, "*The infrastructure railway tariff increased by 10%; it was raised in 2021 by Russian Railways*". The survey participants did not take it into account. It is also evident to market participants that an increase in transporting one transport affects other modes of transport. Thus, the participant with code 1 expressed the opinion that railway transportation has also risen in price: "*If the sea has risen in price, then the railway rate should also rise*". The participant with code 5 explains that all the parts in the supply chain are interconnected, and changes in one leg produce changes on the other leg. Here was his explanation: "*All of the above regions are participants in the global transport market, which is influenced by the same trends*". Based on the data in Table 7, it can be said that the main flow of transit cargo follows route #12 of Table 6. The primary operator of the container flow in this direction, UTLC, transports 72.2% of all transit cargo in the direction of China - Europe - China. According to the company's official statements of December 22, 2020, COVID-19 does not affect the pricing policy, and the company does not plan to raise prices for 2021 along this route since price stability is one of the main advantages of the railway operator (utlc.com, 2020). Thus, it can be concluded that the rise in prices for container transit by rail was insignificant during the pandemic.

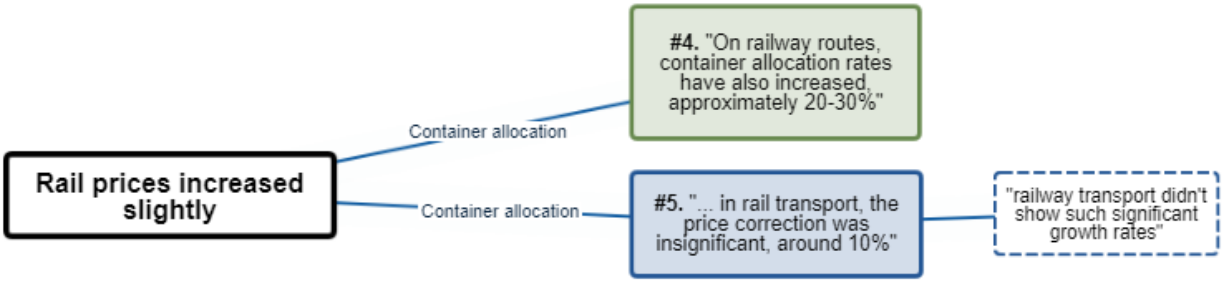

Figure 17. Railway prices during COVID-19.

Respondents were also asked open questions about tariff policies to assess the overall impact of COVID-19 on the transport market. Respondents replied about different modes of transport in case of awareness of these modes. Participants with Code 1 and Code 8 responded that airfreight prices in 2020 remained at the level of 2019. It has been shown in Figure 18:

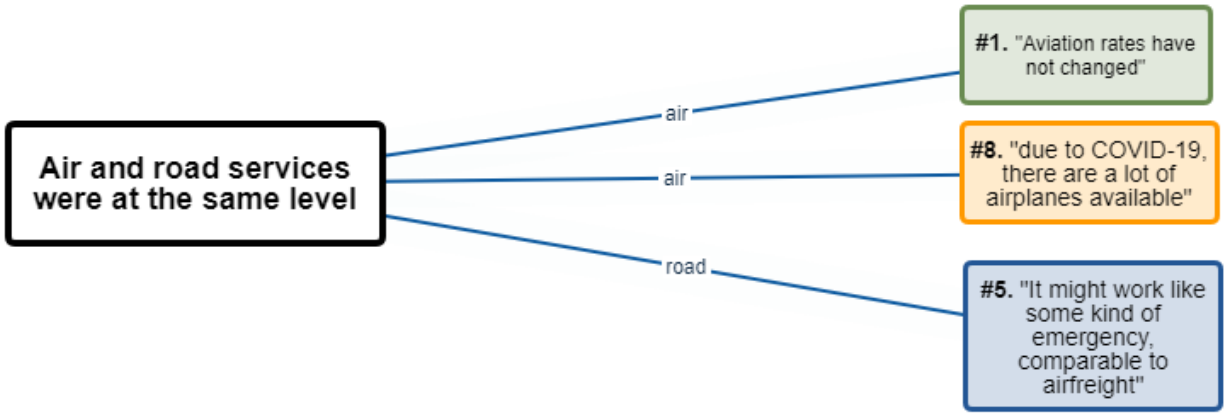

Figure 18. Air and road price policy during the pandemic.

However, the aviation industry's information on prices and occupancy rates is only partially consistent and sometimes controversial. "*Air transport suffered the most, and it is not a secret to anyone.*", said one of the participants. During the pandemic, the air industry cut the costs: jobs, wages, bankrupt statements, number of flights and others (European Parliament, 2020).

Air traffic dropped significantly in the first quarter of 2020 worldwide. Airfreight fell by about 30%, and passenger traffic by 80% to 100%, according to (IATA, 2020b). Demand fell, followed by a drop in capacity. According to (DHL, 2021b), the capacity declined by about 36% and did not recover till February 2021 compared to the pre-year period. According to (DHL, 2021b), in 2020, there was an increase in air freight rates by more than 50% compared to 2019. These data are confirmed by the information from (aircargonews.net, 2021) where the price has risen from $2,52 per kg to $5,58 per kg at the Hong Kong – Europe route. The data from (statista.com, 2021a) was also used to check if the news source's fright prices were correct. Thus, the rise in airfreight

prices is closely related to the available capacity. The decrease in capacity has happened due to decreased aircraft number since half of all airlift is carried by passenger airlines (European Parliament, 2020). In addition to aircraft capacity, the increase in rates almost double worldwide was also influenced by business confidence and declined inventory-to-sale ratio (IATA, 2020a).

The situation with road transport was somewhat different. The participant with code 5, dealing with forwarding services with different modes, replied that trucks' transport of containerized cargo is an additional option, and its overall impact is negligible. This was the answer of the participant: "*Indeed, such transportations exist, the market knows about them, and … transported several such trucks. There are difficulties here. Borders would quickly become clogged, and this cannot be perceived as a stable corridor for constant traffic."* This means that the volumes transported by sea transport cannot be redirected to landlines because interstate borders have limited capacity. Two main reasons explain the emergence of new urgent services for the transportation of goods in long-haul Asia-Europe route. Firstly, there is a demand for specific cargo that does not tolerate delayed dispatch, such as medical equipment. Secondly, there are interruptions in the supply chain of other modes of transport (Zhang, 2020). The second option, the reliability of the supply chain, is essential for Chinese customers. It follows behind the cost transport attribute (Li *et al.*, 2020). This explains the reason for the emergence of new services for the delivery of goods. However, these shipments cannot be called sustainable for an extended period due to their substantial impact on the environment, because road transport emissions produce 74,5% of total transport emissions (statista.com, 2021b).

That is why the European Commissions plans to achieve climate neutrality and reduce transport emission by 90% by shifting 75% of inland cargo from road to rail and inland waterways (European Comission, 2019).

There are many opinions that Northern Europe, and beyond it the rest of the regions, will gradually move to more environmentally friendly modes of transport. Five out of eight participants highlighted the importance of environmental issues in Northern Europe. The overall focus of the participants is to reduce the overall CO_2 emissions. Their opinions are presented in Table 8. Thus, it can be concluded that a strong development of road transport on internal combustion engines is not expected in the coming years.

Table 8. Interviewees' opinions on environmental issues in northern Europe.

Code of participant	Citation/participant opinion
Code 1	*" ... has a big goal - to save the world and reduce CO_2 where possible."*
Code 2	*"We have done an environmental study of this project and building project itself it has the green certificate—our aim to do green terminal."*
Code 3	*"If we are talking about Finnish companies, mostly the large companies are doing sustainability reports. In the sustainability report, the carbon footprint is usually one of the KPIs."*
Code 5	*"Scandinavia is ahead of the planet here, and great attention is paid to this issue."*
Code 7	*"The Government said that after 2025 it's not allowed to buy fossil fuel vehicles in Norway."*

Answers of participants on pricing policy showed that changes in transportation conditions affected the movement of goods in most cases. Participants with code 1 and code 2 replied that terminals and ports services remained at the same level (Figure 19).

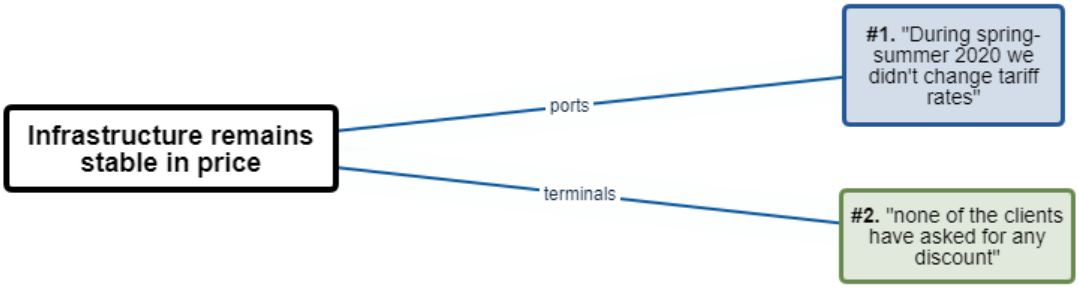

Figure 19. Infrastructure tariff policy during the pandemic.

Based on previous research (Bandarac *et al.*, 2013), port infrastructure pricing depends on several significant factors: channel length, channel depth, trade flow, various business structure and governance models, and geographical region. However, their impact on overall port prices influences too little to change the whole picture. For instance, the price will be reduced by 0.38% if channel length, channel depth and trade flow will be increased by 1% due to the inverse relationship in Table 10.

Table 9. Factor and pot pricing connectivity (Source: Bandara *et al.*, 2013).

Attribute	Attribute increase	Port due change
Channel length	1,00%	0,26%
Channel depth	1,00%	-0,53%
Trade flow	1,00%	-0,11%

Other factors like government or private operation and geographical role are also important, but there were no dramatic changes in these directions.

4.4.3. Container problem

In the third, central block of questions related to the transportation of containers along the Asia-Northern Europe route, the interviewees were asked questions about the availability of containers and the behaviour of customers using containers during a pandemic. The answers varied, but five out of eight representatives treated in the container shipping business responded about the problems associated with container availability. The focus of the interviewees' response was on the lack of access to containers: "*This is a temporary local deficit of containers.*" It became difficult to book them for transportation services, which concludes that containers have become unavailable: "*Cargo in containers was not unloaded, i.e. these containers are there.*" On the contrary, representatives of the scientific community involved in transport research have not noticed any significant changes, but their answers are less significant due to less involvement in the transport business and container operation.

Four out of five respondents gave various reasons, why containers have become unavailable. These reasons are shown in Figure 20. On the one hand, the participant with code 1 speaks about the deterioration of relations between China and the United States, with the result of which the return of containers from the United States has slowed down. Contributor with code 2 provided the suggestion that containers are in the wrong place. The participant with code 4 talked about difficulties in the ports of unloading containers, and the participant with code 5 replied of an imbalance in trade activity because of COVID-19 and the pursuit of sea carriers' interests in high profit. All these reasons are associated with sea transport. Furthermore, this is to be expected since sea transport accounts for 85% of China's exports in 2018 (Bucsky, 2019).

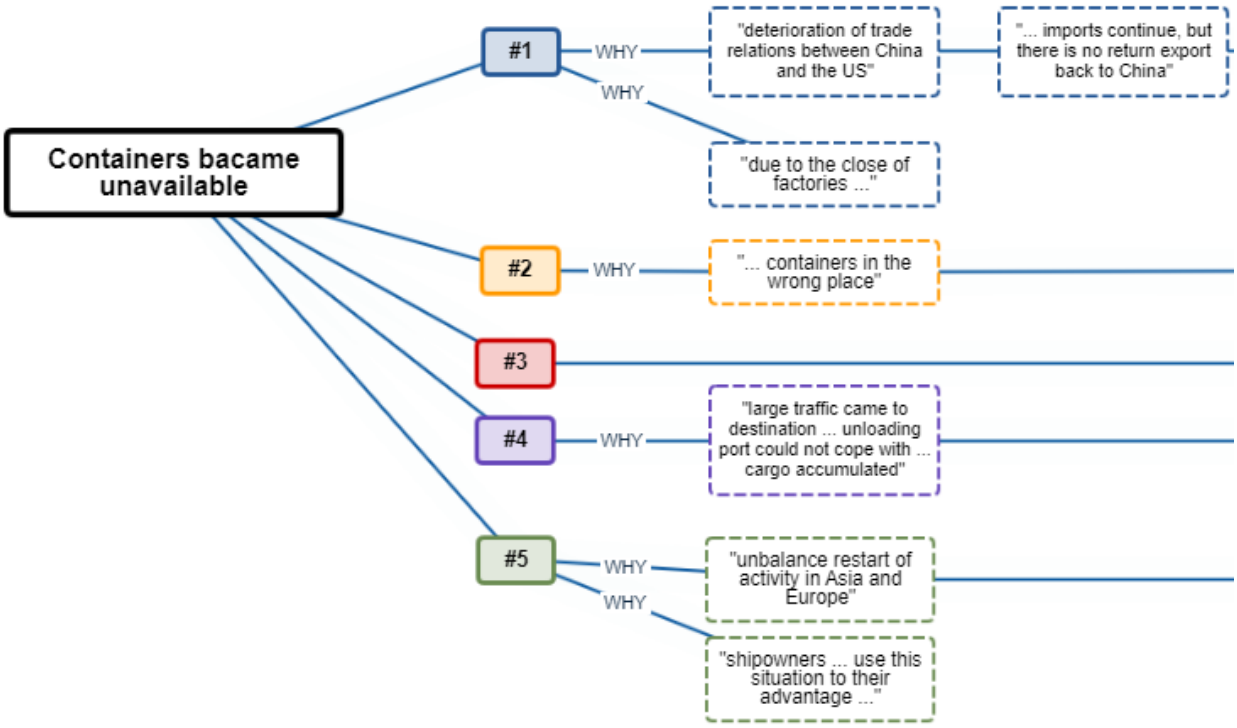

Figure 20. Container problem during the pandemic, part 1.

