

Environmental Sustainability Factor in the Logistics Service Provider Selection Phase of the Freight Procurement Process

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Abstract

This thesis aims to increase the understanding of the importance of the environmental sustainability factor and how it is measured compared to other factors such as cost, time, and reliability in the freight procurement process. The study will help the case company NLC Ferry Ab Oy, other stakeholders, and the public to find out what the needs of their business-to-business freight customers are when choosing a logistics partner in the selection phase of the freight procurement process.

The study's theoretical framework handles the two main topics of environmental sustainability and the procurement process and combines these two into a description of an environmentally sustainable freight procurement process.

The empirical framework is made as a descriptive, applied, qualitative case study among the freight customers of the case company in the Ostrobothnia area in Finland.

The results of the study showed that environmental sustainability is a steadily rising topic within logistics. The customers appreciate that the case company is making efforts to be in the frontline of environmental sustainability in the transport chain. However, the customers feel that they need to be cost-effective and cannot pay significantly more for a more environmentally friendly service. On the other hand, demands from the European Union, local governments, and customers are rising to reduce emissions in the whole transport chain.

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Abstrakt

Målet med den här studien är att öka förståelsen för hur viktig ekologisk hållbarhet är och hur den mäts jämfört med andra faktorer så som kostnad, tid och pålitlighet i en fraktupphandlingsprocess. Arbetet är en fallstudie på uppdrag av NLC Ferry Ab Oy och har som syfte att hjälpa fallföretaget, andra intressenter och allmänheten att förstå de fraktupphandlande kundföretagens behov när de väljer en partner i fraktupphandlingsprocessen.

Studiens teoridel består av två huvudsakliga ämnen, ekologisk hållbarhet och upphandlingsprocessen vilka kombineras till en ekologiskt hållbar fraktupphandlingsprocess.

Den empiriska studien består av en beskrivande, tillämpad, kvalitativ fallstudie bland fallföretagets fraktkunder i Österbotten, Finland.

Resultatet av studien visar att ekologisk hållbarhet är ett ständigt växande ämne inom logistikbranschen. Kunderna uppskattar de ansträngningar som fallföretaget har gjort för att vara i främsta linjen vad gäller ekologisk hållbarhet. Kunderna upplever dock att de måste vara kostnadseffektiva och anser sig inte ha råd att betala betydligt mera för en mera ekologiskt hållbar tjänst. Å andra sidan ökar kraven på kunderna från Europeiska unionen, lokala myndigheter och kunderna att minska utsläppen i transportkedjan.

Språk: Engelska

Nyckelord: Ekologisk hållbarhet, fraktupphandling, grön transport, hållbar logistik, intermodala transporter

Table of Contents

1	Introduction.....	1
1.1	Purpose and Research Questions.....	2
2	Theoretical framework.....	3
2.1	Environmental Sustainability.....	5
2.2	Possible Measures.....	13
2.2.1	ISO 14001 Environmental Management Systems.....	16
2.2.2	Eco-Management and Audit Scheme (EMAS).....	17
2.2.3	The GRI Standards.....	18
2.2.4	Nordic Sustainability Reporting Standard (NSRS).....	18
2.2.5	EU THETIS-MRV CO2 Emission Report.....	20
2.2.6	EU Corporate Sustainability Reporting Directive.....	20
2.3	Freight Procurement Process.....	22
2.4	Environmental Sustainability in the Freight Procurement Process.....	25
2.5	Summary of the theoretical framework.....	28
3	The case company.....	31
3.1	Alternative Routes.....	32
4	Research methodology and limitations.....	33
4.1	Ethical considerations.....	35
4.2	Data collection.....	36
4.3	Reliability and Validity.....	37
5	Empirical framework.....	39
5.1	Introduction to the Interviewed Companies.....	40
5.2	The relationship between the case company and the interviewed companies.....	46
5.3	What the interviewed companies need to offer their customers.....	52
5.4	Key findings from the results of the interview.....	58
5.5	Comparison with previous research.....	63
5.6	Answers to the research questions.....	66
5.7	Conclusion.....	68
5.8	Suggestions for further research.....	69
6	References.....	71

APPENDIX 1: Semi-Structured Interview Guide

Figures and Tables

Figure 1. The three dimensions of sustainable development (Björklund 2012).....	6
Figure 2. UN Global Goals for Sustainable Development (United Nations 2024)	7
Figure 3. Concepts of environmental sustainability (Gulliksson & Holmgren 2021)	9
Figure 4. The three P model (van Weele 2018)	12
Figure 5. Model of four A's (Macharis et. al. 2014)	13
Figure 6. Model describing four ways to reduce CO2 emissions (Björklund 2012)	14
Figure 7. Options to improve environmental sustainability in transport (Björklund 2012)	14
Figure 8. Illustration of the three user-groups of NSRS (Nordic Accountant Federation, 2024a)	19
Figure 9. The linear purchase process model (van Weele 2018)	22
Figure 10. SFP Guidelines main principles (Lepori et.al. 2019)	28
Figure 11. Diagram over the ISO 14001 certification of the interviewed companies.....	43
Figure 12. The interviewed companies' use of intermodal transport modes.....	46
Figure 13. The most important factor when the interviewed companies get an offer	49
Figure 14. Interviewed companies' opinions on using the ferry instead of road to reduce CO2 emissions	51
Figure 15. Diagram of customers of the interviewed companies asking for intermodal transport.....	56
Table 1. Key figures of the interviewed companies.....	40
Table 2. Environmental reporting of the interviewed companies.....	43
Table 3. Other ways the companies are working with environmental sustainability.....	44
Table 4. Interviewed companies' main services used from NLC Ferry Oy Ab.....	47
Table 5. Interviewed companies' views on NLC Ferry Oy Ab's sustainability.....	47
Table 6. Other factors when the interviewed companies get an offer	49
Table 7. Customers of the interviewed companies' factors and environmental sustainability in RFQs.....	53
Table 8. What the case company could do to meet the needs of the interviewed companies' customers.....	57

1 Introduction

We are living in a time where sustainable development is becoming more and more important to, in the long run, ensure the entire future of mankind. The United Nations has since 1987 worked with sustainable development and in 2015 the member countries adopted the 2030 Agenda for Sustainable Development Goals including 17 different goals to improve sustainability for humans and the environment we live in.

As explained more thoroughly in the theoretical framework in Chapter 2, sustainable development consists of three main topics: environmental, social, and economic sustainability which all need to be in balance for a sustainable future. This thesis focuses mostly on environmental sustainability and more precisely in the freight transport sector. According to the European Commission (2023) transport stands for a quarter of all greenhouse gas emissions within the European Union. According to the European Green Deal, these emissions should be reduced by 90 % by 2050. Furthermore, it will investigate different actions that can be taken to reduce these emissions and what the case company is working with to become more environmentally sustainable. There are also growing requirements on transport companies from the customers, governments, and the European Union to reduce emissions.

Most people and businesses realize that something must be done to turn the development in a more sustainable direction, but the questions are what, when, and how? These questions are too broad to completely answer in one study so it will investigate a smaller part of the concept as follows.

The focus is on the procurement process and how important it is with environmental sustainability in this process. How important is environmental sustainability compared to other factors such as cost, time, and reliability when a company is choosing its logistics service provider (LSP)? The second focus is on what kinds of tools are available for the company buying a service from an LSP to measure the environmental sustainability of a potential LSP. The aim is to help the case company to understand the needs of their business-to-business freight purchasing customers when it comes to environmental

sustainability, but it can also be interesting for other stakeholders within the transport industry and the general public since this is an important subject for our common future.

There are already some similar studies that are mentioned in Chapter 2 which are made for other companies in other geographical areas and the LSPs in those studies are working with different business areas. However, no similar study has been done for this case company and their freight customers in the Ostrobothnia area.

The original idea of this thesis came from my interest in logistics since I have a vocational education in logistics and have been working in the field almost without interruption since 2007. I have been working within road freight: first as a driver and later as a Transport Manager. As a Transport Manager in the international field with the Nordic countries as our main area we also send our trucks via ferries between Finland and Sweden, and Sweden and Denmark.

To get started with the thesis project the case company NLC Ferry Ab Oy was contacted since they have a new (since 2021) environmentally friendly ferry in daily traffic between Finland and Sweden. According to my personal communication (Teams meeting 22.9.2021) with the Freight Director of the case company they are interested in finding out how their environmental sustainability efforts can create value for their customers and by that make them choose their services instead of alternative options.

The structure of the thesis is divided into this introduction which continues with the purpose and research questions, then follows the theoretical framework including previous research with the main subjects of environmental sustainability and freight procurement, after that research methodology, reliability, and validity, data collection and research ethics which is followed by the empirical framework of the study where the collected data from the interviews are presented and discussed. Finally, there are suggestions for further research, a conclusion, and the reference list and appendix.

1.1 Purpose and Research Questions

This part of the introduction presents the purpose of the study and the research questions RQ 1 and RQ2.

The purpose of the study is to increase understanding of the importance of Environmental Sustainability and how it is measured in the Logistics Service Provider (LSP) Selection phase in the freight procurement process.

RQ 1: What is Environmental Sustainability and how important is it compared to other factors such as cost, time, and reliability when a customer is selecting a Logistics Service Provider (LSP) in the freight procurement process?

RQ 2: What measurements are used and how can a customer measure the Environmental Sustainability of a potential LSP in the Selection phase of the freight procurement process?

2 Theoretical framework

This chapter describes the theoretical framework of the thesis. The first part of this chapter starts with previous research in the field and the research gap. The following part (2.1) explains the broader scope of sustainability and narrows down to the more specific theory about environmental sustainability in the transport sector. After that possible measures for environmental sustainability are studied in part 2.2. Part 2.3 focuses on the freight procurement process and part 2.4 combines the main topics of environmental sustainability and the freight procurement process. Finally, the theoretical framework is summarized in part 2.5. Here follows some previous research on the subject.

A study by Maack (2012) about *“Logistics service providers’ environmental management”* is a case study among LSPs that shows that the case companies had made environmental efforts beyond legislation both in short- and long-time perspective. The companies saw that they could have competitive advantages by doing so and at the same time reduce their costs. Some advantages mentioned were retaining a good reputation among the public and the possibility of offering environmentally friendly services. The case companies had both internal programs for making their operations more efficient and external programs to market their environmentally friendly services and what value they can give to the customers. One of the interviewees mentioned that there are demands for sustainability both internally from the global management and externally from the customers. Maack (2012) found that the LSPs didn’t perceive that there were specific sustainability demands of the customers, but the customers wanted the LSPs to show that they were somehow

involved in environmental sustainability and show that through environmental certificates and emissions reports. Maack (2012) also found that according to the LSP's perception, the customers were not willing to pay extra for a more environmentally sustainable transport service. The case companies in the study by Maack (2012) found that they had improved their efficiency and environmental sustainability by improved transport optimization and cooperation with other companies in a transport network.

(Maack 2012)

A study by Tran (2015) called *"Environmental Sustainability as Criteria when Choosing Third Party Logistic Providers"* is a case study of two third-party logistic (TPL) buyers and two TPL providers. TPL is a type of LSP that can include a broader spectrum of logistics services including transport, warehousing, customs clearance services, and so on. Tran (2015) found that the TPL providers perceived that their sustainability programs had a great appreciation among the buyers and found that the sustainability programs were a competitive advantage and increased their appreciation among the buyers. However, Tran (2015) found in the study that the buyers only put moderate value on the sustainability programs and found that other factors such as "delivery lead time, service quality and price" as more important factors. Tran (2015) also found that many companies have their sustainability programs and that it is becoming standard in the business field to have one. However, the increasing environmental sustainability regulations from governments and the EU will force companies to improve their sustainability by taking more actions towards environmental sustainability.