According to UNCTAD, the coronavirus pandemic has severely impacted maritime transport. In particular, the pandemic initially reduced maritime trade, increased the number of empty voyages, delayed customs and port clearance, increased waiting times for ships and delayed port crews, increased the workload on workers due to quarantine restrictions, increased the volatility of cargo volumes in ports, reduced port connectivity, increased the load on warehouse services and has reduced the capacity. The connection between inland and sea transport has gotten worse (UNCTAD, 2020a). The total damage caused by the pandemic of container shipping in volumes is estimated in the European market to be from -2.4% to -8.2%, compared with a projected increase of 2.7% of 2020. The Asian region has suffered less. Its damage is estimated from 0.7% to -5.7% in comparison with the forecasted growth of 3.5% (statista.com, 2021c).

Table 11 contains quotes from transport and logistics companies from their public sites about the reasons for the unavailability of containers, and they coincide with the opinion of the survey participants. According to the table, in the opinion of transport market participants, the main reasons for the inaccessibility of containers were the general imbalance in demand, port problems, lack of vessel capacity (310 container vessels were staying idle in February 2020; statista.com, 2021b), as well as delays associated with the return of containers.

Table 10. Reasons why containers became less available in the opinion of freight forwarders.

Reason	**Kuehne + Nagel (kuehne-nagel.com)**	**DHL (dhl.com)**	**Fesco (fesco.ru)**
Demand disbalance	"*The scarcity of containers in the right locations.*"	"*the lack of containers available for loading in Asia.*"	*"…quarantine restrictions in the first half of the year … led to traffic decrease in the world*"
Port problems	"*Congested ports.*"	"*ports struggling to cope as ships arrived with more containers than expected, reduced the number of dockworkers and truckers.*"	"*quarantine restrictions … affected the work of personnel in ports and transport companies.*"
Reduced vessels capacity	"*Reduced number of operational vessels.*"	"*lack of vessels.*"	-
Planning problems	"*A changed flow of goods.*"	-	-
Container turnover has been slowed down	-	"*delays in returning containers.*"	"*container movements has been shown down.*"
Reduction in container production	-	-	"*China reduced the production of new containers in low demand.*"

Significant container imbalance has led to difficulties in unloading and shipping containers to loading sites. The survey participants indicated the most problematic places. Four out of five participants said that problems are observed in the United States; also, the participant with code 1 indicated a possible problematic region of the UK, and the participant with code 5 indicated Europe. Their replies are shown in Figure 21. This information corresponds with (DHL, 2021a), where the company reports about the most extensive congestion in the U.S. ports of Los Angeles and Long Beach. There were 40 vessels at the anchor stop with a delay of more than 11 days. These vessels were stored more than 600 thousand TEU, 7.6% of the total trans-Pacific capacity. Another large congestion was observed at Felixstowe Port. According to the (Klfreight.com, 2020), 15 container ships were delayed from five to ten days. Here was the reply the participant with code 2 "*COVID-19 changed them all the scheduling of the transport*".

Furthermore, the empty containers were not returned on time. The data provided by (freightwaves.com, 2020) shows two periods of delays. The first period started from January 2020

until April 2020. In that, time ships were coming to the ports with 70% on-time arrivals. From April to June the situation became better when vessels arrived on time, improved almost by 10%. The situation started to deteriorate from June 2020 onwards. In November, every second vessel came to the port with five days of average delay.

It was also essential for the research purposes to determine, when containers became unavailable for market players to connect timestamps with other events in the transport market. The survey participants expressed their assumptions. The contributor with code 1 indicated that container problems started in November 2020. The participant with code 3, who interacts and expands partnerships with China, suggested that the situation worsened after the Chinese economy restart. Participant code 5 confirmed participant with code 1's assumption that the problems began before the Christmas season of cargo procurement. All of these interviewee's assumptions are shown in Figure 21.

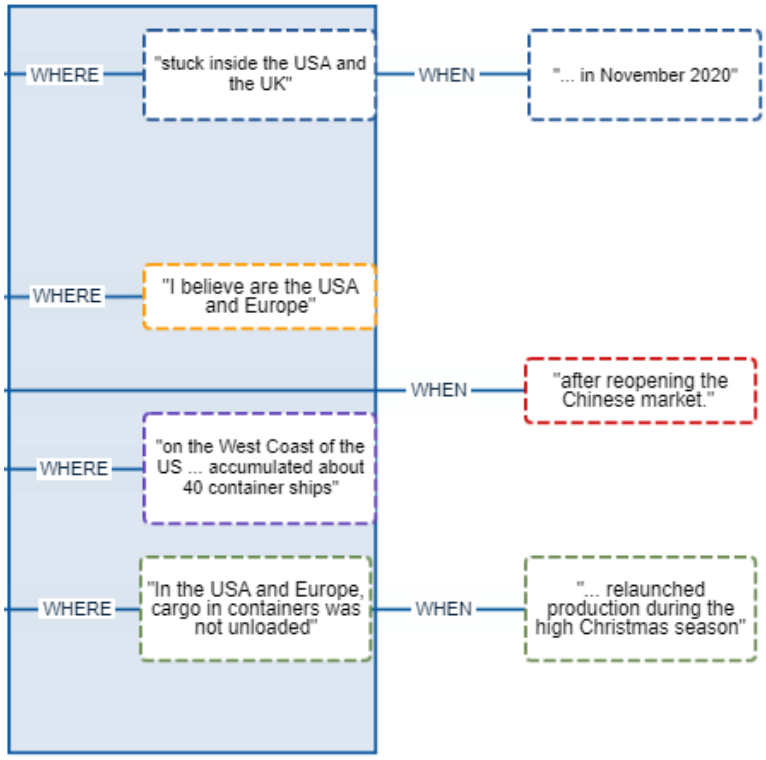

Figure 21. Container problem during the pandemic, part 2.

According to available resources, China softened workforce restriction from 03.04.2020, while central European countries like Germany, France and Italy softened their control from 22.03.2020 to 16.05.2020 (bsg.ox.ac.uk, 2021). Thus, it cannot be concluded that the restart of production and the resumption of the work-workforce enterprises in China and Europe took place at different times, and the inaccessibility of containers appeared after uneven production start-up in Asia and Europe. It turns out that the assumption of the participant with code 3 about the unavailability of

containers in the second quarter of 2020 after the restart of production in China cannot be proved and possibly has less significant weight in the unavailability of container booking during that time. Participant's assumption with code 3 corresponded to the period when the Far East - Europe trade route experienced the most significant decline in cargo loading, April 2020 amounted to approximately -300 thousand TEU by April 2019 (statista.com, 2020).

Contrary, the period of shortage of container equipment is well explained by changes in prices in the maritime transport market. According to the data in Figure 16, the increase in prices for container transportation has been happening since November 2020, when many international carriers began to cancel bookings for sea transportation (shippingwatch.com, 2020). According to (Stopford, 2010), the price change occurs when the available supply changes and rises dramatically in a J-shaped curve of 270%, when the supply is limited. So momentary equilibrium between supply and demand describes daily by price in the loading area. Thus, it can be concluded that the shortage of container equipment could be noticed by cargo owners starting from November 2020, as noted by participants with code 1 and code 5.

4.4.4. Global industry

In the process of an open dialogue with participants of the transport market, it was revealed that the coronavirus pandemic had a powerful impact on the global industry and individual sectors. The participants were asked questions about what had changed in their work and what problems they had noticed. According to the answers, the transport industry was segmented in individual object (road transport, sea transport, rail transport and air transport), supply chain, production and trade (Figure 22).

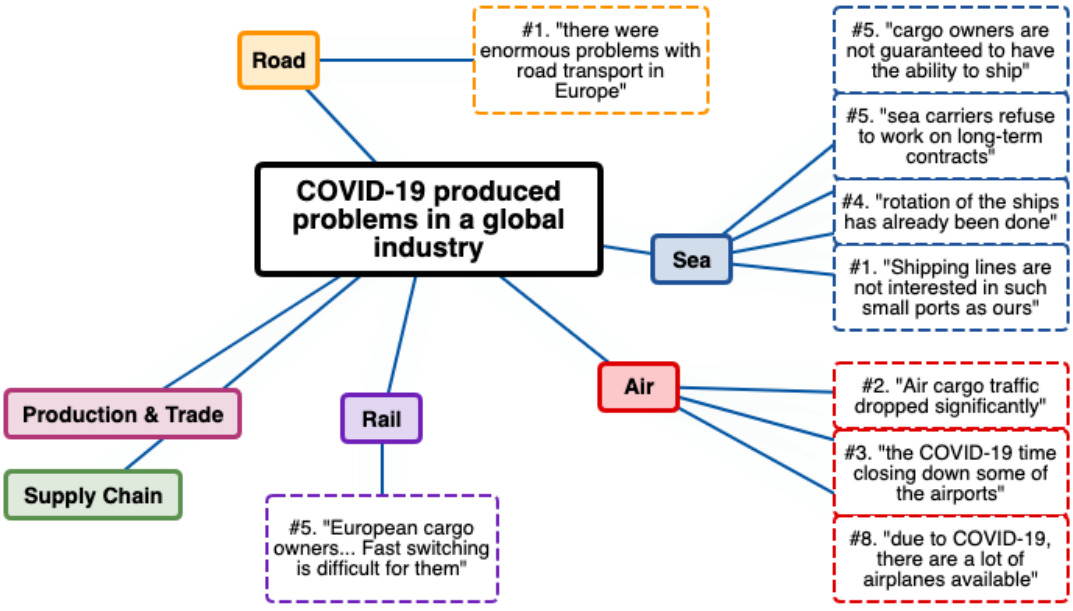

Figure 22. COVID-19 impact during 2020, part 1.

At first, borders between states began to close when the COVID-19 period arrived. States have restricted travel to prevent the spread of infection. Member with code 1 also added, "*Mostly at the borders, when the vehicles stopped and did not know how to proceed. Now the situation has returned to normal, but there were many problems in the spring of 2020.*" Problems arose due to the fact that the rules for the passage of trucks were not established between the states. Another participant with code 4 also confirmed that there were problems with the passage of trucks, but already at the borders between Russia and China, "*Traffic jams were formed at the automobile border checkpoint Kamyshovaya - Hunchun. Vehicles with temperature cargo could not pass through.*" Due to these restrictions, road traffic in Europe fell by 4.8% to 17% in the context of various scenarios (actual and severe impact), and travel distances dropped in April by 29% (statista.com, 2020).

Then other problematic places were sea transport and air transport. Participants with codes 1, 4, 5 who involved in sea transportation marked different stages regarding maritime transport. Firstly, it has been mentioned that shipping lines were not interested in working with secondary ports, "*It is profitable for the lines to do business between main ports, to reduce ship turnover and maximize profit.*" Secondly, the participant with code 4 told about the rotation of the ships. This refers to the anchoring of ships and their dispatch for scheduled maintenance during a period of low demand, i.e. planned reduction of ship capacity. The participant with code 5 spoke about the absence of guarantees for vessel booking and the refusal of the ship owners to service long-term contracts. That is also in correspondence with the last survey made (UNCTAD, 2021). According to this, the COVID-19 affected global trade flows in unpredicted speed and scale. As a result, global merchant trade performance fell by 5% in the first quarter and around 27% in the second quarter. As a result, vessels reduced their capacity, increased the number of empty voyages, and reduced port calls in all regions. Port infrastructure was also involved in that crisis, because quarantine measures restricted the workers, yard performance reduced, the cargo began to accumulate at the unloading points, and the port connectivity reduced (UNCTAD, 2020a).

Regarding air transport, one of the market players said: "*Air transport suffered the most, and it is not a secret to anyone.*" This phrase accurately describes the problems that have happened in the air transportation market. Participants with codes 2 and 3, who are not involved in the freight business, said air traffic had dropped, and some airports were closed during the pandemic. Participant code 8 expressed the point that airplanes have become more affordable. The theory that COVID-19 made significant changes in air travel confirms by surveys (Sun *et al.*, 2020; Abate *et al.*, 2020) and the public report (European Parliament, 2020). However, these changes were less significant than airport closing, because airports are strategic points for each country. The

provision the connectivity in a pandemic period is a high priority for the countries. Airports are the main hubs of vaccines and medical equipment distribution, so the government maintains air transport and provides subsidies to save jobs and aviation itself. However, this does not mean that the government provides 100% support. Airlines are also forced to cut costs on their own, partially lay off people and reduce the number of transport flights.

On the other hand, some positive factors also exist. The pollution of the environment has decreased, particularly the NO_2 produced by airplanes (Albayati *et al.*, 2021). It is also has been mentioned that in case of an urgent lock-down emergency, air cargo can be partly shifted from air to rail due to well-established connectivity between China and Europe (Sun *et al.*, 2020).

Also, during the survey, some problems were identified in the railway transport, but they did not look as significant. The participant with code 5 expressed the opinion that in the event of disruptions in maritime transport, the consignee cannot instantly switch to using rail transport. Firstly, it is possible to increase the costs associated with the transition to a new type of transport. It is required to sign and agree on new contracts, possibly new specialists and equipment, and debugging new processes. All of these operations are potentially time-consuming, and in some cases, new cooperation and partnerships may be limited by government regulators. In other cases, participants noted that rail transport survived the pandemic compared to other industries. The participant with code 4 said: "*Railway transport correctly substituted road transport … . There were not the same restrictions on railway transport.*" Alternatively, another reply from the participant with code 6: "*In my opinion, nothing has changed. Railway transport during the pandemic worked like clockwork. Those workers who were not transferred to teleworking were at their workplaces. There were personnel difficulties in the operational centres, but all this was resolved relatively quickly and did not lead to serious work disruptions.*" The survey (unescap, 2020) also proves that during COVID-19 international railway transport provided reliable and sustainable service along with the Trans-Asian railway network despite major restrictions. During the COVID-19, the main performance factors as speed, traffic carried even increased to cope with the growing traffic. In some regions, government support was still provided to rail transport, even though it was less affected by the coronavirus pandemic than others. For example, the Russian government provided subsidies for the transit container cargo transportation in the amount of 3.47 million US dollars (Government of the Russian Federation, 2020a), the National Development and Reform Commission in China allocated 28.3 million US dollars from the central budget to support the construction of transportation hubs in five freight assembly cities: Zhengzhou, Chongqing, Chengdu, Xi'an, Urumqi. The Kazakhstan government also allowed rejected fines and fees associated with cargo transportation on rails (unescap, 2020). From the participant's point of view,

these governmental subsidies worked during the pandemic "*Yes, the government subsidises transit. … Yes, it works*".

On the contrary, rail transport in Northern Europe has not received government support. Here were the participant replies about government support in Norway: "*I don't think that transport has any big changes in revenue during the last year in Norway. I have not seen that have been mentioned in general. Other industries have much more influence due to COVID-19.*" Alternative opinion has been received from the participant who was doing business in Estonia, "*In Estonia, government support is minimal."*

Other problems in other industries also began with the arrival of the coronavirus infection: manufacturing, trade and the supply chain. The continuation of the participants' answers can be seen in Figure 23.

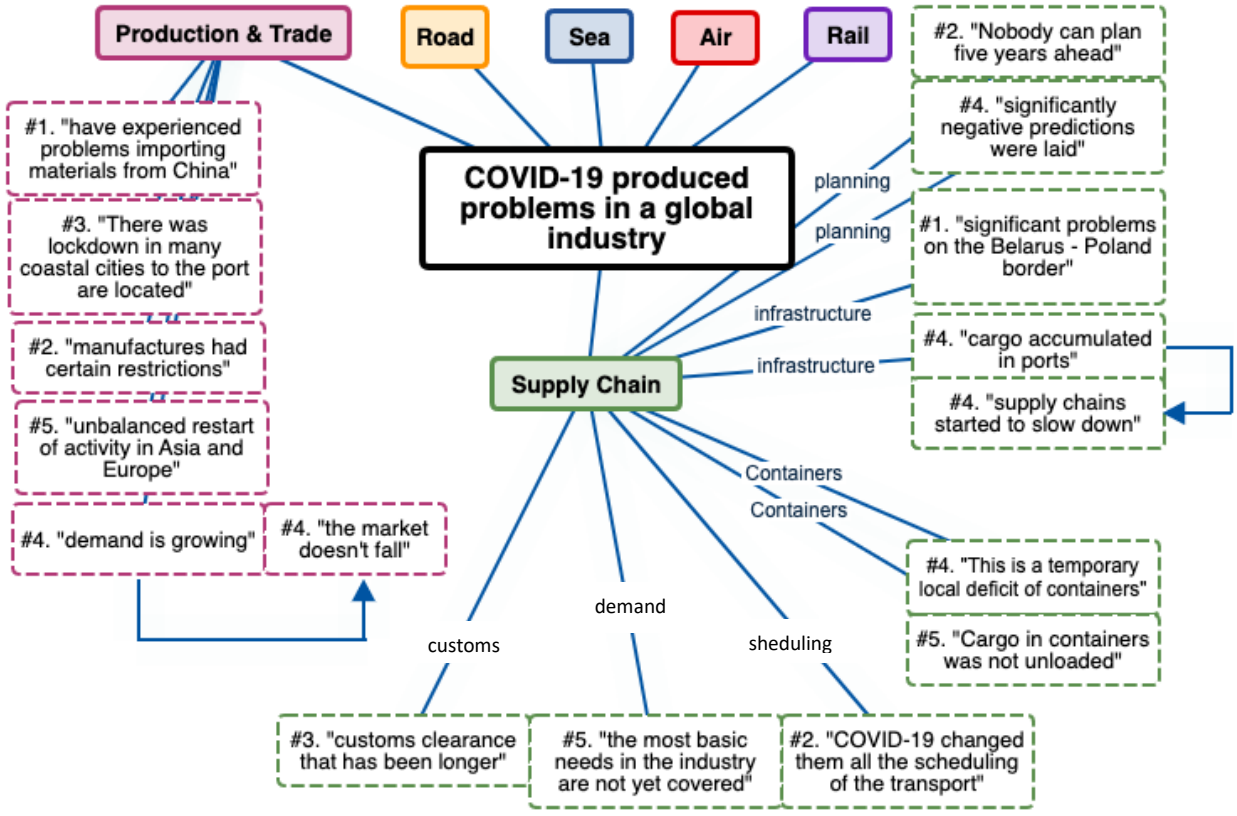

Figure 23. COVID-19 impact during 2020, part 2.

Unexpected occasions have affected the supply chain. Firstly, long-term planning and business forecasting became impossible, because the situation could change daily due to new restrictions, instability of supply chain, production close, and decreased consumption. As a result, companies did not have confidence in the future and especially in long-term forecasts. These changes were noticed by participants with code 2 and code 4.

Infrastructure also suffered. Bottlenecks have emerged, limiting the capacity. For example, a large amount of cargo accumulated on the border between Poland and Belarus, and ports worldwide could not cope with the increasing load. Consequently, the entire supply chain slowed down. Infrastructure changes have been noticed by participants with code 1 and code 4.

Container-related issues have been highlighted in a separate topic and have been detailed in chapter 4.4.3. Separately, it should be noticeв that the coronavirus pandemic made changes in the work of customs authorities. As participant 3 noted, customs clearance took longer. He said, "*The reason behind this is that the Chinese government is trying to control the quality of exported products. So, there is no secondary quality that is being exported to Europe or other countries.*" The participant with number 4 alternatively approved this opinion, "*China is actively pursuing a policy of screening and disinfection from COVID-19, so the processing of goods at the Chinese border is slow.*" The existing survey (ESCAP, 2020) also provides information about difficulties raised in cross-country transportation in China – Vietnam route, when paper documents proceeding additional disinfection activities.

Changes in the scheduling occurred sequentially after changes in freight traffic for different modes of transport. As mentioned earlier, air transport cancelled several passenger flights, in that point of view some parts of the cargo were not delivered; seaports accumulated cargo and many cargo ships were awaiting for unloading; railway traffic increased, which led to more frequent departures and the same change in the schedule, and border crossings for trucks were hampered by the imposed restrictions. Thus, it can be concluded that transport scheduling in the global supply chain has changed dramatically.

The participant with code 5 noticed that the basic needs of the market were not satisfied. This means that customers have not received the required amount of cargo or transport services. High fluctuations in demand also confirm this. For example, from Q4 2019 to Q2 2020, world trade fell by almost 17% (from about $ 4.6 to $ 3.91 trillion), and in Q3 2020, world trade increased by 25% (from about $ 3.91 to $ 4.9 trillion) (UNCTAD, 2020b).

Participants with codes 1-5 involved in business relationships found out changes in trade and production. The general nature of the problems remained approximately the same. Government restrictions halted production, as there are many workers indirect interaction in factories, disruptions in the supply of materials in the supply chain followed, uneven demand activity in different regions forced companies to rebuild their usual way of working.

4.4.5. Adaptation and optimization

The resulting negative effect of the coronavirus on business had a high impact on the global economy. As time has shown, the duration of changes cannot be predicted. The vaccination of the societies began in 2020 and continues in 2021. Getting a vaccine does not guarantee 100% immunity, so business and the world community adapt their work to new conditions. Optimization works differently depending on the industry and the region. The survey participants gave a variety of answers to the question of how companies adapt to the new realities. The respondents' answers were grouped into five main thematic blocks: market, supply chain, strategy, new services, and government support. In fact that the answers turned out to be extensive, which is why they divided into Figure 24 and Figure 25.

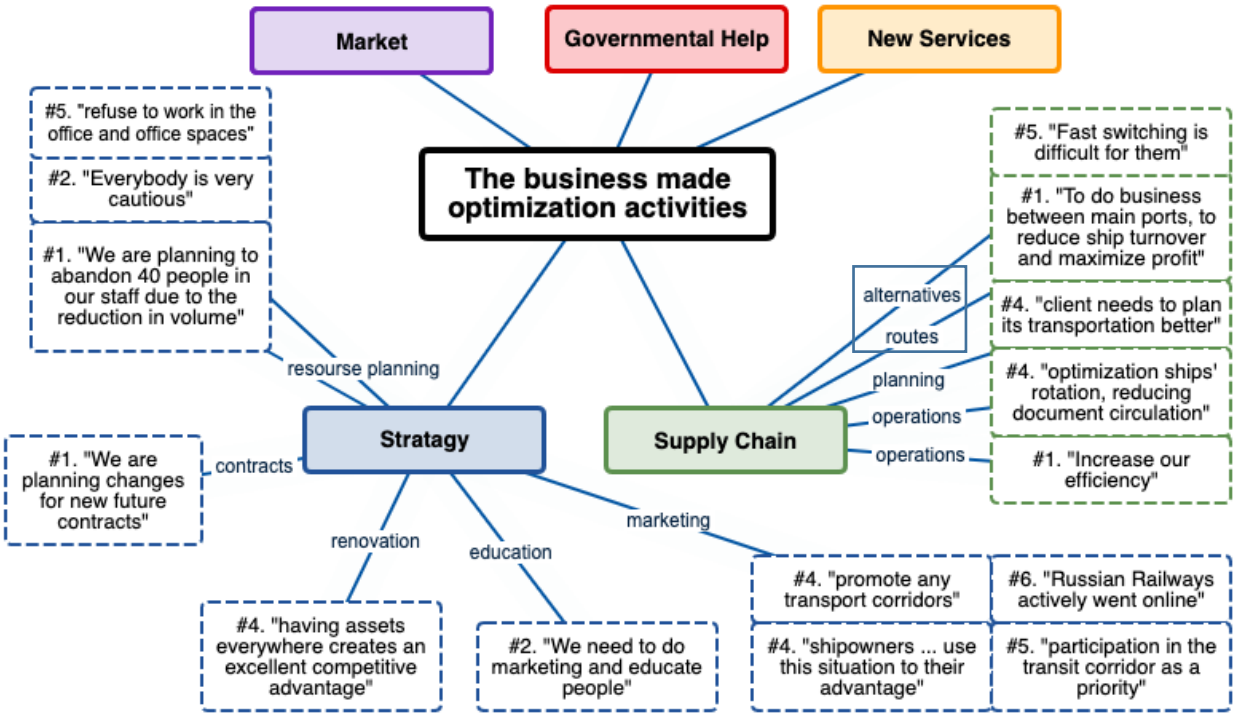

Figure 24. Business optimization activities, part 1.