(Tran 2015)

A study by Ahopelto (2022) with the title *"The Significance of Environmental Sustainability in the Procurement of Sea Freight"* is a case study made for a global sea freight forwarding business and researches their customers' values in their decision-making regarding environmental sustainability when purchasing sea freight services. Ahopelto (2022) found in her study that environmental sustainability is a relevant and growing topic for freight purchasing companies but still the cost is the most important factor. *"Reliability, customer service, and availability"* are also found to be more important factors than environmental sustainability. *"Transparent data sharing and clear pricing and quotation"* were other

factors appreciated by the customers. Ahopelto (2022) found that the freight buyers preferred that environmental sustainability was included in the standard freight rate and not offered as an additional service with extra costs. The study by Ahopelto (2022) also found that “*global political and financial uncertainties*” are not significantly affecting the companies’ goals to increase their environmental sustainability and fulfill their sustainability goals.

(Ahopelto 2022)

What makes this thesis unique, and by that creating a research gap, compared to the previous research found is that it is made from the point of view of the specific case company, a company offering sea freight solutions with a roll-on/roll-off passenger (Ro-pax) vessel (ferry) between Finland and Sweden and their customers in the Ostrobothnia region. However, 13 out of 15 of the case company’s customers invited to the study are either freight forwarders or road transport carriers, so these 13 customers are also, as the case company, Logistic Service Providers (LSPs), with customers of their own which makes the study more complex. The study shows the connection between the customers of the case company’s needs and the needs created by the customers of the case company’s customers. The remaining two customers of the case company are manufacturing companies with direct freight contracts with the case company so there is a possibility to compare the results of the study to find similarities or differences between the LSP customers and the manufacturing customers. The case company wants to find out specifically how their environmental sustainability strategy is meeting the needs of these specific customers and how it affects their decision-making in the procurement process of the ferry services offered by the case company.

2.1 Environmental Sustainability

According to Björklund (2012) the term “*sustainability*” is often used to describe *sustainable development*. Sustainable development consists of three main subjects: Environmental sustainability, social sustainability, and economic sustainability.

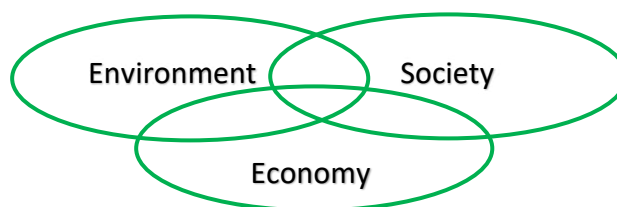


Figure 1. The three dimensions of sustainable development (Björklund 2012)

The model illustrates the overlap of the different dimensions. The company should take into consideration in its decision-making process how the decision affects sustainability. There is a possibility that one of the dimensions increases in size and another one decreases. For example, if the company buys a product cheaper from a place further away it increases the economy but decreases the environment because of the additional emissions caused by longer transport.

This model can be interpreted with different approaches. The main idea is that the total area of these circles must not decrease. A strict approach would be that the circles must stay unchanged but, in some cases, it can be reasonable to temporarily increase one area but have a goal to get them back in balance over time through different strategic decisions.

(Björklund, 2012) p.29-31

According to Gulliksson and Holmgren (2021) and Björklund (2012) a common definition of "Sustainable development" is made by the United Nation's (UN) so-called "Brundtland report" World Commission on Environment and Development (1987): "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

All members of The United Nations adopted in 2015 a program called "Agenda 2030 - Sustainable Development Goals" which is divided into 17 different themes described in the picture below.



Figure 2. UN Global Goals for Sustainable Development (United Nations 2024)

These goals are set to create “*peace and prosperity for people and the planet, now and into the future*”. As seen from the themes in the picture, the global goals for sustainable development include many factors from different areas to create a sustainable environment for people to live in. “9. Industry, innovation, and infrastructure, 13. Climate action, 14. Life below water, and 15. Life on land” are themes that are especially relevant to this thesis.

(United Nations 2024)

According to Gulliksson and Holmgren (2021), sustainable development can be divided into “*strong sustainability*” and “*weak sustainability*”. Strong sustainability is strict and only allows humanity to use the “*interest*” of the natural resources. Weak sustainability is more liberal and means that the “*society’s capital*” cannot decrease. Society’s capital is divided into: “*Natural capital*” including both renewable and non-renewable resources, “*Real capital*” which is manufactured objects such as buildings and machines, “*Human capital*” which is the knowledge and experience of humans, and “*social capital*” including behavior and institutions etc. The idea is that the total sum of these must not decrease, so if we use for example non-renewable resources another capital must increase instead.

Other definitions of sustainable development can according to Gulliksson & Holmgren (2021) be that society is developing in a manner that *“life quality doesn’t decrease over time”*. Another definition *“nature capital can’t decrease over time”* can be referred to as *“strong sustainability”*. Yet another definition is to *“manage the resources in a manner that a sustainable return from goods and services is guaranteed”* and can be referred to as *“weak sustainability.”*

(Gulliksson & Holmgren, 2021) p 13-16

According to van Weele (2018), many companies have a function called *“Corporate Social Responsibility”* (CSR) which can include many parts of a company including procurement. It has become more important for companies not to just focus on their economic profit but also on other values that are important for society for a sustainable business. CSR includes improvements such as better conditions for workers, taking care of environmental issues, and creating a better world in general. CSR can be seen as a sustainability concept for a business. CSR sometimes referred to as sustainability can be described as an *“idea to develop business solutions in such a way that requirements of the current world population are met without doing harm to the needs of future generations.”* (van Weele, 2018) According to van Weele (2018), important current threats to sustainability are the decrease of natural resources and global warming. The natural resources we have need to be used responsibly which also helps fight global warming.

(van Weele, 2018) p. 356-358, 374-375

According to Gulliksson & Holmgren (2021), there is no generally accepted definition of environmental sustainability but there are some concepts described in the figure below.

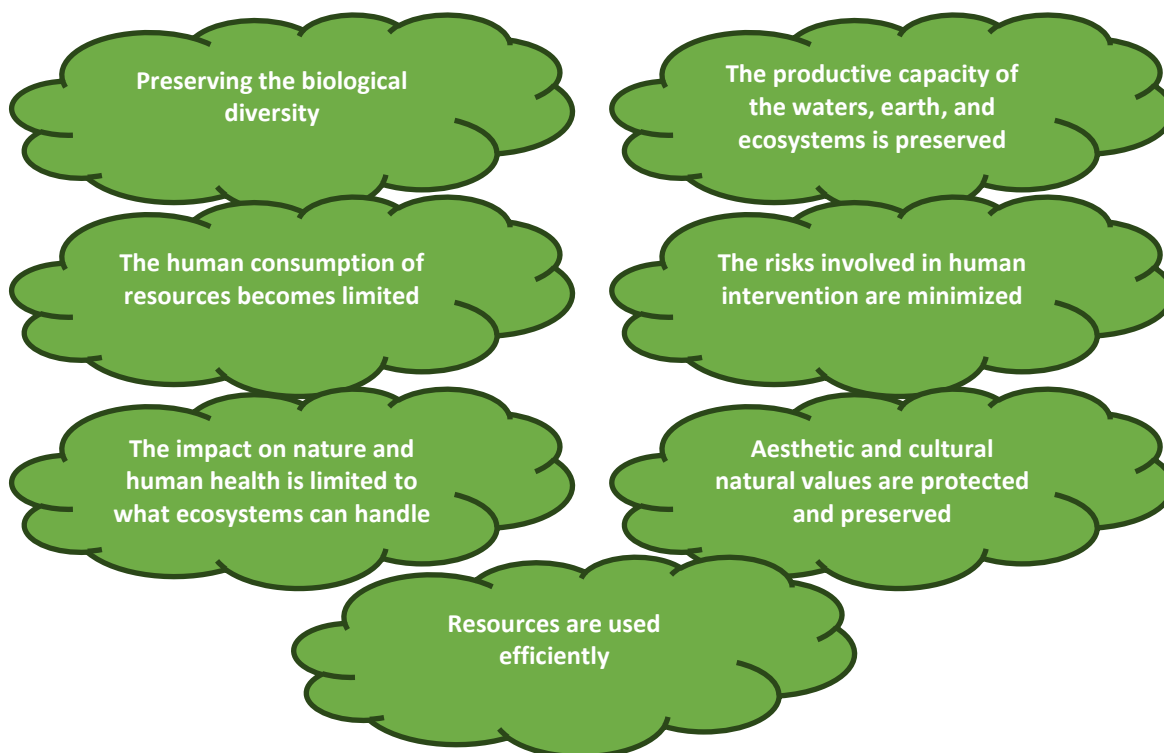


Figure 3. Concepts of environmental sustainability (Gulliksson & Holmgren 2021)

(Gulliksson & Holmgren, 2021) p. 185

Björklund (2012) describes environmental sustainability as the cornerstone of requirements for life and productivity in an ecosystem. The idea is to preserve the waters', the earth's, and ecosystems' production abilities and to reduce the impact on nature and people's health to an acceptable level. There are many concepts within environmental sustainability but according to Björklund (2012), it is hard to find an exact definition of them.

Björklund (2012) also lists some examples of threats to the environment:

"Climate impact, eutrophication, acidification, specific problems for urban areas, exploitation of ground, broken natural cycles and hazardous residual products, thinning of the ozone layer, ground-level ozone, impact through metals and organic environmental toxins, and introduction and spread of alien organisms."

(Björklund 2012)

"Climate impact" includes the excessive emissions of gases that increase the greenhouse effect of the earth. There are about ten so-called greenhouse gases and the most common are carbon dioxide (CO₂), ozone, and methane. There has been extra focus on reducing the CO₂ emissions that come from burning fossil fuels.

Acidification and eutrophication are caused by emissions of sulfur and nitrogen emissions which react with air and water and become acid that causes acidification of land and water. This harms nature including animal life and plants but also causes faster decay of buildings and other structures causing extra costs for society. Eutrophication is not caused only by emissions in the air but also by emissions from sewage, and the agricultural and forest industry sector.

The *specific problems in urban areas* come from the heavy traffic in these areas including noise and air pollution which harm humans and the environment. When there is a lot of traffic there will be traffic jams where the emissions become higher in a concentrated area. *Exploitation of ground* when building residential areas, other facilities, and infrastructure can have a bad impact on nature and wildlife. Roads and railroads can block the animals' natural paths used for moving between different areas.

Broken natural cycles and hazardous residual products. A natural cycle can consist of an ecosystem that returns as much of the resources that were used in the beginning. If more resources are used than being reproduced the natural cycle is broken and the source will sometime end. As an example, fossil fuels according to Björklund (2012) were used 600 000 times faster than they are reproduced. Some production facilities, especially in poor countries, cause hazardous residual products that are not properly disposed of and discharged into waters which harms humans, plants, and wildlife.

Thinning of the ozone layer can be caused by emissions from refrigeration processes and *ground-level ozone* can harm humans and plants. Some *metals* that can be dangerous for animals and humans, these metals can be found in, among others, batteries, paint, and in the combustion of fossil fuels. There are also *environmental toxins* caused by the value chains. The spreading of *alien species* is also a problem that organisms are spread by an example the ballast water of ships into another area where the species does not belong.

(Björklund, 2012) p. 32-38

According to Khan, Shah, and Yu (2021), poor air quality is one of the threats to environmental sustainability. All life on earth "*plants, crops, aquatic water life, humans, and animals*" depends on that the air quality is at a sufficient level. Decent air quality consists of 78 % nitrogen, 21 % oxygen, and 1 % other gases. A large part of the air polluting

emissions comes from burning fuels. There are solid fuels such as wood and coal and then there are combustion fuels such as liquids and gases. The fuels are used for heating, cooking, electricity, transportation, and so on. Many activities of humans cause emissions such as the construction of buildings, goods manufacturing, and pesticides used in the agricultural sector. There are also natural sources such as wildfires and volcanoes that cause emissions. There is a general “*Air Quality Index (AQI)*” that includes the pollutants in the air including the following emissions “*carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), coarse particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), and sulfur dioxide (SO₂)*”.