Participants with code 1 and participant with code 4 noted the exposure of operational efficiency, which means a productivity improvement (work is done faster than earlier or in fewer teams). Here were the comments from a participant which company have inland and sea services: "*We are moving towards this standard by optimising ships' rotation, reducing document circulation, establishing cooperation with customs authorities, and trying to speed up processing at the terminal. Due to optimisation actions in general, acceleration and efficiency gains are underway.*" On the one hand, labour productivity is growing; on the other hand, new risks arise and planning becomes more difficult. So the clients in that situation of uncertainty shifted to better planning activity, "*Now we see that clients began to apply for rates in advance, to make pre-bookings.*"

Since the ships optimize their routes and turn only between the main ports to reduce the berthing time during high seasons, smaller ports reduce ship calls; the port customers are willing to replace interruptions in supplies, which are very problematic due to the lack of the necessary infrastructure. As a participant with code 5 said, "*Fast switching is very difficult for them*". For example, rail traffic requires appropriate terminals that handle significant traffic flows. Take Finland into consideration. There are no large-scale intermodal terminals in there at the moment. In 2022, the construction of the first intermodal terminal will be completed, which capable of receiving Russian standard trains (with a number of 70 wagons in total length of 1 km). This will allow nearby recipients to have an alternative channel for the cargo supply and dispatch of products. At the moment Vuosaari terminal in Helsinki provides regular train services. These measures of adaptivity also correspond with (Deloitte, 2021) where the consulting company reports that other businesses have to be more accurate in workforce/labour planning after a long break, understand and activate alternative sources of supply and expand the network to be prepared for disruption and shortage.

New market conditions have led to changes in existing business strategies. Participants' responses were also varied and can be divided into subcategories: resource planning, contract management, asset renewal, educational activities, and new strategies. Increased business productivity, lower annualized handling volumes and reduced costs are forcing some companies to optimize their existing capacity. For example, a participant with code 1 replied that in 2021 the company would fire 40 people. This decision is not easy, but it is a forced step towards further development. The participant with code 5 noted that their business is gradually moving away from the traditional management model, and employees are switching to remote work, and there is no need for office space. In this way, the company at the same time reduces excess production costs. The participant with code 2 said that companies have become more cautious and are not investing heavily in further development.

The coronavirus pandemic has affected industries in different ways. For example, passenger flights fell by 66%, which strongly affects the company's revenue and capitalization. On the contrary, other companies have found an opportunity for rapid growth, such as Nurminen Logistics, their transportation has tripled, new routes to Asia (nurminenlogistics.com, 2021), schedules have been launched, and the stock index has increased from beginning 2020 to end of April 2021. These significant changes in capitalization have allowed some companies to upgrade their assets. This is how the participant with code 4 answered: "*We are actively renewing assets for each company. Something is outdated, but something requires more volume, such as a vessel. The container market is growing, and we need larger vessels to handle this flow to maintain our market share.*"

As it was proved earlier, the level of prices for transport has seriously changed. For this reason, the companies are planning to revise their pricing policy, so the participant with code 1 replied that they plan to slightly increase prices in 2021 and update the standard service agreement. The geography of the participant with code 1 refers to the Northern European market, in which there are many competing companies in approximately the same conditions. Therefore, an increase in the price of one participant will be correlated with an increase in prices for services from other players. Thus, in 2021 prices for infrastructure in the Baltic Basin should increase. The participant with code 4 also confirmed the change in the price level. With the arrival of the coronavirus and heightened uncertainty, his company plans to update prices more frequently, "*The regularity of tariff revisions has changed since the cargo transportation market changes very often.*"

The participant with code 2 noted that work is planned to educate people. This aspect applies to the situation of how to work in a pandemic, what rules and regulations to observe, and educational work with clients about the discovery of new opportunities. For example, question #12 of Appendix III about the potential need to develop new intermodal centres (like RRT Kouvola) in Northern Europe have not found a significant response among the survey participants:

- One participant confirmed the need for such centres;
- One participant is inclined to believe that they are not needed since, at the moment, the infrastructure capacity in the northwestern region is excessive;
- One participant did not give a direct answer to this question;
- Two participants noticed that the project would be relevant in case of requests from clients.

The previous research (Lin *et al.*, 2020) that has been made in fall 2020 confirms the lack of business awareness of the benefits of intermodal centres, it is based on transportation goods in containers from Shanghai to Goteborg. The case study identifies alternative options of cargo delivery when LCL shipments can be converted to FCL and when 20-foot FCL shipments can be converted to 40-foot FCL shipments. According to the authors, alternative options may save money for cargo owners from 33% in option one and from 4% to 39% in option two. Additional nonmonetary benefits also exist, such as reducing the complexity in departure and destination points, reducing the carbon emissions by new, more demanding intermodal centres. This is one example of how intermodal centres can be used in addition to the standard handling of incoming traffic.

Changes in commodity flows and trade, business modernization are also transforming the marketing approach of companies. Participants with code 4 and code 5 responded that the companies intend to use the emerging opportunities to increase transit trade flows between Europe

and Asia. Other companies like shipowners are also taking advantage of the growing demand and increasing their efficiency and sales. The participant with code 6 noticed that once traditional businesses like railways find new customers online and create the necessary infrastructure.

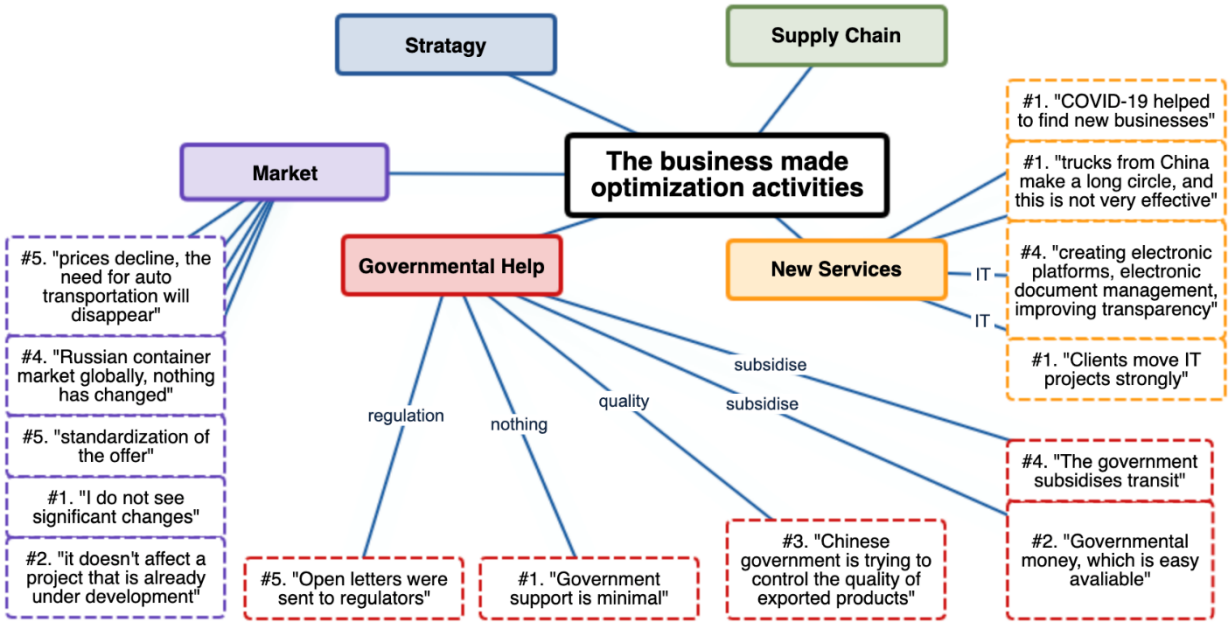

Figure 25. Business optimization activities, part 2.

The market transformation has allowed companies to launch new businesses and services for their customers. The member with code 1 said that the arrival of the covid helped find new businesses for the company without specifying details. The participant also clarified that services were launched to deliver goods by the road along with the Asia - Europe route. The participant with code 5 confirmed the launch of car delivery services: "*Indeed, such transportations exist, the market knows about them, and … transported several such trucks.*" Another big breakthrough has come in the field of IT. Companies are increasingly moving online. Due to the coronavirus pandemic, a giant leap has been made. Some companies may have postponed the development of information infrastructure due to high costs. However, when the pandemic came, and people began to spend more at home, shop online and do business online, it became evident for companies that IT development was necessary. Each of the participants confirmed this big trend. The first participant was mentioned, "*Clients move IT projects very strongly. Maybe you have heard of a project like Tradelens Maersk. Now CMA, Hapag-Lloyd and MSI are also connected. Very accurately, quickly and efficiently allows you to track where the container is now. Now more and more lines and terminals are connected to this project*". As Deloitte notes in its report, decades of supply chain development has failed. Consistently built processes (planning, assembly, transportation, support) do not allow a quick response to market demands. Currently, there is a shift towards the digital core, where these processes are supported, and digital information is

exchanged (Deloitte, 2021). The participant with code 5 worried that specific categories of business are not in demand due to the emergence of electronic platforms "*Previously, the commercial services of shipping lines were quite numerous, customers were discussed personally by the sales department, and now everything is moving towards the aviation model, where there is a particular public tariff at which the transportation is carried out. Therefore, for the forwarding business, this means the possibility of differentiation in the market is reduced. Previously, the freight forwarder could consolidate the cargo, get profitable long-term contracts that were resold to the client with marginality, but digitalization reduces the ability to receive personalized offers.*"

According to participants' responses, the government plays a significant role in the transport industry during the coronavirus pandemic. Firstly, the state performs a supervisory function and controls the quality of manufactured products. According to the participant with code 3, the Chinese government controls the quality of exports. Secondly, the state helps companies or industries that have been seriously affected during the pandemic by providing preferences, subsidies or other assistance. Here was an answer the participant with code 8, "*If you have a big lack of revenue, then you can apply for support. It doesn't matter for the industry it is; if you have a big decrease in revenue, then you can have a possibility to apply for support.*" Depending on the geographic region, government assistance might not be provided, as the participant with code 1 answered, government support was minimal. In a period of high demand, instability, and various kinds of restrictions, certain companies may cease to adhere to moral principles, provide support and begin to use their dominant positions favouring high earnings. Other companies may suffer from this, which can ultimately lead to bankruptcy. Therefore, a business can send requests to state supervisory authorities with a request to conduct an audit for fair competition, as mentioned by the participant with code 5.

Participants in the survey also described the changes that have occurred in the transport market, and their responses are depicted in Figure 25. The participant with code 1 replied that COVID-19 did not seriously affect the infrastructure in the North European region. This is confirmed by earlier analysis that the price level remained at a comparable level, a slight decrease in freight traffic by 5.5%, and increased productivity in low traffic conditions. The participant with code 2 had a similar opinion. However, he noted that the coronavirus did not affect the projects that are under construction. The participant with code 4 assessed that the coronavirus did not change the container shipping market in Russia. This is since the company has slightly improved its operating results, and the volume of traffic increased by 2% year-to-year.

Furthermore, the participant with code 5 suggested that the digitalization of services will lead to a standardized offer of transport services by the sea carriers. Globally he said that the prices for sea

freight would decrease over time. Lower prices will ultimately lead to the fact that truck services on the Asia-Northern Europe route will go away and will not be demanded.

4.4.6. Ecology issues

In modern logistics, environmental issues have increasing importance. A list of environmental questions was produced to clarify the current situation in the transport market. The questions were placed in a separate fourth section of the questionary list. Environmental issues and the coronavirus pandemic are considered separately and do not depend on each other within the framework of this study. The responses of the participants can be divided into three categories, which are shown in Figure 26.

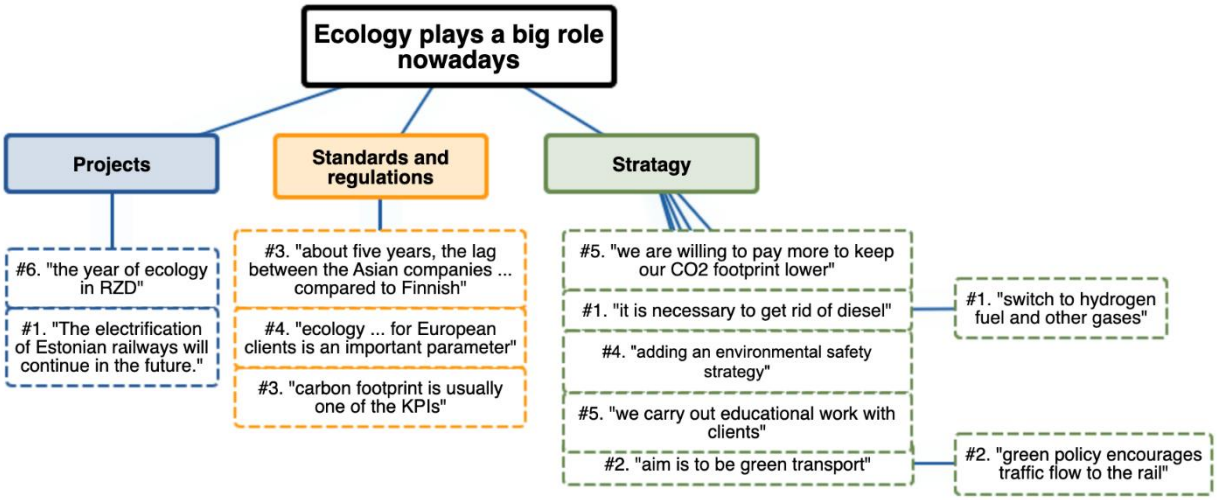

Figure 26. Ecological issues on Asia-North Europe route.

The projects section turned out to be the smallest in the number of answers. The participant with code 6 indicated that 2021 was declared the year of ecology at Russian Railways. This means that the company, which provides the possibility of transit cargo traffic, intends to improve the environmental standards of production and update the work strategy until 2030. The participant with code 1 also replied about new projects in railway transport, but this time in the European region. He noted that the electrification of railway transport would continue in the future.

The participant with code 3 replied that accounting for carbon footprint has become a vital indicator of the effectiveness of Northern European companies, and Asian companies are also developing in this direction, but so far are following European partners, in confirmation that environmental issues have become a standard. The participant with code 4, which provides international logistics services for the transport of goods in containers, also confirmed the importance of environmental standards, especially for the European consumer.

Four out of eight participants responded that they are taking action to achieve environmental sustainability. To do this, companies develop their strategies depending on the conditions and operating activity. For example, the participant with code 1 replied that it is necessary to eliminate diesel fuel and switch to alternative fuels. The participant with code 2 also confirmed that all alternative energy sources are taken into account in the design and construction of the infrastructure facility, "*We are following many aspects from start to end and considering geo-energy and sun power for the terminal, many aspects we are looking at.*" Participants with code 4 and code 5 with offices in Russia begin work in this direction. Participant Code 4 responded that their company started developing an environmental strategy, and Participant Code 5 responded that their company wants to reduce its carbon footprint and make education work with its customers.

4.4.7. Future perspective

The coronavirus pandemic has made significant changes in the way transportation and other industries in general. Its influence is discussed in the paragraphs 4.4.1 - 4.4.4. In their own way, the companies assessed the impact of the pandemic and began to adapt to the new working conditions and made adjustments to their strategies. However, for sustainable development, it is necessary to plan ahead and think over different scenarios. The interviewees gave their assessment of the future prospects.

4.4.7.1. Maritime transport

Following the participants' answers with code 1 and code 4, maritime transport will continue to develop, but with some limitations (shown as (-) in Figures). Their replies can be seen in Figure 27. Both respondents conduct their commercial activities on the seaside. The participant with code 1 said that the main cargo flow transported by sea transport would remain at the same level. This means that there may be changes in the structure of freight flows of other types of transport, but the primary freight traffic will be stable. There was an opinion of participant with code 1: "*Due to railway transport growth, motor transport will suffer, as volumes will go away from it*." He also made some suggestions about projects and services. In his opinion, shipowners and infrastructure will renew their assets and make future digital steps more transparent and efficient.

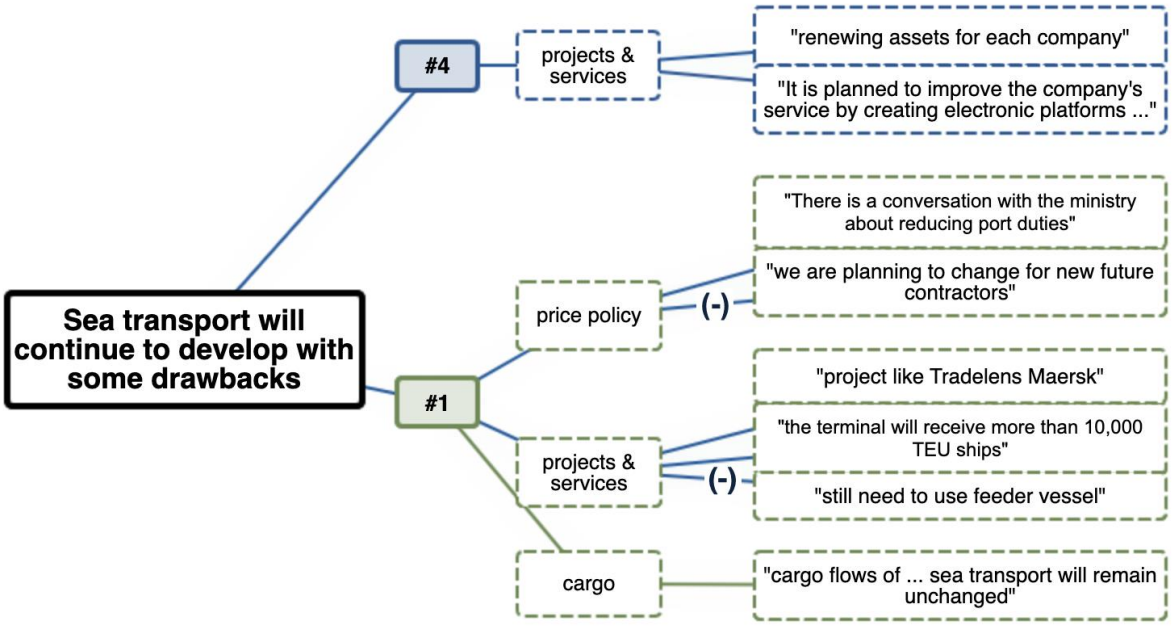

Figure 27. Future development of maritime transport.

His opinion was also in the same line with the replies of participant with code 4, who said that the company intends to update its assets and introduce modern technologies to improve the quality of service. However, besides future development, there are some limitations. For example, Participant 1 responded that their region is still using feeder vessels, which ultimately makes transportation more expensive due to the use of additional vehicles, labour, and handling equipment. The tariff policy will also change. The company of participant with code 1 plans to revise future tariff conditions in future contracts. The participant has not specified the level of the price changes. For business, this measures creates some kind of uncertainty. At the same time, government regulators can also provide various adjustments. According to the participant with code 1, their ministry is going to reduce port dues.

4.4.7.2. Road traffic

Three responses were received regarding the road transportation between regions in Figure 28. Participants with code 1 and code 5 expressed their opinion that road freight transport between Asia and Northern Europe is not an efficient way of transporting goods. The participant with code 5 gave a more detailed answer why this option cannot be stable over a long period. "*Here, it would help if you start by comparing the volume. For example, large shipowners Maersk, MSC, CMA have daily calls to major Asian ports by ships with a capacity of 15,000 containers or more, i.e. every day, 15,000 containers leave major ports. To compare this with the possibility of land borders, we take 15,000 cars and let them cross the border in 30 days, and it is almost impossible.*"

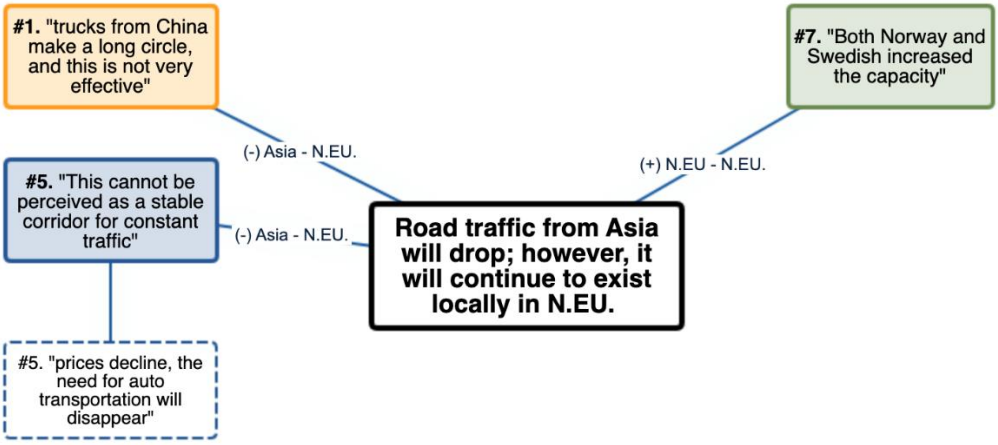

Figure 28. Prospects for road transport.

Thus, road transport will not be able to cope with the large volumes transported by sea transport. In addition, the cost of trucking is comparable to the cost of air freight, which is not acceptable for some industries that have traditionally used sea transport, "*It might work like some kind of emergency, comparable to airfreight.*" According to the participants with code 1 and code 5, road transportation on the Asia - Northern Europe route will continue to exist as an alternative option for urgent delivery of goods with low operation efficiency. It will be used to keep production running when other modes of transport are unavailable. Contrary, the participant with code 7 told about the development of the capacity of the land borders between Norway and Sweden. These territories have a small length of state borders compared to the transit states of Russia and Kazakhstan. So, it can be concluded that road traffic will exist over short distances along with the Northern Europe region.

4.4.7.3. Railway transport

The situation in rail transport looks more stable in developments points in upcoming years. Seven out of eight participants noted the prospects for the development of the industry. Their responses are shown in Figure 29. The answers can be divided into three main groups by the reasons of the optimistic forecast of a rail connection. Firstly, there are projects which are under development. Participants with code 1 and code 6 explained this in more details. The first participant named two projects: the Amber Train and Rail Baltic. The Amber Train project aimed at developing freight rail traffic between the Baltic States and the Rail Baltic project, which also includes the expansion of freight and passenger traffic. Both projects have a long-term planning horizon in the Baltic region. Also, the participant with code 1 mentioned potential new routes, for example, from Sweden to China throughout Estonia. The participant with code 6 named the project a European Carrier related to the international activities of Russian Railways.

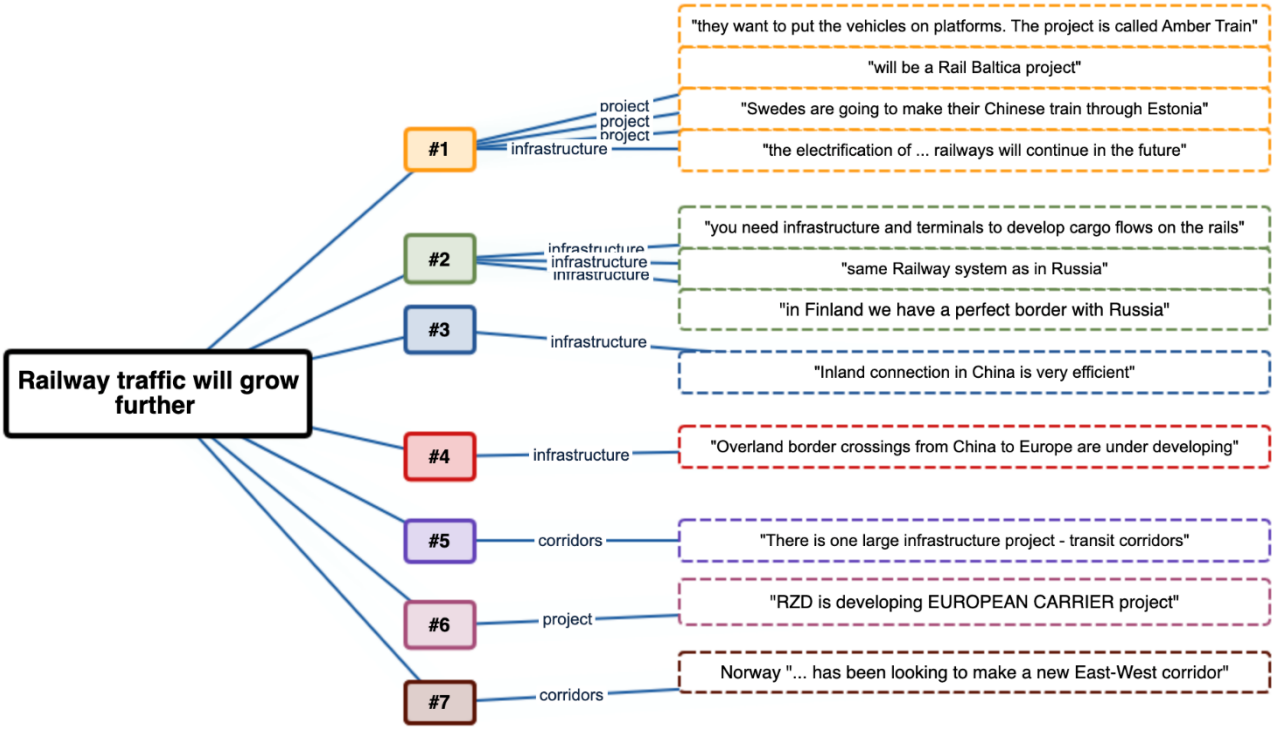

Figure 29. Future development of railway transport.