According to Khan et. al. (2021), transportation is a considerable source of air pollution causing “*acidification, eutrophication, and ozone.*” Acidification is caused by the emissions of pollutants and lowers the pH level in lake waters and oceans which is harmful to the organisms living there. Ozone can cause health problems for both humans and animals but also harm plants. Also, other air pollution causes many diseases for humans such as lung cancer, asthma, and various heart diseases. Air pollution is also causing heavy costs for countries. According to Khan et. al (2021) countries such as the USA and China have direct costs of hundreds of billions of U.S. dollars because of air pollution. There are also indirect costs such as less productivity due to workforce illness and changed buying behavior.

(Khan, Shah, & Yu, 2021)

According to Macharis et. al. (2014), logistics and in particular freight transport have become a concern when it comes to environmental impact. You can hear about a concept called “*green logistics*” that focuses on the environmental impact of logistics. *Sustainable logistics* is a broader concept including the impact on the environment, but it also includes the impact on the society and economy.

(Macharis, Melo, Woxenius, van Lier, & Staff, 2014)

The goals of sustainable logistics can according to Macharis et. al (2014) be described with three Ps: “*People, planet and profit*”. The three Ps are also mentioned by van Weele (2018) as a factor in CSR.



Figure 4. The three P model (van Weele 2018)

People stands for good and healthy working conditions for the employees who can also develop themselves in their work. *Planet* stands for efficient use of raw materials, correct waste disposal, and other environmentally friendly activities that help to reduce carbon emissions. *Profit* includes guidelines on how the company can make a profit while keeping an eye on the sustainability factors of the investments and operations.

(van Weele, 2018) p. 359-361

According to Macharis et. al. (2014), research has shown that it is quite easy to get private companies to invest in sustainable improvements that will give a clear economic return. When it comes to projects that maybe will not give an economic return but a positive impact on society and/or the environment it is often more difficult to get the companies to invest if they don't get help from the public sector. According to the research in Macharis et. al.'s book it will not however be possible to reach the ambitious goals of CO2 reduction only by monetarily profitable methods.

(Macharis, Melo, Woxenius, van Lier, & Staff, 2014)

According to the European Commission (2023) transport activities within the European Union (EU) have increased over the years and the demand seems to increase in the future. Transport is now (2023) causing a quarter of the total greenhouse gas emissions within the EU. *The European Green Deal* aims to reduce transport emissions by 90% by 2050 which demands a movement to more sustainable transportation methods. One of the methods that the European Commission (2023) wants to support is to extend the use of alternative fuels and zero-emission vehicles. Another goal is to use more sustainable transport modes such as inland waterways and rail. Intermodal transports combine for example road transport with rail and/or waterborne transport. (European Commission, 2023)

2.2 Possible Measures

One possible measure to improve sustainability in logistics is according to Macharis et. al (2014) to use the model of four A's: "Awareness, Avoidance, Acting and shifting and Anticipation."

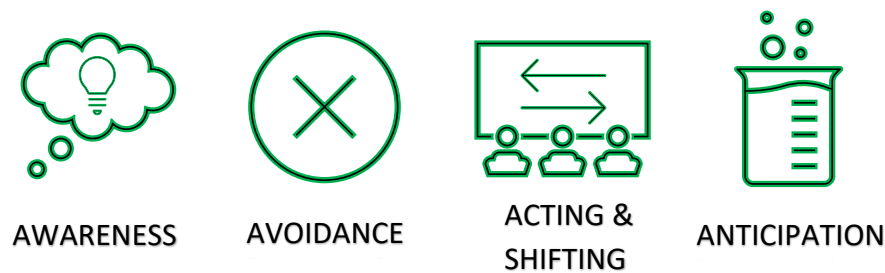


Figure 5. Model of four A's (Macharis et. al. 2014)

Awareness can be improved by collecting data about and presenting the effects and external costs of the logistics activities. There are also several programs that logistics companies can attend to show that they care about sustainability for example Green Freight Europe which aims to reduce the emissions from road freight within Europe. *Avoidance* can consist of different approaches. The first thing to think about is whether the transport is necessary. Will the goods certainly be needed at the destination? Another thing is to optimize the size and packaging of the goods and bundle several packages into the same transport to avoid wasted space in the transport unit. It could also be of importance to improve the cooperation between freight companies to help each other fill out the space in the units. *Acting and shifting* is about, when possible, thinking of more sustainable freight methods, for example, to use inland waterways and railroad instead of road transport or air freight. Also, intermodal transport can be used which is for example a combination of road and waterway or railroad. Another approach to acting and shifting is to utilize the late evening, night, or early morning for deliveries when there is less risk of traffic jams. *Anticipation* of new technologies. Several new technologies are on the market that reduce CO₂ emissions from transport such as electrical vehicles. Different technologies will improve the smoothness of the logistics chain that are useful for more sustainable freight. (Macharis, Melo, Woxenius, van Lier, & Staff, 2014)

According to Björklund (2012), there are four ways to reduce CO₂ emissions described in the model below.

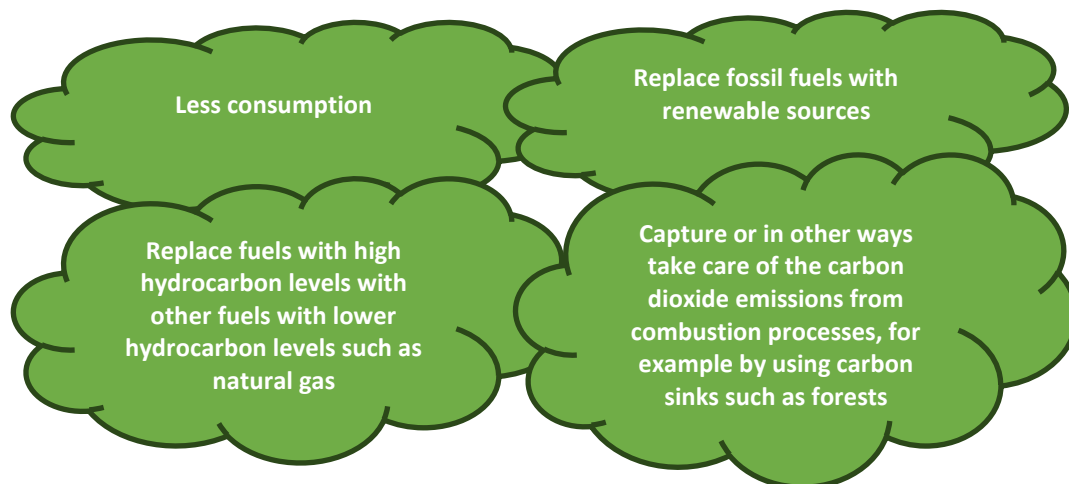


Figure 6. Model describing four ways to reduce CO₂ emissions (Björklund 2012)

(Björklund, 2012) p. 33

According to Björklund (2012), there are three major options to improve environmental sustainability in transport.

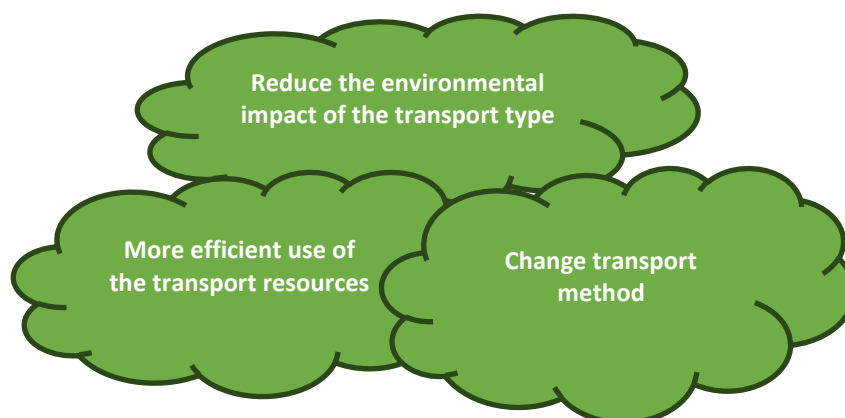


Figure 7. Options to improve environmental sustainability in transport (Björklund 2012)

1. *Reduce the environmental impact of the transport type.* This can be done by switching to more environmentally friendly fuel, proper maintenance and technical improvements of the transport units, and reduced speed.

2. *More efficient use of the transport resources* by combining cargo, optimization of routes, and use of technology that helps the managing of the transports.
3. *Change transport method*. There might for example be a possibility to change road or air freight with higher emissions to electrified railroad with lower emissions. To be an efficient method railroad transport needs a certain volume to win over road transport. By using multimodal transports the best sides of two transport methods can be combined.

(Björklund, 2012) p. 109-115

The European Union (EU) has made a package called “*Fit for 55*” to reduce carbon emissions within the union. Within this package, there is a directive called the *EU Emissions Trading System (ETS)* whose mission is to reduce the greenhouse gas emissions from the shipping industry to the required level by the EU.

All vessels with a weight above 5000 gross tonnage (GT) that come or depart an EU port are impacted by the ETS. The shipping companies will get or purchase a certain number of allowances, and they are only allowed to emit according to these allowances. The options when they need more are to either lower their CO₂ emissions or buy more allowances. The ETS will be taken into use gradually starting in 2023 and being fully implemented in 2026. The shipping companies will need allowances for 50% of the emissions when one of the harbors (departure or arrival) is within the EU or 100% for the emissions between two EU ports. The budget of the ETS allowance trade is 1,6 billion euros which is placed in an Innovation Fund that aims to renew the ship fleets.

(Bureau Veritas, 2022)

There are several technologies developed to improve fuel usage and/or reduce the emissions from ships. This includes sails or kites, more efficient engines, waste heat recovery, redesign of the hull by reducing its weight and/or improving the shape so it will not have as much resistance from the water, improvements of propellers and rudders, installing Scrubbers and Filters to reduce emissions and the usage of Shore-based power instead of the ship’s generators when in harbor.

(Cullinane, 2014)

2.2.1 ISO 14001 Environmental Management Systems

A business can reduce its environmental footprint by an *“Environmental management system”* and one common system is the ISO 14001 standard. (Björklund, 2012) p. 45-46 According to Sallnäs (2017), a purchasing company can often require that a supplier comply with the ISO 14001 Standard.

The independent International Organization for Standardization (ISO) provides different standards that businesses can use to prove that their products and services are *“safe, reliable, and of high quality”*. The standards also help the business to develop *“sustainable and ethical practices”*. Among the most popular standards, there are ISO 9001 for *“quality management systems”* and ISO 14001 for *“environmental management systems”*. A company can be certified for one or several of these standards. The ISO standards are used in over 180 countries in the world.

The ISO 14000 family is a set of standards for environmental management. Businesses who want to certify themselves for a standard use the ISO 14001 standard. Other standards in the family that are used for other purposes such as *“audits, communications, labeling and life cycle analysis, as well as environmental challenges such as climate change”*. The ISO 14001 standard helps businesses and organizations of all kinds and sizes to create their *“environmental management system”* according to the requirements of the standard. The standard includes praxis for how to use resources efficiently, reduce waste, adapt and mitigate the challenges of climate change, and handle air, soil, and water pollution.

By using the standards businesses and organizations can prove that they comply with the regulations connected to environmental sustainability which can improve their reputation among customers and other stakeholders and improve the managers' and other employees' understanding of the subject to achieve certain sustainability goals. Also, the suppliers of the business or organization can be involved in the environmental management system.

(International Organization for Standardization, 2024)

2.2.2 Eco-Management and Audit Scheme (EMAS)

According to Sallnäs (2017), another common environmental management system required from suppliers by purchasing companies is the Eco-Management and Audit Scheme (EMAS).

(Sallnäs, 2017)

EMAS is an environmental management system established by the EU that can be used combined with ISO 14001 or independently. EMAS includes the same basics as the ISO 14001 system but also includes environmental reporting, external control, and registration. The system is made for companies to identify their direct and indirect impact on the environment. The system helps the company to reduce its waste and emissions and control the consumption of energy and natural resources. The goal is to reduce both environmental impacts and to reduce costs for the company.

An EMAS-certified company is bound to follow the environmental legislation, continuously improve its environmental efficiency, and to report publicly about its environmental sustainability. The information from an EMAS report is considered a trustworthy source for stakeholders and the public since it is verified by an external organization. In Finland, it is the Finnish Environment Institute who is responsible for the verifications. In Finland, the process starts when the company creates its environmental management system and creates an environmental sustainability report according to the given standards. When these are made, the company asks for an audition from a by the by the Finnish Accreditation Service (FINAS) certified environmental inspector. When the inspector acknowledges the verification to the Finnish Environment Institute, the company is registered into the EMAS system, gets an EMAS certificate, and gets permission to use the EMAS logotype.

(Finnish Environment Institute, 2024)

Companies can prove their sustainability by presenting their relevant figures according to different standards set by organizations. Here follows an explanation of two available standards: The Global Standards for Sustainability Impacts (GRI Standards) and the Nordic Sustainability Reporting Standard (NSRS). The GRI Standards are mentioned by Björklund (2012) as a widely used reporting standard among companies. Finally, this section handles

the THETIS-MRV reporting system which is specific for maritime companies, and the EU Corporate Sustainability Reporting Directive (CSRD) which applies to large and listed companies.

2.2.3 The GRI Standards

The GRI Standards are a set of standards divided into three different types of standards: GRI Universal Standards which are the most general and apply to all companies, GRI Sector Standards that is more specific and apply to certain sectors and GRI Topic Standards which handle the most specific topics.

The company can go through what standards are available and evaluate which ones are relevant for the company and then start working with them. The standards can be used by all kinds and sizes of organizations.

Many stakeholders can benefit from the information the organization provides through the information presented according to these standards. Internal stakeholders within the organization can use them for decision-making and setting up strategies for the business, external stakeholders such as potential investors can see how the organization is handling sustainability and evaluate how successful it will be in the future, and it can also help researchers and other interested to evaluate the company. Since the same standards are used by many organizations it is easier to compare them between each other and how the organization is developing over time.

In the introduction of each standard, there is a specific disclosure that explains in detail what information should be included in the report. Some requirements are mandatory to include but also recommendations of facts that could be beneficial to present. The standards also provide guidance that helps the user to understand how to use the standards.

(Global Reporting Initiative, 2024)

2.2.4 Nordic Sustainability Reporting Standard (NSRS)

The Nordic Sustainability Reporting Standard (NSRS) is a sustainability standard developed by the Nordic Accountant Federation especially for accountants whose clients are small-

and medium-sized enterprises (SMEs) in the Nordic countries to help them in their decision-making to become more sustainable. Even if the standards are made for SMEs they are, according to the Nordic Accountant Federation (2024), comparable with other international standards.



Figure 8. Illustration of the three user-groups of NSRS (Nordic Accountant Federation, 2024a)

The “Users” of the standards are the SMEs who can, with the help of their accountant, make a sustainability report according to the standards. According to the Nordic Accountant Federation (2024), the user can gain advantages in the market by proving to their potential customers and financiers that the enterprise is up to date when it comes to sustainability. The “Primary-Users” are the accountants for the SME’s. The accountants can according to the Nordic Accountant Federation (2024) by using NSRS gain knowledge and a competitive advantage by offering this green service to their clients. The “End-Users” are according to the Nordic Accountant Federation (2024) “investors, large companies, banks, government, consumers and other stakeholders” that want to get information about the enterprise beyond the financial data. The use of NSRS helps them in their decision-making process to compare enterprises and their non-financial data and create goals and targets for sustainability.

(Nordic Accountant Federation, 2024a)

The NSRS standards are found in two levels: NSRS Entry Level and NSRS Level 1. The standards are available on the NSRS website in English, Danish, Finnish (only Entry Level), Norwegian, and Swedish. The standards consist of an Implementation Tool and an Implementation manual for each level. There are also additional appendixes for support such as a Glossary, a Theoretical Annex, a Report Template, and an Example Report.

The implementation tools are in Excel format. The Entry Level is a simplified version more suitable for internal use only and the Level 1 is for official reporting also to external

stakeholders. The Entry Level includes the following steps “*Climate commitment, Profile, Stakeholder inclusion, Materiality Process, Governance profile, Management Approach, Finalizing, Evaluate*” and Level 1 includes steps “*Climate commitment, Profile, Stakeholder inclusion, Impact assessment, Climate opportunity, Governance Profile, Management Approach, Integrated reporting, Finalizing, Evaluation*” plus two support pages.

(Nordic Accountant Federation, 2024b)

2.2.5 EU THETIS-MRV CO2 Emission Report

Specifically for maritime transport as the case company The European Union (EU) stated a regulation called: “*Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting, and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC*” which includes that vessels weighing above 5000 gross tonnage (GT) with some exceptions must starting 31 August 2017 report the CO2 emissions when operating within the EU and if the destination or departure is from a port within the EU. These standardized extensive reports including among other relevant factors fuel consumption and emissions must be verified by an accredited company.

(European Union, 2024a)

2.2.6 EU Corporate Sustainability Reporting Directive

Starting in 2023 the EU Corporate Sustainability Reporting Directive (CSRD) requires large companies and listed companies (except listed micro-companies) to publish social environmental sustainability reports annually. The reporting is a part of the previously mentioned “*European green deal*” and helps investors and other relevant stakeholders to evaluate the environmental and social sustainability performance of the companies. The directive also applies to companies from outside the EU that generate over 150 million euros on the EU market. The first year to be reported is 2024 which report is to be published in 2025.

The reports are to be made according to the European Sustainability Reporting Standards (ESRS) which are made to meet EU requirements and at the same time adaptable to

international standards. According to the EU, the companies' reporting costs will over time be reduced thanks to the harmonization of the required information for the reports.

(European Commission, 2024)

The GHG emissions that should be reported by the companies according to CSRD are divided into three scopes. *Scope 1* is the direct emissions caused internally by the company, *Scope 2* is the indirect emissions caused by purchased or acquired sources, and *Scope 3* is the elements further away in the value chain than Scope 1 and Scope 2 which can include transport activities.

(European Union, 2024b)

According to the EU's Eurostat web page, small companies have less than 50 employees, medium 50-249 employees, and above that the company is considered a large company. (Eurostat, 2024) So, this means that companies with over 250 employees must do sustainability reports according to the CSRD. Small and medium-sized companies are sometimes referred to as "SMEs". Listed SMEs are also affected by the CSRD except listed micro-companies.

Borowicz and Czerepko (2023) have studied the possible consequences of CSRD on transport companies. The study found that there is a risk that even if the directive is made to be common for all EU there might be differences between the legislation in different countries that makes the reports less comparable with each other. They also found that several companies are already publishing their environmental reports. According to Borowicz and Czerepko (2023), actions have already been taken to reduce the environmental footprint of transportation by optimizing the transport chains, improving technology and electrification of the transport equipment, and moving to more sustainable methods such as railway instead of air. Companies are also looking at their operations in their offices to recycle and reduce waste and use more environmentally friendly supplies. Borowicz and Czerepko (2023) found that improving sustainability is a trend within the EU and that transport is an important part of this because of the high level of emissions caused by the transport sector. (Borowicz & Czerepko, 2023)

2.3 Freight Procurement Process

This part of the chapter will explain procurement processes and the parts that are included. The beginning of the chapter explains the general procurement process models and narrows it down into freight procurement and what factors that are specific to that business.

According to van Weele (2018), there are two types of procurement models: “*The linear purchase process model*” and the “*Extended purchasing process model*”. These models are general models for procurement and can be adapted to any type of product or service.

The linear purchase model consists of the following steps: “*Define specification, Select supplier, Contract agreement, Ordering, Expediting, and Evaluation*”.

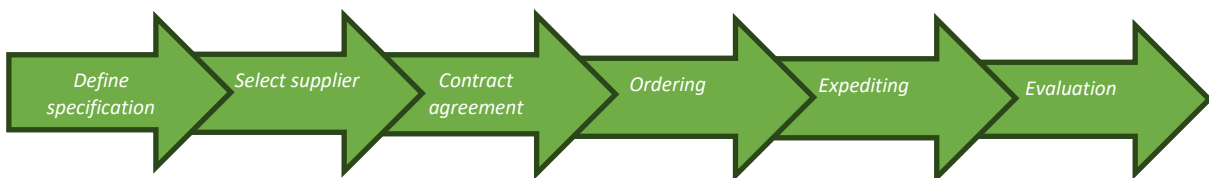


Figure 9. The linear purchase process model (van Weele 2018)

In the “*define specification*” step the purchaser gathers information from relevant stakeholders within the company about the specific requirements of the product and/or service that will fulfill the company’s needs. The company also can choose between producing the product or service internally or going forward with the procurement process from an external supplier. The “*purchase order specification*” can be divided into “*functional specifications*” and “*technical specifications*”. Depending on the nature of the product or service this can include quality specifications, logistics specifications, maintenance specifications, legal and environmental requirements, and a target budget.

When the needs are specified, the process goes on to the “*Select supplier*” step. The goal in this step is to select the best possible supplier for the product and/or service the company needs. Usually, the company already has some trusted suppliers that come to mind when starting this step of the process. The selection step is divided into four steps.

The first step is to decide the *level of sub-contracting*. Should it be a “*turnkey*” contract or only a partial contract? Another factor in this step is to decide whether the product or

service should have a fixed price or a cost-reimbursable price, the latter typically an agreed hourly rate plus if relevant the used materials.

The second step is to do a *“preliminary qualification of suppliers and making up the ‘bidders’ list”*. In this step potential suppliers that could have the possibility to meet the requirements are listed and contacted for a *“request for information”* (RFI). Here the contacted potential suppliers can send information about how they could solve the needs of the potential customer and possibly invite them to visit their company.

Out of these companies the most suitable potential suppliers go further to the *“request for quotation”* (RFQ) step. Here the potential suppliers give their bids to the customer so that the customer can compare these with each other. After receiving the bids, the purchasing department should analyze them thoroughly to see how they match the requirements, and not only the purchasing price, but the *“total cost of ownership”* (TCO) can be relevant to consider also.

Finally, the company will make a risk analysis of the potential suppliers and after that choose one or in some cases two or more suppliers to continue with in the process to the *“Negotiation and Contracting”* phase of the purchase process. In the *“Negotiation and Contracting”* phase a contract suitable for the product or service in question is made between the buyer and seller. The contract can include *“Prices and terms of delivery, terms of payment, penalty clauses and warranty conditions and other arrangements.”* When the contract has been made between the parties the next step is *“The ordering process and expediting.”* Depending on what kind of product or service and how frequently it will be needed the ordering process can look different. Sometimes the contract itself can be seen as the order and in other cases purchase orders are placed throughout the contract period.

The expediting part consists of check-ups from the buyer so that the supplier can hold their promised delivery times and other relevant factors to avoid surprises in the supply chain. When the product is delivered the buyer can make an *“acceptance test”* to see if the product quality is according to the contract.

After the product or service is taken in use the process goes on to the step *“Follow-up and evaluation”* where the functionality and quality of the product or service is monitored. If there are deficiencies with the contract the buyer can state a claim to the seller. The buyer

can keep a record of how well the product or service is executed by the supplier and consider this in future purchases.