The goal of this project is to improve the available range of transportation services for foreign partners. Thus, development takes place not only in the zones of consumption or cargo occurrence, but also in transit traffic. Secondly, the availability of suitable infrastructure is a serious factor in the development of railway traffic. The participant with code 1 replied that further electrification of Estonian railways is planned in the coming years. The participant with code 2 stated that the railway infrastructure between Russia and Finland is in good condition, as there are no delays in the movement of trains and between states. Participant Code 3 commented on the excellent performance of ground transportation in China. Considering the rail links in the Asian region in Chen et al., research confirms the effectiveness of railways in China. For example, the cargo volume and frequency of air travel in China fell by 22% and 19%, respectively, with the development of high-speed rail (Chen and Jiang, 2020). The participant with code 4 said that the borders between Russia and China are in the stage of capacity expansion. Thus, along the entire Northern Europe - Asia route, the work is underway to improve the capacity of infrastructure projects, which will ultimately lead to the development of rail traffic. Thirdly, according to interviewees with code 5 and code 7, business participants are interested in developing land transit corridors.

4.4.7.4. Infrastructure

According to the interviewees' answers with codes 1, 2 and 3 in Figure 30, infrastructure facilities will continue to develop.

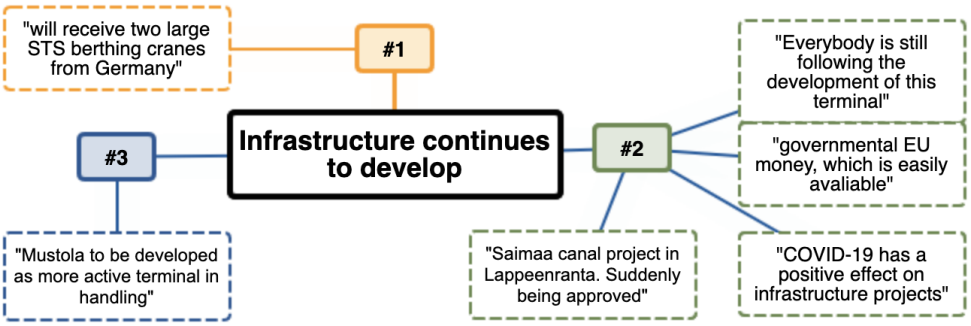

Figure 30. Prospects for infrastructure.

This applies to warehouses, intermodal centres as well as port facilities. As the participants say, the coronavirus pandemic has not affected the under-construction facilities, especially in the North Europe region. The funds for the objects had already been planned in the past. "*Everybody is still following the development of this terminal, but the terminal is not ready yet*". However, there are always risks that the governmental rules and restrictions may change, as the participant with code 2 mentioned: "*Nevertheless if the new rules raised and more than ten people cannot be working together, it will start affecting building sites and overall building this project.*" Moreover, according to participants with code 2 and code 3, the coronavirus pandemic launched the development of projects that had previously been mothballed. The participant with code 2 said: "*For example, the Saimaa canal project in Lappeenranta. Suddenly being approved and they start to work next year or this year. So COVID-19 has a positive effect on infrastructure projects because some are governmental, and Government has COVID-19 money*." This is more about objects with state investments, private business "*is very cautious*" in this regard since the usual planning possibilities are disrupted.

4.4.7.5. Other aspects

The interviewees gave their vision of the future situation concerning other aspects of the business or industries. Their answers presented in Figure 31 and Figure 32. Global trends were identified in the responses of participants with codes 2, 3, 6 and 8. Interviewees 6 and 8 noted a general trend in home production. This tendency may arise in the future due to reducing disruption risks in the global supply chain during unforeseen situations and the increasing cost of production in the Asian region. The participant with code 3 responded to the increasing trend of e-commerce trading. For the container market, this means a further increase in the volume of transported products. In addition, the participant with code 2 expressed the hope for world economic stabilization after the vaccination of the population.

Participants with code 4 and code 5 highlighted strategic points for companies. Participant 5 suggested that distance work will become a big trend shortly, "*The company transfers employees*

to work from home. We refuse to work in the office and office space as well. We are reducing offices and transferring to remote work without layoffs." This applies not only to the transport industry sector, because other companies also follow this trend. The participant with code 4 company felt relatively confident during the pandemic, as it controlled all legs of its supply chain, including vessels, port facilities and railway transport. The participant noted that the company intends to expand operation activity to the new geographic regions.

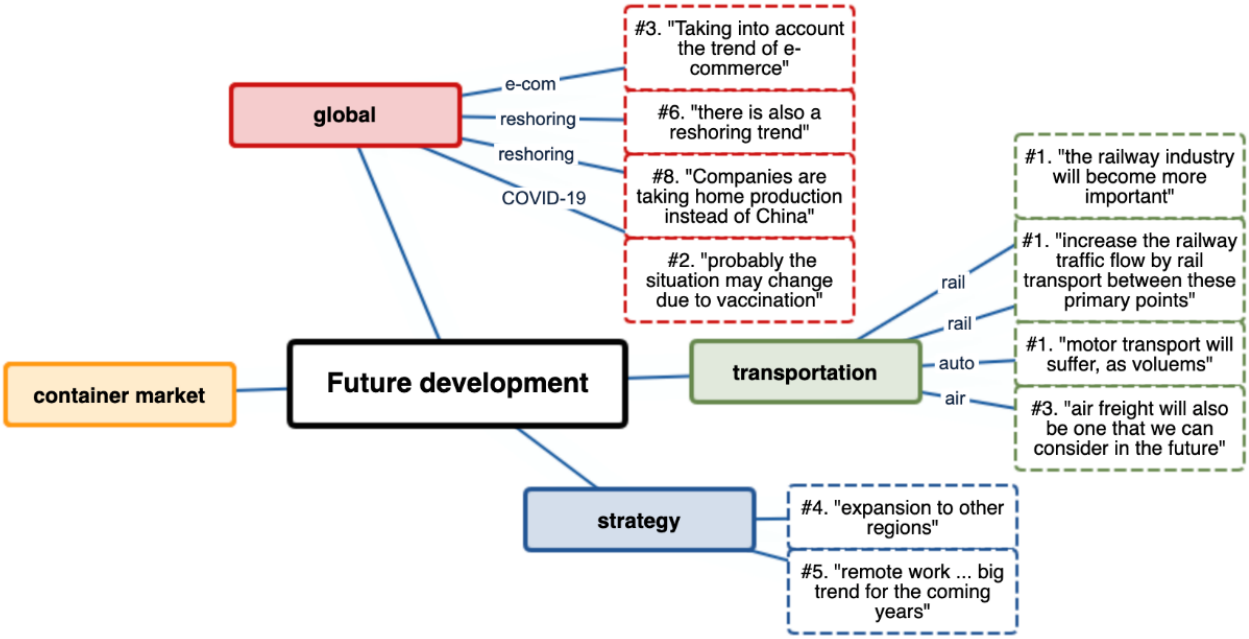

Figure 31. Other future perspectives, part 1.

During the survey, participants with code 1 and code 3 expressed their assumptions about the modes of transport. The participant with code 1 replied that the importance of rail transport would increase soon, and therefore the volume of transported goods will increase on rails. At the same time, road transport will be in less demand. The part of its volumes will be transferred to railway transport. Finally, the participant with code 3 replied that air transport would be restored and business will continue to use it in the future.

The availability of containers for shippers and the possibility of transporting goods in the direction of Asia - Northern Europe is the main topic of this study. Therefore, the participants in the semi-structured interview were also asked questions about the prospects for the development of container traffic between regions. Participants with codes 3,4,5,6 gave their guesses regarding this issue. As noted by the participant with code 3, China is still the main target of the partnership. Today and soon, China will be the primary driver of growth. At the same time, the growth of container transit will also continue on the Russian territory. Transit flow across the Russian

territory in 2020 amounted to 757,150 TEU, then in 2021, the Russian Railways carrier company sets the goal of transporting 914,000 TEUs in transit traffic.

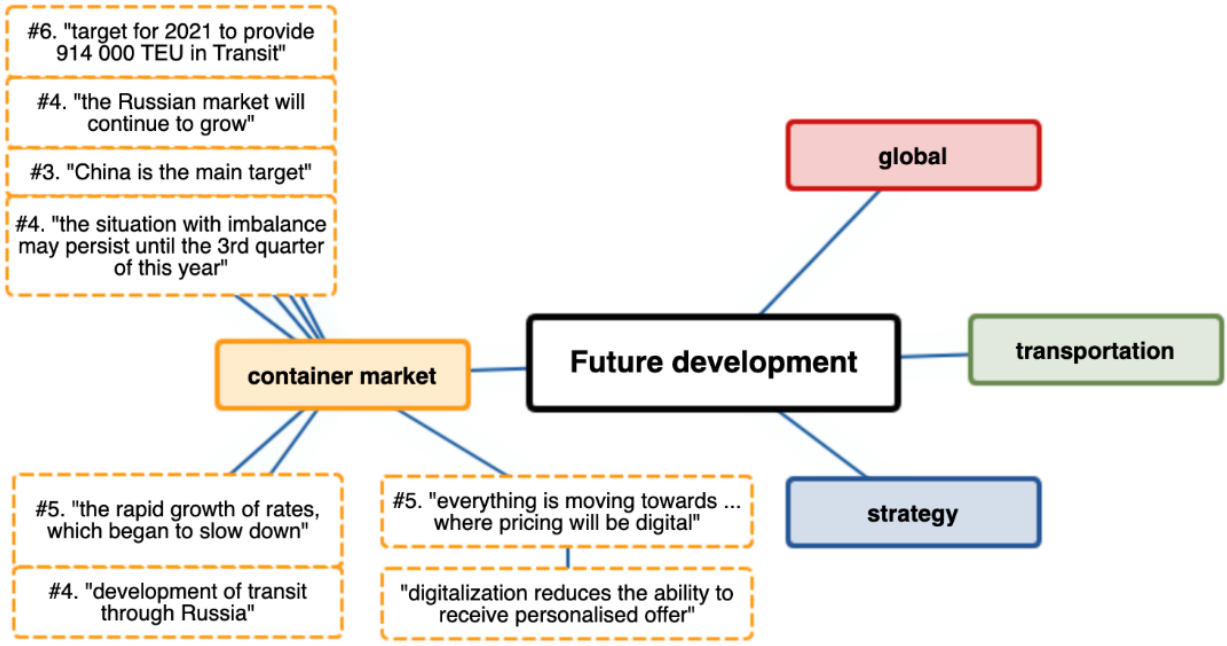

Figure 32. Other future perspectives, part 2.

According to the participants' replies, the containerization of goods in Russia is gaining momentum. The participant with code 4 said: "*The Russian market will continue to grow, and containerisation is underway. This is not unfounded, since the largest metallurgical companies in Russia are switching from transportation in open wagons to transportation in containers.*" Goods traditionally transported in wagons, whether gondola car or boxcar, are shifting to containers. As the participants explain, these changes are due to the greater convenience of containers in terms of delivery to the final destination since the client does not have an additional need to reload the goods from vehicles. The participant with code 4 assumed that the container equipment imbalance situation would continue until the third quarter of 2020. Accordingly, the participant with code 5 noted that the rapid growth in container rates would slow down as the situation stabilizes. In addition, the participant with code 5 predicted further digitalization of the industry. In his opinion, the price offers for cargo transportation services will go online. This option might reduce the burden on intermediary companies and improve direct communication and transparency between the cargo owner and the carrier.

4.4.8. External factors

In semi-structured interviews, survey participants also spoke about other factors affecting the transportation of goods in containers along with the Northern Europe - Asia route. One of those factors was politics. It plays a significant role, so the interviewees could not step away from that

and described their observations of how traffic routes and cargo flows are changing during the time. However, this topic goes beyond the boundaries of this research and, for this reason, was not taken into consideration.