As previously mentioned, there is also a more advanced “*Extended purchasing model*” that can be useful for more complex purchases. It includes the same parts as the linear models but with more details but there is also a new focus on “*Risk management*” and “*Stakeholder management.*” This model is unlike the linear model a circular model which means that usually when one process is done another one starts.

(van Weele, 2018) p.28-46

Since this thesis focuses on freight procurement, here follows a specification of which characteristics there are in the freight procurement process. Quite like the linear purchase model by van Weele (2018), according to Bahr & Sweeney (2019), the freight procurement process is generally divided into six different phases: *Specification, Selection, Contract, Ordering, Expediting, and Follow-up & Evaluation.*

In the first stage of the process, the shipper sends out a request for proposal to logistics service providers (LSP) defining the transport need including technical and functional demands. The logistics service providers that are contacted can according to Bahr & Sweeney (2019) be selected by “*previous experiences, market surveys, and industry rankings*”. To make it easier to compare the offerings a standard form is often used.

The shipper then selects the most suitable LSPs that can match usually “*technical, economic, or operative aspects*” to continue with the following steps of the freight procurement process and start negotiations with them. When the contract is formed an order is placed and then the goods are taken care of by the LSP in the “*Expediting*” phase. After a while, the final phase can take place where the shipper evaluates the operations of the LSPs and that the services have been delivered according to the contract.

(Bahr & Sweeney, 2019)

According to Rodrigue (2022), you can find that *cost, time, and reliability* are factors that normally are considered when choosing freight methods. For example, Air Cargo is the fastest option but also the most expensive. Railroad and Water are the slowest but also most cost-efficient. In between them, you can find road transport. (Rodrigue, 2022)

According to Multaharju et.al. (2017) also *high-quality documentation and shipment planning* are traditional factors that are widely used in freight procurement. Unlike Rordigue (2022) Multaharju et. al. (2017) don't mention reliability as a traditional factor. The research done by Multaharju et.al. (2017) is called "*Sustainability-related risk management in buying logistics services*" and is a case study of Finnish companies when choosing logistics service providers for their company. It is found that several of the customers of the case companies in the Multaharju et.al. (2017) study have requirements about sustainability from their customers so there is an interest for them to implement sustainability in their whole supply chain in which logistics have a major role. The study found that larger logistics service buyers have higher demands on sustainability and larger logistics service providers have more advanced sustainability programs than the smaller ones.

(Multaharju, Lintukangas, Hallikas, & Kähkönen, 2017)

2.4 Environmental Sustainability in the Freight Procurement Process

This part of the chapter combines the two main concepts in this theoretical framework "*environmental sustainability*" and the "*freight procurement process*".

Aichbauer et. al (2022) have written a book called "*Responsible Procurement – Leading the Way to Sustainable Tomorrow.*" The book is included in a series called "*Management for Professionals*" and is made to help and inspire people working in procurement and other managers to improve sustainability in their procurement process. The book is divided into two parts. The first part is called "*Setting the Scene*" and explains why we need sustainable procurement and how to create the base and goals for implementing it into the company's operations. The second part "*From Ambition to Impact*" explains the implementation of the sustainability goals into the procurement process in detail.

According to Aichbauer et. al (2022), there are not only regulations from the government that businesses need to follow but they also have a Corporate Responsibility to "*do the right thing*" when it comes to sustainability. There are both legal and moral imperatives that businesses need to consider. To follow all legislation might mean a lot of work for a business but it could also be beneficial for the business to follow all rules and go beyond

the legal requirements to make a competitive advantage when it comes to sustainability. The competition legislation within the EU and on a national level allows businesses to cooperate more freely when developing sustainable solutions so that companies can help each other to become more sustainable. Collaboration between companies can reduce costs and achieve better results when they can share their resources.

According to Aichbauer et. al (2022), there are several benefits for businesses that are early to present sustainable solutions: *“improved operations, enriched risk management, strengthened stakeholder relationships, cost savings, value creation, and improved market positioning.”* Aichbauer et. al (2022) emphasize the importance of procurement in a sustainable business model. The procurement department can play a large role by choosing responsible partners and taking sustainability and resilience values into account as well as price. They claim that the business world is rapidly going through a change towards a *“stakeholder economy”* where the business not only has responsibility towards the investors but also other stakeholders such as *“customers, employees, suppliers, and society at large”*. To complete this change the procurement process needs to have this broader purpose.

Bask & Rajahonka (2017) have written a paper about *“The role of environmental sustainability in the freight transport mode choice”* which focuses on a literature review of previous research on environmental sustainability and multimodal transports in the freight procurement process. The research collected 11 articles about transport mode selection criteria and nine out of eleven articles mentioned price/cost as a factor while only three out of eleven articles mentioned environmental sustainability or carbon emission as one of the criteria. The oldest article in the selection was from 1990 and the most recent was from 2014. The first time environmental sustainability or carbon emissions was mentioned in the selected article was in 2001 and the other two in 2013 and 2014.

According to Bask & Rajahonka (2017), older research about transport mode choice focuses more on the client’s point of view while more recent research focuses more on the logistics service provider’s (LSP) point of view. When it comes to the eight articles about freight procurement (RfQs/tenders) researched in the paper, half of them include environmental sustainability, and two of the more recent also include multimodal transport.

Bask & Rajahonka (2017) conclude their findings that environmental sustainability is not among the main criteria in freight procurement. Transport costs, time, frequency, and reliability are more often mentioned as criteria in the process. By the time of this research environmental sustainability and multimodal transport criteria in the freight procurement process are considered to be in an early phase but becoming more actual in later material. In total 40 articles were researched in this paper and 22 of them included environmental sustainability as a criterion. Half of the articles including environmental sustainability were from 2012 or more recent. Multimodal transports were mentioned in 22 of the articles while the other focused on only single transport modes. There is also a trend that multimodal transports are discussed more in the more recent articles from 2003 onwards.

(Bask & Rajahonka, 2017)

According to Bahr & Sweeney (2019) who have researched the *“Follow-up & Evaluation”* phase of freight procurement green values and sustainability are of great concern among shippers, but it is not clear how this is followed up with the LSPs in practice. Metrics that LSPs can use to present sustainability are CO2 emissions and fuel usage. Both LSPs and shippers see a connection between environmental sustainability and economic efficiency. However, it seems like the most important factors are cost and service level.

(Bahr & Sweeney, 2019)

Smart Freight Centre (SFC) which is an organization that aims to improve the efficiency and decrease emissions in global transport and the World Business Council for Sustainable Development (WBCSD) which is a cooperation between over 200 companies to improve sustainability have together made a publication called *“Smart Freight Procurement Guidelines”* (SFP Guidelines). The SFP Guidelines are a collection of *“action cards”* that companies can take into consideration in their freight procurement process. There are several real-life case examples of the different steps in the process. The guidelines divide the freight procurement process into four phases: *“Planning, tendering, contracting, and contract-based supplier management.”* Before these phases, there is also a *“Preliminary phase”* where the company is planning and looking at its budget and other concerns to complete the procurement process.

One important mission of these guidelines is to give tools for the companies to not only focus on the freight costs but also on emissions of air pollutants and greenhouse gas (GHG).



Figure 10. SFP Guidelines main principles (Lepori et.al. 2019)

The main principles of the SFP Guidelines are Transparency (report emissions), collaboration (with other parties to optimize the transport chain), and leadership and innovation (new ideas on how to do business and leading towards climate consciousness).

(Lepori, Punte, Toth-Weedon, & Heinrich, 2019)

According to van Weele (2018), companies are including in their CSR programs supplier guidelines that need to be followed by a potential supplier. These can be in the form of a “code of conduct” that needs to be signed by the supplier. The company can then follow up and evaluate by different methods such as self-evaluation and/or supplier audits how well the suppliers are living up to these given guidelines and code of conduct.

(van Weele, 2018) p.366

2.5 Summary of the theoretical framework

Here is a summary of the theoretical framework for this thesis.

The word sustainability is connected to sustainable development. Sustainable development includes environmental sustainability, social sustainability, and economic sustainability. The theory behind sustainable development can be seen from two perspectives. “Strong sustainability” is stricter and allows us to use only the “interest” of the natural resources and “Weak sustainability” is more liberal and says that “society’s capital” cannot decrease over time. Society’s capital is divided into “Natural capital”, “Real capital”, “Human capital”, and “Social capital”. “Weak sustainability” allows us to take resources out of one capital as long as another capital increases in the same way.

Corporate Social Responsibility (CSR) is a function that many companies have so they can bring other than monetary value to society. This can include handling environmental issues. CSR can sometimes be referred to as the companies' sustainability concept.

Environmental sustainability is the cornerstone of requirements for life and productivity in an ecosystem. This includes protecting the waters, the earth, and ecosystems so they can produce the resources we need. It also includes preserving a healthy environment for humans to live in and reducing the impacts on nature.

Threats to environmental sustainability mentioned are among others "*Climate impact*" which includes the emissions of greenhouse gases such as CO₂ and the use of fossil fuels which was in 2012 600 000 times faster than they were reproduced. The emissions from burning fossil fuels also cause air pollution which is a threat to all life on earth.

Logistics and freight transport have become a concern when it comes to environmental sustainability. There are concepts such as "*green logistics*" with a focus on environmental sustainability in logistics. *Sustainable logistics* is a broader concept including the three Ps: "*People, planet, and profit*" where "*planet*" is the environmental sustainability part.

The European Commission is working on reducing emissions from transport within the EU by setting up goals such as *The European Green Deal* which aims to reduce emissions from transport by 90% by the year 2050. They are also promoting the use of alternative fuels and the use of intermodal transport within the union.

To improve environmental sustainability in logistics a company can use the model of four A's which includes "*Awareness, Avoidance, Acting and shifting, and Anticipation*". The transport company can use different methods for reducing the CO₂ emissions such as reducing consumption and using alternative fuels. Environmental sustainability within logistics can also be improved by more efficient use of transport resources and a change of transport method.

The EU has a package called "*Fit for 55*" which includes the *EU Emissions Trading System (ETS)* which aims to reduce the GHG emissions from the shipping industry within the EU. There are different technologies for the shipping industry to reduce their environmental

impact such as improving fuel usage and reducing emissions, more efficient design of the ships and engines, and usage of shore-based power when the ship is in harbor.

A company can improve its environmental sustainability by using an “*Environmental management system*” such as ISO 14001 and/or EMAS. The company can also make environmental sustainability reports Using for example the GRI standards or the Nordic Sustainability Reporting Standard (NSRS).

The EU demands that vessels over 5000 GT must since 2017 report their CO2 emission to the public EU THETIS-MRV CO2 Emission database. From 2023 the EU also requires all large companies and listed companies to follow the EU Corporate Sustainability Reporting Directive (CSRD) to make sustainability reports for their operations.

The freight procurement process can be either a *linear purchase process model* or an *extended purchase model*. The linear purchase process includes these steps “*Define specification, Select supplier, Contract agreement, Ordering, Expediting, and Evaluation*” and the extended model used for more complex purchases which also includes “*Risk management*” and “*Stakeholder management.*”

Cost, time, reliability, high-quality documentation, and shipment planning are factors that normally are considered when a purchasing company is choosing freight methods. Previous research by Multaharju et.al. (2017) has found that in general larger companies have higher demands on sustainability in freight procurement. There is a theory called “*Responsible procurement*” which helps the purchasing company to include sustainability in their freight procurement process. Sustainability must be considered from start to finish of the procurement process.

Previous research by Bask & Rajahonka (2017) shows that in the transport mode selection criteria, most of the articles mention price/cost as a factor but only a few environmental sustainability or carbon emissions as a criterion. These articles were written between 1990 and 2014. Half of the articles in the research about RfQs/tenders included environmental sustainability. The study found that environmental sustainability is a topic rising in popularity within the research in the later years of the study.