5. Discussion

This chapter is devoted to the synthesis and discussion of the results obtained from academic sources, the empirical part of the study, as well as the analysis of external factors.

Practically, the coronavirus pandemic came suddenly. The business did not have time to prepare for the new working conditions, so the business had to rebuild its activities in a rush. Unscheduled changes in some cases led to high costs, and in other cases, companies even had to stop their production. Such an environment negatively affects the enterprise's economy, the regional economy, and the world's economic system. The progress achieved in previous years has been reset, and the planned growth turns into a precipitous decline. For example, in 2020, airline companies lost more than 118 billion US dollars (IATA, 2020b).

None of the survey participants said that their company was ready for such pressure tests during the interview. It would be correct to call such tests as a risks. There is quite a lot of research on the topic of risk management. The research made by Norrman (2004) was highly cited. First, it mentions quite many examples of companies failing due to wrong principles of the risk management. Secondly, the study provides an applicable framework for other companies (processes organization, labour structure, quality control methodologies, etc.), shows the importance of control over the second and third-tier suppliers. Using such operating principles for transport companies could provide fewer losses from the coronavirus pandemic. For example, drivers might have instructions of work in epidemic cases or have personal protective equipment in their medical care. Customs services could start using electronic document management earlier than it has happened. At the moment, the main task of the business is to be ready for various challenges and think already over the possible scenarios for work organization in an unpredictable situation. The business can be assumed that vaccination of the population will take place in the following years, and it can plan how employees can be prepared for these measures, or it can be assumed that vaccines against coronavirus infection will be failed. Therefore, a pessimistic scenario for the company needs to be developed. There is a hope that businesses can learn from this “black swan” and prepare themselves for further, more challenging conditions.

The second important phenomenon, which has not received a response among the respondents during this work, was the lack of interest in new intermodal centres. For example, respondents were asked about the future intermodal terminal in the city of Kouvola (Finland), question number 12 of Appendix III. As noted by the participant with code 4, such terminals are necessary for storing large volumes of goods, “*Typically, terminals are built to handle large cargo flows, close to a large shipper or consignee, or to handle a pool of such customers.*” However, it is only one

side of the truth. The business has not fully appreciated the capabilities of such terminals. The article (Lin *et al.*, 2020) describes other the advantages of using such terminals for cargo handling. It has to be noticed that such terminals can work in downstream consolidations while sending cargo from Asia and upstream consolidation while sending cargo from North Europe. In both cases, it might be helpful due to the following reasons:

- Consolidation and deconsolidation of goods in such terminals helps to transfer goods from road transport to rail transport, which is a key element of the European policy.
- In some cases, upstream buyer consolidation may reduce total logistics cost by 33% due to the elimination of extra warehousing on a downstream side of the supply chain
- In some cases, full 20-foot FCL shipments can be replaced by 40-foot FCL shipments with significant cost savings from 4% to 39% to the cargo owners.

In the context of intense business competition, everybody is very cautious about sharing information. The empirical practice has shown that only 22.5% of participating companies are ready to provide any information or share their experience in times of global problem. Moreover, it is understandable why this happens. Information is a very valuable thing now. The participant with code 2 confirmed that some companies could resell services to another company, i.e. actually turn out to be intermediary companies. Here were the comments of the participant: "*Yes, it is a bit confusing because some other companies are offering rates to the same train, so what is exactly, how many trains there are may see in the statistics.*" In general, these actions harm business due to the lack of direct dialogue between supplying company and the client, and the supplying companies can lose additional profits. Other participants in the semi-structured interviews confirmed their willingness to participate solely for academic purposes and imposed a ban on publication in news sources. Companies in the Asian sector turned out to be even more closed and have not confirmed their attendance. Repeated requests and invitations to interviews did not have any impact on their representatives. All these factors are holding back business from an open dialogue with society to achieving public benefit. Therefore, the (Yu *et al.*, 2001) research gives an example when transparency gives much more outstanding results than independent operation strategy. The authors mentioned one company, which is L&TT, based in Hong Kong and doing business in manufacturing and distributing electronic components to the customers located mainly in Europe. According to their fundings, demand forecasting was always one of the main manufacture problems, because demand changes, prices fluctuate, the delivery time shortens every time, and customers become more sensitive in consumption. It becomes a massive problem for the global system, and accurate planning requires new powerful tools and approaches. Depending on the depth of information sharing, the company could reduce inventory level by around 30% and

expected average inventory cost by around 45% over observation time. This example illustrates the essence of a generic information strategy. Each of the parties benefits: the buyer is sure that he will be able to buy the product, and most likely at a lower cost, since the manufacturer knows how much of the product is needed, and the intermediary companies reduce logistics costs. That is why interaction between business and the scientific community is so important. On the one hand, companies share their accumulated experience, and on the other hand, they get frameworks for future operation; everybody wins in that situation.

A broad interest of the participants was formed in the final section of the questionary, which was addressed to the environmental issues during conversations. Almost all of the participants expressed their assumptions about the importance of this category. The interviewees named actual projects aimed to improve environmental norms and standards for future supporting strategies of the companies. However, these conclusions should be supplemented by mentioning the key drivers of green logistics in the supply chain. In research (Diabat and Govindan, 2011), authors identified the critical determinants of a green supply chain and the relationship between these determinants. According to this study, "Government regulation and legislation", "Environmental collaboration with customers", and "Reverse logistics" have the highest power among others. Interviewees did not mention the third factor; however, the first two factors were somehow said during interviews. The participant with code 7 said: "*The Government said that after 2025 it's not allowed to buy fossil fuel vehicles in Norway. Moreover, now much research is going on electrified trailers.*" Moreover, the participant with code 6 also approved the role of government, "*The political order is needed to start solving this issue. The propaganda has not yet yielded significant results.*" Both opinions of the participants summarize by saying that environmental problems can be solved by government willing, but there is another way. In the work (Andersen, 2009) given example shows corporate social responsibility in the supply chain of a large enterprise, identifies the factors affecting corporate social responsibility. The company meantioned in the article is generally recognized in environmental issues. From this perspective becoming clear how one single company can improve environmental and social standards. Not only government can force the business to be ecology friendly. This case also brings the idea that better environmental standards may attract new customers. There is a hope that this particular example may encourage other companies to follow this sustainability trend in the supply chain.

In addition, it should be said that the studied academic sources (Zhong *et al.*, 2003) and (Bookbinder, 2013) do not reflect the widespread scale of the disease. In these studies, the focus falls on local outbreaks of epidemics, which cannot be applied to this research topic. The Butt (2021) work is more relevant, it shows how the supply chain responds to COVID-19 challenges,

but it does not take into account the local characteristics of the transport market in Northern Europe. There is a hope that this work will be helpful for business and academic purposes, as it covers the analysis of the market for container transportation by various modes of transport, shows the current problems and local business responses and gives an outlook at the development of transportation in this direction.

6. Conclusion

This master's thesis aimed to understand the impact of the coronavirus pandemic on container traffic along the Asia-Northern Europe route. At the same time, the major gap in the existing research was that the pandemic environment turned out to be new and not entirely covered by existing research. Previously discovered diseases, such as SARS in China, were considered in work (Zhong *et al.*, 2003) or other challenges with national disasters in Africa: malaria, maternal and infant mortality, acute respiratory infections, diarrhoea and pneumonia, were considered in work (Bookbinder, 2013), had a local or neighbouring character of extension. As a result, a slight hotbed of disease was prevented, and their impact was reflected mainly on the local market or local economy.

On the other hand, COVID-19 still continues. There is no single treatment for the pandemic coronavirus. Therefore, society and business have to adapt to the new working conditions and obtain new knowledge. This study was conducted to assess the impact of this disease from a logistics perspective comprehensively.

6.1. General answers

In chapter 1.3, the main research questions were highlighted. Chapter 4.4 contains empirical observations from interview participants involved in business or academic relation of the transport market. Then these answers were collected and analyzed in mind-maps forms. However, the answers were grouped by topic, and the overall result is not fully visible. For that purpose, the key theses were placed in frames to answer research questions in Figure 33 - Figure 35.

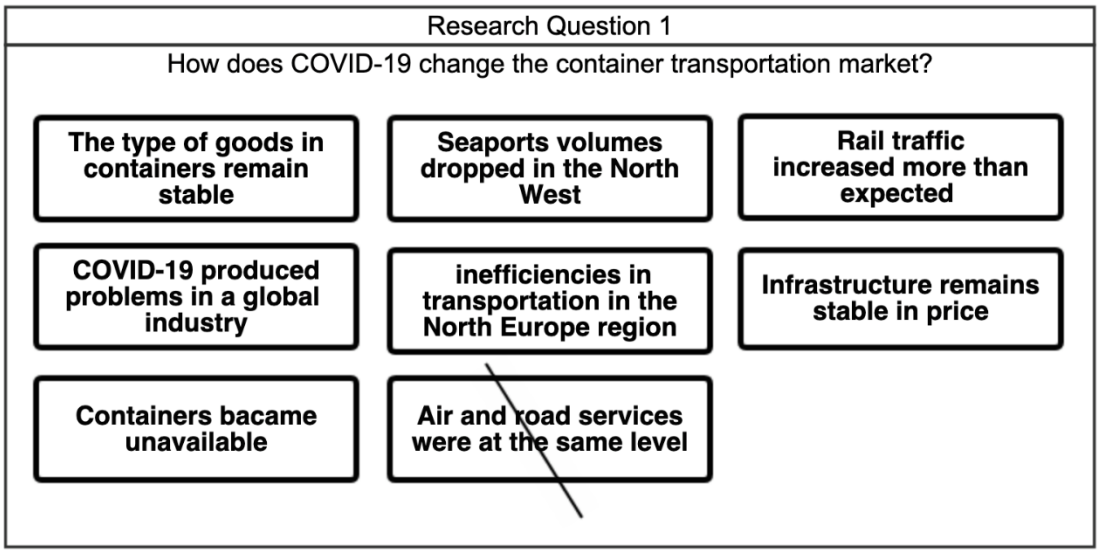

Figure 33. The answer to the first research question.

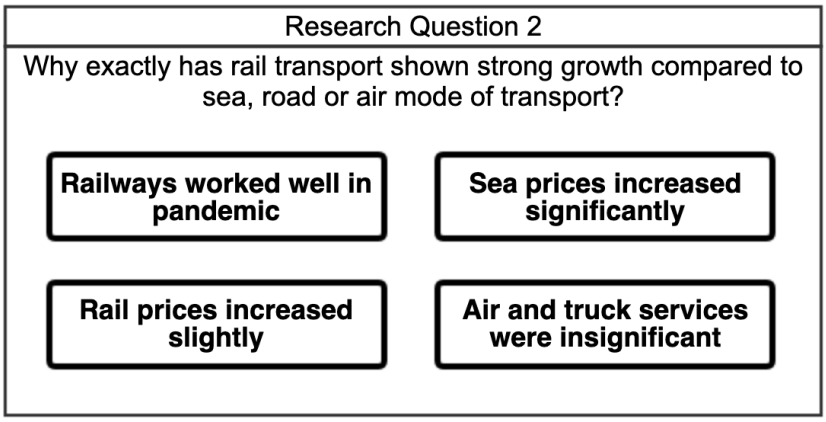

Figure 34. The answer to the second research question.

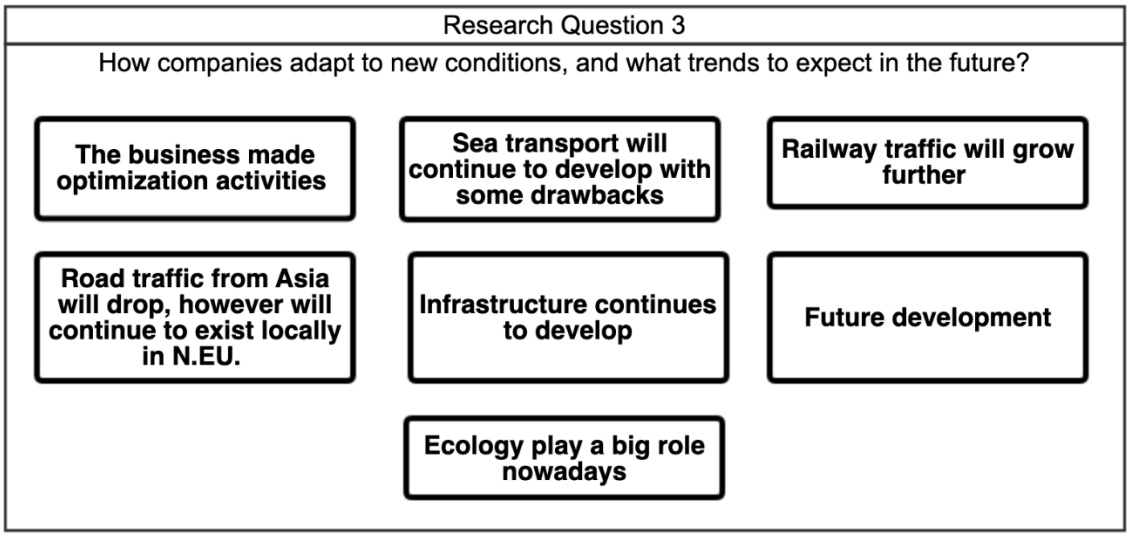

Figure 35. The answer to the third research question.