Previous research by Bahr & Sweeney (2019) found that LSPs can use reports of CO2 emissions and fuel consumption to present their sustainability to a freight-purchasing customer. Environmental sustainability and economic efficiency can both be improved by lowering fuel consumption. However, the result of this research found that cost and service level were more important factors than environmental sustainability among freight purchasers.

A company can improve the environmental sustainability in their freight procurement process using the *“Smart Freight Procurement Guidelines”* including the main topics *“Transparency, Collaboration, and Leadership & Innovation”*. The purchasing company can make a *“code of conduct”* that their suppliers need to approve which can include environmental sustainability factors.

3 The case company

The history of this route as we know it today goes back to 1948 when the company Vasa-Umeå AB was founded and started to operate the route and has since then been operated by different shipping companies throughout the years.

(Herrgård, 2022)

According to the Freight Director (personal communication, meeting 1.2.2024), the current shipping company NLC Ferry Ab Oy was founded in 2012 by the City of Vaasa and the municipality of Umeå to operate between the cities. They bought a used ferry built in 1981 for this traffic. In 2015 they started the Swedish company Kvarken Link AB and in 2019 the Finnish equivalent Kvarken Link Oy to support the acquisition of the first brand-new ferry built specifically for this route. Kvarken Link is nowadays the parent company of NLC Ferry Ab Oy. NLC Ferry Ab Oy certified 29.1.2024 for the ISO 9001 quality management system and the environmental management system ISO 14001.

The ferry was the first newbuild for the route between Vaasa and Umeå and when delivered in 2021 it was one of the most environmentally friendly passenger vessels in the world. The ferry is equipped with the latest technology such as a dual fuel system, so it can also use liquid natural gas or biogas, a NOx-reducing catalyst and a system that recovers waste heat and cold, and a hybrid inductive charging and battery solution. The ferry can

take up to 935 passengers and 1500 lane meters of cargo. Its total length is 150 m and gross tonnage is 24300.

The ferry is designed to be versatile when it comes to different transport demands. The aft ramp is 15 meters wide and the main deck's height is 4,9m to facilitate oversized transports. There are also 50 electric connections for connecting trailers carrying temperature-sensitive goods. The ferry is International Maritime Dangerous Goods (IMDG) certified and there is a special open so-called weather deck suitable for transporting dangerous goods.

The case company offers via partners to send containers and trailers from the port of Umeå by train to Gothenburg or Trelleborg in south Sweden from where they can continue their journey on other ships or other transport methods. By using these intermodal solutions, the CO2 emissions of the transport can be reduced compared to other freight modes.

3.1 Alternative Routes

The case company's ferry is the only vessel operating between Vaasa and Umeå so there is no competition on this route. According to my own experience, the clients' options are either to go by road via Haparanda or ferry from southern Finland for example Turku to Stockholm or Naantali to Kapellskär.

The distance between Vaasa and Umeå city centers is according to Google Maps 120 km including ferry and 835 km via Haparanda. However, the potential customer's goods are to a large extent going from broader areas than just Vaasa and Umeå so at some point it will become more beneficial to go via Haparanda instead of via Vaasa-Umeå. For example, according to Google Maps, the distance between Kokkola in central Ostrobothnia to Piteå in Sweden is 505 km via Haparanda and 453 km via Vaasa-Umeå including the distance on the ferry. Another example could be from Pori in Satakunta to Sundsvall in Sweden which is, including ferry, according to Google Maps 564 km via Vaasa-Umeå or 745 km via Naantali-Kapellskär. When calculating the costs, you take into consideration how much the lorry costs per km and the freight rate of the ferry company.

4 Research methodology and limitations

The research is done as a descriptive, applied, qualitative case study by selecting a group of customers of the case company. The research contains individual in-depth interviews with representatives from two freight forwarding companies, three road freight carriers, and one manufacturing company situated around the Ostrobothnia area in Finland. Here follows an explanation of the different methods and motivations why the specific methods were chosen for this research.

According to Patel & Davidson (2019), there are different types of study designs that can be chosen depending on how much previous knowledge there is within the subject. If the research gap is large and there is limited previous knowledge the study is “*exploratory*” and aims to gather as much information as possible about the subject to create a base for further studies. In cases where there are some previously available studies the study becomes “*descriptive*”. The research can describe happenings in the past or in the present time. A descriptive study is more limited to a specific problem area. Descriptive research can contain each aspect separately or make connections between different aspects. Since there is previous research on the main subjects handled in this thesis a descriptive approach is taken in the research to investigate the specifics of this case company. This thesis aims to describe the aspects separately as well as connect the different aspects.

According to Kothari (2004), research can be *applied* or *fundamental*. Applied research aims to help society or a company with a clear problem that they are facing. Fundamental research mainly aims to increase the general understanding of a specific subject. Since this research aims to help the case company increase the understanding of a specific problem this is considered as *applied* research.

Research can also according to Kothari (2004) be either *quantitative* or *qualitative*. Quantitative research measures quantity or amount in an empirical study while a qualitative approach is used to research “*attitudes, opinions, and behavior*”. I believe that a qualitative study of a smaller group of customers is better for getting a deep understanding of this rather complex research problem.

According to Sachdeva (2008), interviews are the primary source of collection of qualitative data. Interviews can be held as individual in-depth interviews or in groups. There are three

types of interviews: “*Unstructured interview, semi-structured interview, and structured interview*”. An *unstructured* interview doesn’t contain any specific questions or order of topics that will be handled and can be customized for each participant, a *semi-structured* interview can contain a set of questions and give space for a free discussion with the participant while *structured* interviews have fixed questions. The positive side of a structured interview is that the results are easier to compare and that the neutrality of the interviewer is maintained. The interviews in this thesis are of the *semi-structured* type which includes a few specific questions but also opens for the interviewee to discuss the subject with possible additional questions from the interviewer which creates a dialogue that can increase the understanding of the subject. One of the interviews has two respondents working together in the same company but I would still classify it more as an individual in-depth interview than a group interview, the rest of the interviews are conducted with only one respondent from each company.

According to Patel & Davidson (2019), the connection between the theoretical framework and the empirical research can be executed with a *deductive, inductive, or abductive* approach. The way of working with a deductive approach is based on “*general principles and existing theories*” which relate to different hypotheses in the research. The deductive approach is considered to support objectiveness in the research when it is based on previous theories and is less based on the “*researcher’s subjective perceptions*”. With an inductive approach, the researcher works in a discovering way and makes the empirical part of the research objective first, and then based on the empirical research makes a theory. The risk with the inductive approach is that it is hard to confirm the generality of the study because the theory created is based on data only from this specific research. The abductive approach is a combination of inductive and deductive approaches. The process begins with an inductive first step where the researcher looks at a specific case and creates a suggestion for a theoretical framework for the study. After this first step, the rest of the study is made with a deductive approach based on the findings in the previous step. The abductive approach is considered more flexible than the other options but increases the risks of bias from previous experiences and research.

Because of the in my opinion sufficient existence of previous research within the field of this study, this research is executed mostly with a deductive approach based on previous research and theories. However, the study is not locked to the deductive approach and

includes a bit of an abductive approach as well since the specific case was discussed with the client before the execution of the actual empirical framework which gave some ideas of what should be included in the theoretical and empirical framework. Since the interviews were semi-structured, new findings and theories could also be included in the final results. The analysis of the collected qualitative data is analyzed with a deductive approach where the collected data is put in categories that are relevant for answering the research questions and finding similarities and differences in the answers.

This thesis is limited to the operations of the case company and the selected customers. The selected customers are freight buyers from the Ostrobothnia region in Finland. It is also limited to business-to-business freight, so consumers are not a part of the study. The main focus is on environmental sustainability, but other forms of sustainability are also mentioned in the study. The main focus is also on the Selection phase of the freight procurement process even though the whole process is explained.

4.1 Ethical considerations

According to Patel & Davidson (2019), it is essential that the objective of the study is made clear to the potential respondents in advance. It is also important that the potential respondents are informed about how the collected data will be stored. If the data is anonymous the researcher doesn't know who gave the answers and if it is confidential the researcher knows who is answering but will not publish their names in the study. The participants in this study were informed by email about the main topics and volunteered to participate in the study. The interviewed companies and respondents answered confidentially.

According to Wiles (2013), research ethics includes *recording consent* which obligates the researcher to inform about the purpose of the recording and asking for consent from the interviewee for recording the interview. Before the interviews started, I informed the interviewees about the purpose of recording and got permission from the respondents to record the interviews. The questions in the interview were business-related so the respondent's personal integrity was not affected by the study.

4.2 Data collection

The work with the empirical framework started with meetings with the cargo director of the case company to investigate what they wanted to find out from the study. Upon this, research questions 1 and 2 were set and the base for the theoretical framework was created to have an insight into the theory behind the subject of the study. The study was also adapted to existing theory and the interest of the author and the public. After that, the semi-structured interview guide was created and I got contacts from the case company to significant freight customers in the selected area of Ostrobothnia.

The invitations to interviews were sent by email on Monday morning 11.3.2024. The invitation was written in Swedish and English. In the email, there was a brief description of the study including the case company, subject, and which kind of expertise was wanted from the interviewed persons. The invitation asked the respondents to answer the invitation latest Friday 15.3.2024 and the interviews should be scheduled within March. When the first deadline was due, four of the respondents had accepted the invitation. On Saturday 16.3.2024 a kind reminder was sent to the companies who had not responded, and an additional two companies accepted the invitations.

The companies invited to the interviews are all freight customers of the case company. The invited companies are divided into two main categories:

1. Logistics service providers (LSP)
2. Manufacturing companies

As mentioned in the previous chapter, five LSPs, and one manufacturing company chose to participate in the interviews.

The LSPs are divided into two sub-categories: "Group A" are freight forwarders who mainly don't own the transport units operating for them and "Group B" are road freight carriers who own all or a majority of the transport units that they operate with. "Group B" is also working with freight forwarding since the companies also at least to some extent have their direct customers (not under a freight forwarder).

All the LSPs included in this study are according to Eurostat (2024) considered SMEs with less than 250 employees, and the manufacturing company is considered a large company with over 250 employees.

The interviews were conducted during the period 15.3.2024 to 28.3.2024. Brief notes were taken during the interviews and the audio from the interviews was recorded with the consent of the participants and literal transcriptions were done afterwards.

The data analyzing process started with summarizing the raw data from the transcripts taking relevant information for the research questions from the answers, adding these to the documents, and at the same time translating the answers to English. After this was done, I sent the summarized answers to the interviewed companies for approval to verify that I had understood correctly what they meant and asked them to make corrections or additions if needed. One of the companies made some additions to some of the answers which created extra value for the study.

The following step was to go through the answers again, make comments, and code and organize the data into an Excel sheet to compare the results between the respondents. The Excel sheet is divided into two main categories "LSPs" and "Manufacturing company" and also the "LSPs" into the sub-categories "Group A" for freight forwarders and "Group B" for road freight carriers.

4.3 Reliability and Validity

According to Patel & Davidson (2019), *validity* means that the study is researching the problem it is aiming to study and *reliability* means that the research in the study is made reliably. Validity and reliability are interconnected, and having both parts in balance is important to create reliable and valid research. In quantitative research, validity can be strengthened by a good theoretical framework, good instruments, and accuracy in the measuring process. In qualitative research, where the aim can be to discover phenomena or to describe perceptions or culture, the focus of validity and reliability is on the total quality of the study. The validity of qualitative research can be seen as good inner logic where the different parts of the study can be related to a meaningful entirety.

(Patel & Davidson, 2019) p. 129, 133-136

The nature of the case company and its customers creates a complex sample of respondents when most customers of the case company are middlemen between the shipper and the receiver. Because of this fact validity can be weaker compared to another study focusing more on a case with direct customers. However, the LSPs and their respondents from relevant management positions in this study should have good knowledge of the needs and demands of their customers which affect their decision-making in the purchasing process which gives a good reliability to the study.

Here follows an explanation of the different types of respondents in the study and how many invited companies from each category participated in this study. The categories and interviewed companies are explained more in-depth in the empirical framework.

From *Category 1* (LSPs) "*Group A*" a total of seven companies were invited to the study of which two participated (28,57 % participation) and two of them declined participation in the study. From "*Group B*" a total of six companies were invited to the study of which three accepted the invitation (50 % participation).

From *Category 2* there were two companies invited to the study of which one of them participated (50 % participation).

The total number of invited participants was 15 of which six accepted the invitation (total 40 % participation) to interview and later participated in the study, two declined and the rest did not respond to the invitation.

According to Patel & Davidson (2019), generalization which is a part of validity can be a problem in a qualitative study. However, a qualitative study can lead to understanding phenomena and variations of them in a specific context. The generalization can be related to other similar contexts or situations. The number of participants in this qualitative study is limited but still, a total of 40 % of the invited companies participated which I think is sufficient for investigating the research problem within this case study. The previous studies mentioned in the theoretical framework also have few respondents.

Five of the interviews were conducted face-to-face at the interviewed company and one of them through a Microsoft Teams meeting. Five of the interviews were held in Swedish which was the native language of both the interviewer and participants and one of the

interviews was held in English which wasn't the interviewers' nor the participants' native language. I believe that face-to-face meetings in the native language of both the interviewer and the participants resulted in the best reliability and validity in the study, still, the online meeting and the interview held in English were of good quality thanks to the professionalism of both interviewer and respondents.

The questions in the semi-structured interview guide, found in Appendix 1, were made as neutral as possible. However, in the invitation letter sent to the respondents, the topic of environmental sustainability in the freight procurement process was mentioned, which can affect reliability by making the respondents think from a more environmentally sustainable perspective than if the questions had come without the respondent's knowledge that the research included environmental sustainability.

There is a risk that some companies didn't participate in the study because they knew from the invitation that it handled environmental sustainability and the reason for not participating could be that their company is not interested in the topic, by that, reliability can be affected and the study may give a more positive picture of the environmental sustainability in freight procurement than if all companies would have participated.

Since I have gathered a fair amount of experience within the industry there is a risk of bias from previous experiences, however, I have tried to be as objective as possible and aimed to not lead the discussion in a specific direction. I believe that my experience and knowledge can strengthen the general quality of the research.

5 Empirical framework

This chapter will explain the findings from the study, a discussion of the results, a comparison with previous research, suggestions for further research, and a conclusion. The following part of the chapter will present the most relevant parts of the collected data, which is divided into three main themes, first an introduction to the interviewed companies, secondly, the relationship between the case company and the interviewed companies, and a third and final theme that is about what the interviewed companies need to offer their customers.

5.1 Introduction to the Interviewed Companies

Here follows a presentation of the interviewed companies concluded with a table of the main figures of them divided into categories. This part of the chapter will help the reader understand the characteristics of the interviewed companies and how they are working with environmental sustainability today.

Here follows a table describing the key figures of the interviewed companies and how they are divided into the main categories of Logistic Service Providers (LSPs) and Manufacturing company and the sub-categories of LSPs into “Group A” for *Freight forwarders* and “Group B” for *Road freight carriers*. The manufacturing company has its own “Group C”.

Category	1. Logistics Service Providers (LSPs)					2. Manufacturing Company
Sub-category	Group A (Freight forwarders)		Group B (Road freight carriers)			Group C
Alias	Company A	Company B	Company C	Company D	Company E	Company F
Main business	Freight forwarder	Freight forwarder	Road freight carrier	Road freight carrier	Road freight carrier	Manufacturing
Represented by (respondent alias)	Area Manager (A1), Sales Manager (A2)	Owner / CEO (B)	Business Development Manager (C)	Owner / CEO (D)	Market Manager (E)	Sustainability and After Sales Manager (F)
Founded	1882	1971	1953	1952	1955	1945
Employees (size)	50 (medium)	12 (small)	50 (medium)	35 (small)	200 (medium)	330 (large)
Market	Global	Nordics	Nordics	Nordics	All Europe	Nordics, Baltics, other Northern Europe
Based in (OB = Ostrobothnia)	Finland (OB)	Finland (OB)	Finland (OB)	Finland (OB)	Finland (OB) + Estonia	Finland (OB) + Norway, Sweden, Lithuania

Table 1. Key figures of the interviewed companies

According to the interview conducted with Respondents A1 and A2 (15.3.2024) Company A is a freight forwarding company with no own vehicles. They work as a middleman between the customers and the company that executes the actual transportation. They offer all kinds of transport modes (road, railroad, sea, and air), warehouse services, and customs clearance. They see their large volumes, business know-how, personal service, and a broad palette of services are their strong sides in the transport market. The company has 50 employees divided between three different places situated in Ostrobothnia and Central Ostrobothnia in Finland. The company is part of a larger group of companies with logistics operations in different parts of Finland. Company A is represented by the Area Manager (Respondent A1) for the Vaasa region who works as a foreman for the office employees and is also involved in sales and business development and the Sales Manager (Respondent A2) who is responsible for both sales and procurement in the Vaasa region.

According to the interview conducted with Respondent B (18.3.2024) Company B is a freight forwarding company using subcontractors for their transport missions. The company has over 50 years of experience transporting goods by road. The company's main market used to be transport between Finland and north Norway but nowadays the goods are going to and from all of Norway. The company operates with both curtainsider trailers for regular goods and walking floor trailers which also can carry goods in bulk. The company has 12 employees. Company B is represented by the owner of the company who is also the CEO (Respondent B).

According to the interview conducted with Respondent C (25.3.2024) Company C is a road transport company situated in Ostrobothnia with 70 years of experience in the Nordic market. The fleet is adapted to the needs of industry and trade and can offer maximum capacity in measurements and weight. The company has about 25 trucks but 100 trailers, so the trucks are frequently swapping trailers in Sweden and Finland. The company is also offering project- and forwarding services. The company employs 50 people and uses mostly its own trucks but also subcontractors. Company C is represented by the Business Development Manager who is also responsible for sustainable development in the company (Respondent C).

According to the interview conducted with Respondent D (27.3.2024) Company D is a road transport company with over 70 years in business. They have 21 trucks, 30 trailers, and 35

employees and had a turnover of 8,7 million euros in 2023. The company is still today a family-owned business. Company D is represented by the CEO (Respondent D) who is also a part-owner and is involved in almost everything in the family business.

According to the interview conducted with Respondent E (25.3.2024) Company E is a road transport company founded in 1955. In the beginning, the company transported general cargo and wood. The company started transporting goods in bulk in 1981 when they had a concrete plant. In the early 2000s, the company had about 7-8 trucks when they started their internationalization process. From the year 2000 to 2023 the company has had an annual growth of about 20 percent per year and is now operating with 300 transport units in all of Europe. About 85 % of the revenue comes from dry bulk transport, about 10 % from liquid gas transport, and other services such as warehousing and terminal stand for 5 %. The revenue is about 40 million euros, and the company has 200 employees. The company is constantly looking for growth, development, and expansion to new markets. *“The green transition gives us challenges but also possibilities, for example, we can become users of alternative fuels but also transport them for other users”* (Respondent E, author’s translation) Company E is represented by the Market Manager (Respondent E) who started working in the company in 1999 when the expansion and internationalization started. The Market Manager works with sales and marketing but also with strategic coordination of when, where, and how the company is expanding to new markets.

According to the interview conducted with Respondent F (25.3.2024) Company F is a company manufacturing truck bodies and trailers. They are niched on box units with openable sides, they also make the frames for the trailers. The company group has 330 employees including our businesses in Norway, Sweden, and Lithuania. At the main plant in Ostrobothnia, there are 290 employees. Company F is represented by the Sustainability and Aftersales Manager (Respondent F). The Sustainability part of his job includes environment, quality, and real estate. He is part of a team with the real estate manager and is involved in worker protection. Aftersales includes responsibility for the workshop and spare part sales. He is also a board member of the Swedish and Norwegian subsidiaries. He is mainly working with development, sustainability, and aftersales.

The following part of the interview handled how the interviewed companies are working with environmental sustainability including possible certifications and reporting.

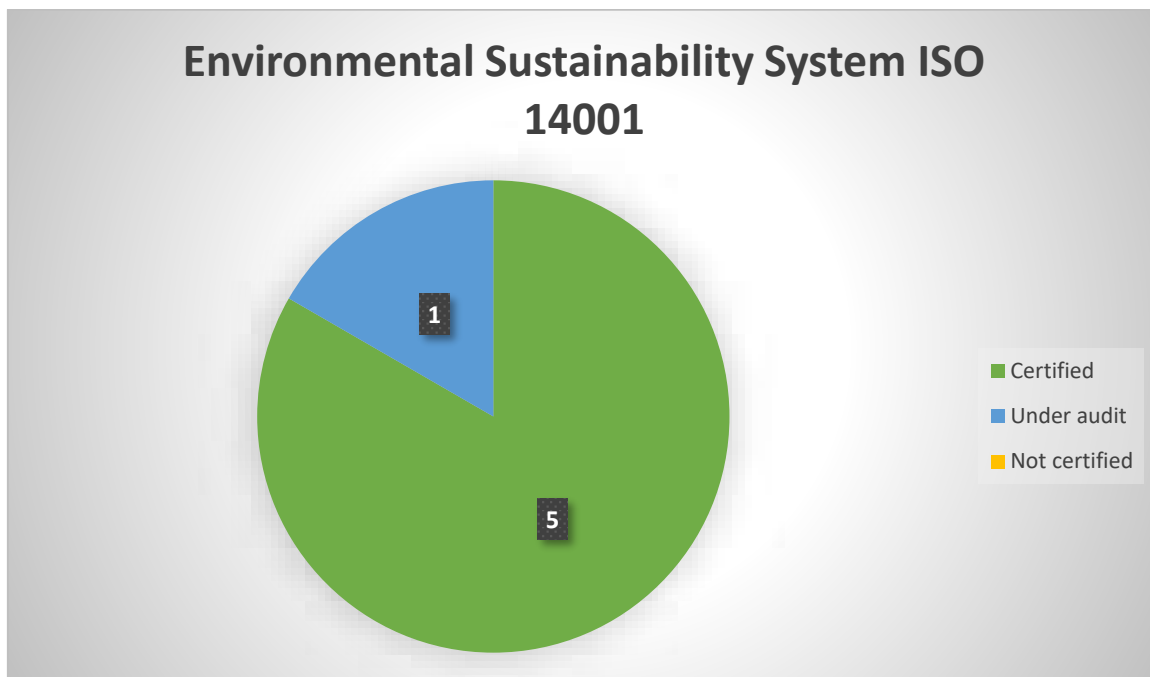


Figure 11. Diagram over the ISO 14001 certification of the interviewed companies

When it comes to the use of environmental sustainability systems all the interviewed companies except Company B already have the ISO 14001 certification and Company B is in the process of getting certified. All the companies who have ISO 14001 certification also have ISO 9001 quality certification.

Company A	Company B	Company C	Company D	Company E	Company F
CO2e reports	Not yet, checking options	Yes, according to the NSRS standards	CO2 reports	CO2/CO2e reports + annual report	CO2 report now + from 2025 extended report according to CSRD

Table 2. Environmental reporting of the interviewed companies

The companies differ when it comes to environmental reporting. Company A makes CO2e reports according to the customers’ requirements and is working to make the reports more detailed soon by involving an external consultant company to help them with the reports. Company B doesn’t do environmental reporting yet, but they are checking options for how they can start to do reporting. Company C is making environmental reporting according to the NSRS standard, as mentioned in the theoretical framework these reports include more

factors than just CO2e reporting. Company D makes CO2 reports at the request of the customers and according to their requirements. Company E makes an annual environmental report for the whole company but can also offer customer-specific CO2 or CO2e reports which are not made by a specific standard but are tailor-made for the customers' requirements. Company F has so far given only CO2 reports, but they are now working on presenting a more extensive report next year according to the EU Corporate Sustainability Reporting Directive (CSRD).