It should be noted that not all the suggestions of the interviewees were confirmed. For example, in Figure 33, the participants' assumption that air services were at the same level due to the high availability by air have not been confirmed. Numerous sources refute this hypothesis, because, with a decrease in the number of aircraft (mainly passenger type), the total aviation capacity decreased, which caused an increase in the price level for air cargo transportation. The rest of the participants' assumptions were confirmed from secondary sources.

6.2. Limitations and suggestions

The collection of information on this study took place from January to February 2021. Sea freight rates have not stabilized at May 2021. This means that it is not yet possible to obtain the final results. Therefore it is necessary to continue further observations and conduct survey representatives. Several limitations impeded a more detailed analysis of the situation and the interpretation of the study results. One of these factors was the lack of participants from the Asian business. This limitation has hampered a detailed understanding of the problems and complexities

in the region during the coronavirus pandemic. The reason for this was the low response to written invitations from participants. The second factor, which did not allow the author to provide a more accurate description of price fluctuations in the transport market, was the absence of price data in the public domain. Traditionally, all offers for cargo transportation are individual for companies and depend on the cargo type, vehicle used, period of transportation, transportation speed, level of pollution and other components.

At the moment, vaccination of the society against coronavirus infection continues. Its effectiveness, lifetime has not yet been thoroughly studied; therefore, outbreaks of the disease still occur in certain regions.

During the first and second quarters of 2021, significant events took place, such as traffic congestion in the Suez Canal or a tsunami in the Pacific Ocean, leaving a profound imprint on traffic flows. The extent of their influence is not yet clear.

It is also important to note that other authors published many other scientific studies, articles and papers to complement this research.

This work identifies the reasons for how the coronavirus pandemic has affected the transport of containers along the Asia - Sulfur Europe route. However, it would also be interesting to identify the sensitivity of the considered reasons to the volumes of transportation of products and its price conditions in subsequent studies, which would be necessary for the business industry of these regions.

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Appendices

Appendix I. Email template for approaching English speaker interviewees.
Dear …

My name is Maxim Makarov. I am a Junior Research Assistant at Lappeenranta-Lahti University of Technology (LUT). I am studying container transportation issues during a pandemic period for my master's thesis work in Finland. My supervisor is Professor Olli-Pekka Hilmola.

I invite you to participate into an interview to gather information for my thesis. This study's purpose is a comprehensive analysis of the impact of the COVID-19 on the container transport market on the route of Northern Europe - Asia. This problem has affected all sectors of the economy and is now especially relevant for business from adaptation to new realities.

To find its effect on business and possible opportunities, I conduct interviews of actors in the transport market. The questions are concerning the following topics: Transport Corridors, Trade Relations, Container Market, Coronavirus Crisis, Infrastructure Projects, Future Forecast, Tariff Policy, Legislative Changes, Governmental Support, Environmental Issues, and your interests. I hope that it will take no more than 45-90 minutes of your time. If you are interested, we could set up the interview in a format convenient for you (face-to-face / online) and the desired date and time. At the end of this research work, I am ready to provide the results obtained. If you have any questions, please contact me via any channel of communication listed below.

The results of this interview will be used for the purpose of conducting scientific research for a master's thesis. All the information will be processed anonymously, and no specific people or companies can be identified.

Appendix II. Email template for approaching Russian speaker interviewees.
Уважаемый …

Меня зовут Макаров Максим. Я являюсь младшим научным сотрудником технического университета Лаппеенранта-Лахти. В настоящий момент я изучаю проблемы, связанные с перевозокой контейнеров во время пандемии в рамках моей магистерской диссертационной работы в Финляндии. Моим научным руководителем является профессор Олли-Пекка Хилмола.

Целью данного исследования является комплексный анализ влияния короновируса на рынок контейнерных перевозок по направлению Северная Европа - Азия. Данный вопрос затронул все секторы экономики и сейчас особенно актуален для бизнеса с точки зрения адаптации к новым условиям. (continues)

(Appendix II continues)

Чтобы данное исследование нашло свое практическое применение в бизнесе я провожу опрос участников транспортного рынка. Не могли бы вы принять участие в данном опросе? Темы вопросов: транспортные коридоры, торговые отношения, контейнерный рынок, кризис короновируса, инфраструктрные проекты, прогнозы, тарифная политика, законодательные изменения, государственная поддержка, экологические вопросы, Ваши пожелания и дополнения. Надеюсь, что это займет не более 45-90 минут Вашего времени. В случае вашей заинтересованности не могли бы обозначить удобный для вас формат интервью (очный / заочный) и желаемую дату и время? По окончании данного исследования я готов предоставить полученные результаты. Если у Вас остались какие-либо вопросы свяжитесь со мной любым удобным для Вас способом.

Результаты интервью будут использованы для проведения научных исследований и подготовки магистерской диссертации. Вся собранная информация будет обезличена (анонимна) и никакие имена или названия компаний не будут упомянуты.

Appendix III. Protocol of questions for semi-structure interview. For English speaker interviewees.

Section "General Information"
Basic information: Company Name Position Duties General questions: 1) What kind of containerized goods do you have? 2) What transport corridors are using and what access to them? 3) Who are your competitors? How would you describe the competition? 4) How do you assess the quality characteristics of the services provided (reliability, efficiency, time, safety, etc.)? 5) What infrastructure projects are you interested in?
Section «The state of the transport market»
6) How do you assess the transport market's general state in Northern Europe, Asian countries, transit countries (Sea / railway / air / road)? 7) How do you assess the current state of the transport market and infrastructure facilities? What challenges have occurred? (continues)

(Appendix III continues)

Section with questions on the research topic "Container Transportation on the route Northern Europe – Asia"

Rail:

8) Is railway transport different from other types of transport in a pandemic? What the role of Government in (EU, Asia, Russia, and Kazakhstan) in rail traffic?

Containers:

9) What the situation with container availability (when, where, how)?
10) How has consumer behavior changed? What possible reasons?

Intermodal centers:

11) Have there been any problems in the use of infrastructure facilities, access to them? In which part, West or East?
12) Are there any needs for new intermodal centers? Will the new centers like RRT Kouvola (link https://www.kouvola.fi/en/home/kouvola-logistics-city/rail-and-road-terminal-kouvola-rrt/) increase the global container flux? How? What attributes they need (length track, additional services)?

Transport Attributes:

13) How has the tariff policy changed? Other aspects (time, efficiency, security, availability, etc.)?

New conditions (adaptation):

14) How did you adapt to new realities?
15) What is the further development strategy of the company, key areas of development?

Legal:

16) How has legislation and government support changed?

Other:

17) What are the prospects and forecasts for the industry?

Section "Other questions"

Environmental issues:

18) How do you comply with environmental standards (National/International)?
19) Do you measure your environmental sustainability (CO_2 emissions)? Have you got some environmental certification?
20) Does environmental policy-making effect your operations? How?
21) Do your partners/customers demand environmental sustainability?
22) Have you got a strategy for developing your company's environmental sustainability?

(continues)

(Appendix III continues)

Your interests:

23) What would be interesting to know about the research topic / from other market participants?
24) Any wishes?

Appendix IV. Protocol of questions for semi-structure interview. For Russian speaker interviewees.

Раздел "Общая информация"

Основная информация:

Компания

Имя

Занимаемая должность

Обязанности

Общие вопросы:

1) С какими типами грузов, перевозимых в контейнерах, Вы работаете?
2) Какие транспортные коридоры вы используете и какова их доступность?
3) Кто Ваши конкуренты? Как бы Вы их описали?
4) Как Вы оцениваете качество предоставляемых услуг (надежность, эффективность, временные затраты, безопасность перевозки и другие параметры)?
5) Какие инфраструктурные проекты были бы Вам интересны?

Раздел «Состояние транспортного рынка»

6) Как Вы оцениваете общее состояние транспортного рынка в Северной Европе, Азиатском регионе, транзитных государств (море / жд / авиа / авто)?
7) Как Вы оцениваете текущее состояние транспортного рынка и инфраструктурных объектов? Какие сложности возникли?

Раздел вопросов по исследуемой теме "Транспортировка контейнеров по маршруту Северная Европа - Азия"

Железная дорога:

8) Отличается ли работа железнодорожного транспорта во время пандемии по отношении к остальным видам транспорта? Какое участие принимают правительства (Европа, Азия, Россия и Казахстан) в регулировании железнодорожных перевозок?

Контейнеры:

9) Как обстоит ситуация с доступностью контейнеров (когда, где, как)?
10) Как изменилось поведение потребителя? Каковы возможные причины?

(continues)

(Appendix IV continues)

Интермодальные центры:

11) Возникали ли у Вас проблемы с доступом к инфраструктурным объектам? В каких регионах, Запад или Восток?
12) Существует ли у Вас потребность в новых интермодальных центрах? Увеличат ли новые интермодельные центры, такие как Коувола (ссылка: https://www.kouvola.fi/en/home/kouvola-logistics-city/rail-and-road-terminal-kouvola-rrt/) контейнерных трафик? Как? Какие особенности интермодальных центров востребованы (длина приемо-отправочных путей, какие дополнительные услуги)?

Транспортные характеристики:

13) Как изменилась тарифная политика? Другие аспекты (время перевозки, эффективность, безопасность, доступность и т.д.)?

Новые условия (адаптация):

14) Как Вы приспособились к новым условиям?
15) Какая дальнейшая стратегия развития компании, какие ключевые направления развития?

Законодательная база:

16) Как изменилась законодательная база и государственная поддержка?

Прочие:

17) Каковы перспективы и прогнозы развития отрасли?

Раздел “Прочие вопросы”

Вопросы экологии:

18) Как вы соблюдаете экологические стандарты (национальные / международные)?
19) Как вы поддерживаете экологическую обстановку на должном уровне (выбросы CO_2)? Есть ли у Вас экологические стандарты?
20) Влияют ли на вашу работу экологические стандарты? Как?
21) Есть ли запросы от ваших партнёров / клиентов на поддержание экологической стабильности?
22) Есть ли в Вашей компании стратегия по поддержанию экологической стабильности?

Ваши интересы:

23) Что Вам было бы интересно узнать о теме исследования / от других участников рынка?
24) Пожелания / Предложения?

Appendix V. Restrictions from RZD for loading cargo in containers in the East - West direction (Source: RZD client notifications).

Order #	Station	Period	Duration	Reason	Number of delayed container trains
8697	Zabaikalsk (export)	03.04.2021-09.04.2021	6	limitation from China	16
6792	Naushki	02.04.2021-06.04.2021	4	limitation from China	18
6788	Grodekovo (export)	02.04.2021-06.04.2021	4	limitation from China	5
4895	Vladivostok	11.03.2021-17.03.2021	6	limitation of port	11
4896	Naushki	13.03.2021-17.03.2021	4	limitation from China	34
4753	Zabaikalsk (export)	12.03.2021-16.03.2021	4	limitation from China	38
4514	Zabaikalsk (export)	06.03.2021-11.03.2021	5	limitation from China	29
4517	Naushki	06.03.2021-12.03.2021	6	limitation from China	24
4062	Vladivostok	01.03.2021-05.03.2021	4	limitation of port	12
3149	Vladivostok	17.02.2021-19.02.2021	2	limitation of port	11
1900	Zabaikalsk (export)	03.02.2021-08.02.2021	5	limitation from China	17
1901	Naushki	03.02.2021-08.02.2021	5	limitation from China	11
1611	Nakhodka-Vostochnaya	29.01.2021-02.02.2021	4	limitation of port	-
1012	Zabaikalsk (export)	24.01.2021-27.01.2021	3	limitation from China	30
298	Zabaikalsk (export)	16.01.2021-19.01.2021	3	limitation from China	22
111	Vladivostok	13.01.2021-15.01.2021	2	limitation of port	8
112	Nakhodka-Vostochnaya	13.01.2021-16.01.2021	3	limitation of port	11
4	Naushki	04.01.2021-11.01.2021	7	limitation from China	28
3	Zabaikalsk (export)	04.01.2021-09.01.2021	5	limitation from China	24