Company A	Company B	Company C	Company D	Company E	Company F
Intermodal solutions	Ecodriving, long trucks, optimizing flow	Optimizing flow, alternative fuels included in their strategy	Offering alternative fuels	Green transition, optimizing flow, alternative fuels	Quality, energy efficiency, versatile products, waste management, product development, CO2 compensation, alternative fuels

Table 3. Other ways the companies are working with environmental sustainability

When asked what other ways the companies are working with environmental sustainability Company A says that they are promoting environmentally sustainable solutions to their customers. For example, the classic way of shipping from the Ostrobothnia region is that the goods are transported by road down to south Finland and from there with smaller feeder vessels to the larger ports in western Europe. They are now building a network that includes road freight only from the local region to the harbor in Vaasa and from there the goods go first with NLC Ferry Oy Abs ferry to Umeå in Sweden and from there on the railroad to Gothenburg which is the closest deep sea harbor to our region where the goods can be loaded straight onto a larger and more environmental friendly vessel compared to the smaller feeder vessels. The Swedish railroad is electrified and supplied by waterpower and is therefore a very environmentally friendly option.

Company B is working with environmental sustainability in other ways by having only modern trucks with the highest EURO 6 emission standard operating for them. They are

also encouraging the drivers to “Ecodriving” which means that the drivers assisted by software in the truck can save fuel by avoiding harsh braking, wasted energy, overspeed, and idling the engine. They are also using so-called b-links which add another transport unit to the trailer which means that they have a larger capacity than the normal semi-trailer with only one truck and one engine which causes less emissions. They are also working on optimizing their routes and transport network to minimize empty driving which both reduces costs and emissions.

Company C is focusing on optimizing the flow of traffic. The environmental sustainability part is mostly reducing emissions from transport. It is included in their strategy that they should use renewable fuels such as HVO, but they feel that right now the market isn’t ready to pay more for this, but they see that this is going to be more important in the future.

Company D is offering the customers the possibility to use renewable diesel HVO for an additional cost. All their customers see it as positive with HVO, but only a few are ready to take the additional cost. If the company isn’t compensated for the extra cost of HVO fuel from the customer, they use regular diesel.

Company E has, according to Respondent E, been working with environmental management for a long time. They are adapting their business to be in the frontline of the green transition to not get behind in the competition. They are working on involving every employee in the company in the process. They are working with optimization of the transports to follow up and reduce empty driving. Renewable fuels are a part of the strategy, and they already have four LNG gas-powered trucks in their fleet. Some of the clients also want them to use HVO and they are offering this service.

Company F emphasizes high-quality products and a supply of spare parts for a long time after production to make the trailers they produce last long. Their buildings are also made energy efficient. In general, they are working according to the United Nations’ global goals for sustainability. They put effort into correct disposal and reduction of waste. They are constantly looking for new, more environmentally friendly materials and technologies to use in their production. They work to minimize their CO₂ emissions and in 2023 it was a total of 91 tons which according to Respondent F is equivalent to 9 normal persons

emissions and they have compensated for all these emissions. Their trucks and other vehicles use renewable Neste Mydiesel (HVO).

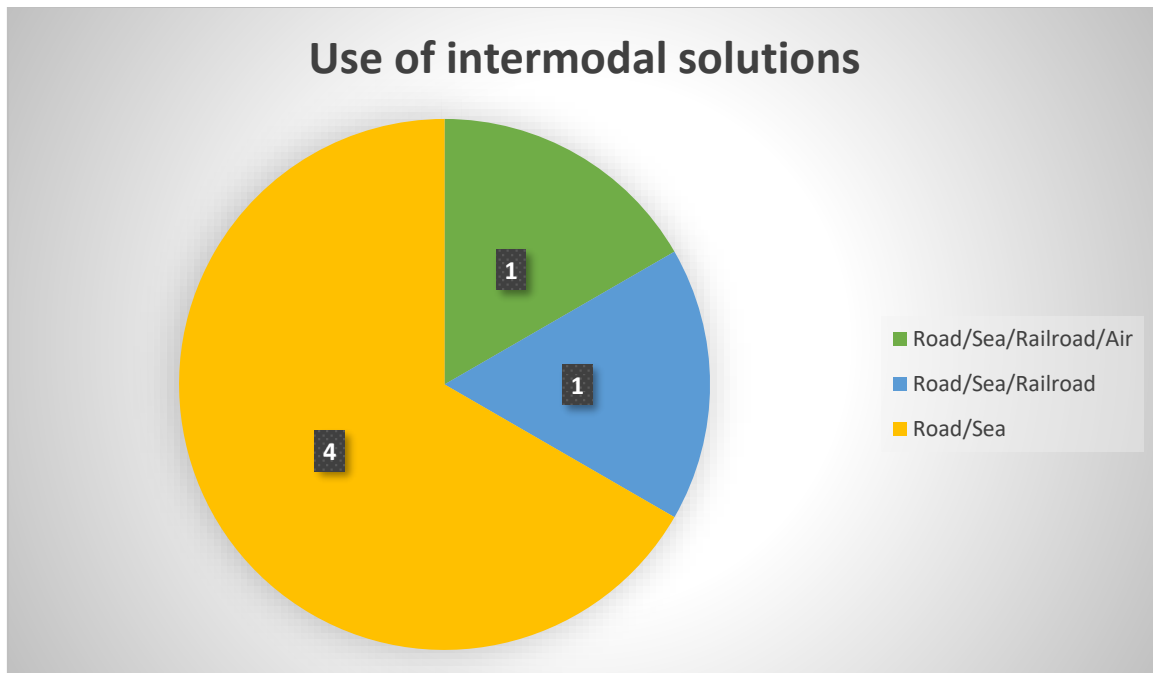


Figure 12. The interviewed companies' use of intermodal transport modes

I asked the companies if they use intermodal solutions. Company A uses all transport modes and a combination of them road, sea, railroad, and airfreight. Company B, C, D, and F are using only combinations of road and sea (ferries). Company E is using a combination of road and sea to a large as possible extent and to some extent also combinations with road and railroad.

5.2 The relationship between the case company and the interviewed companies

The following part of the interview handles the relationship between the interviewed companies and the case company including which kind of services they use. This part also includes the factors that the interviewed companies look at when they get an offer from the case company or similar companies and how important environmental sustainability is when they choose an LSP, in this case, the ferry company.

Company A, B, E, and F all mention that they have had a long-term cooperation with the case company. Company C is not working with the case company as much as ferry

companies in southern Finland because the southern options are often more suitable for their goods flow. Company B and D mention that they sometimes use the case company's ferry instead of the southern options even if the southern option would be more natural thanks to the good cooperation between the companies and the capacity that the case company offers.

Company A	Company B	Company C	Company D	Company E	Company F
Transports on cassettes	Trucks with driver	Trailers / Truck + trailer + driver	Trucks with driver	Trucks with driver	Trailers / Truck + trailer + driver

Table 4. Interviewed companies' main services used from NLC Ferry Oy Ab

Company A used to have a lot of traffic with trucks and trailers but nowadays they are mostly using the ferry to transport goods on cassettes. Company B, D, and E are mostly sending trucks with drivers on the ferry. Company C and F are sending both units with drivers as well as trailers separately.

All the interviewed companies see the case company as an environmentally sustainable company.

Company A	Company B	Company C	Company D	Company E	Company F
Yes, pioneer, modern ferry	Yes, new vessel, alternative fuels	Yes, alternative fuels	Yes, alternative fuels	Yes, new ferry, alternative fuels, better option	Yes, in the frontline of sustainable development, electric meters, new technology (alternative fuels)

Table 5. Interviewed companies' views on NLC Ferry Oy Ab's sustainability

Company A sees the case company as a pioneer in environmental sustainability in the sea freight market. The ferry has lots of modern, state-of-the-art systems which are reducing their emissions.

Company B mentions that especially since they ordered their new vessel, they can see that they are doing a lot of work to improve environmental sustainability by, for example, using alternative fuels such as liquefied natural gas and biogas.

Company C sees the case company as a good option for an environmentally friendly solution. They see it as an advantage that the ferry can use alternative fuels which will be more and more important in the future.

Company D sees NLC Ferry Oy Ab as an environmentally sustainable company that is making efforts to reduce emissions, for example by using alternative fuels.

Company E says that the case company with its new ferry is environmentally friendly, which is positive for stronger co-operation. The ferry is good with great opportunities for usage of alternative fuels such as biogas and others in the future. They see the case company as a better option when it comes to environmental sustainability compared to the ferry companies operating from south Finland.

Company F sees that Oy NLC Ferry Ab has been in the frontline of sustainable development since the planning of the new ferry started. The ferry uses the latest technology, and the company seems interested and a driving force for further development. Company F has chosen the case company's electric option, so their usage of the ferry is a zero-emission option.

The following question is about what factors the interviewed company is looking at when they get an offer from the case company or a similar company and is followed up by a question about the importance of environmental sustainability in the offer and if they are prepared to pay more for a more environmentally sustainable service.

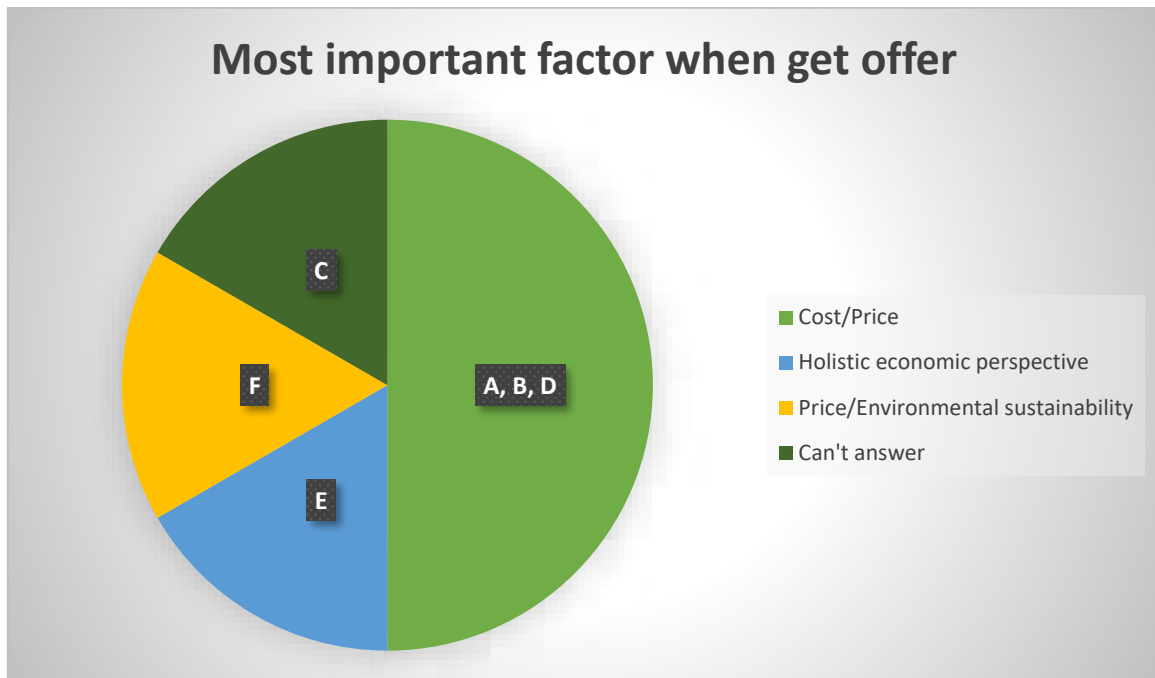


Figure 13. The most important factor when the interviewed companies get an offer

Company A	Company B	Company C	Company D	Company E	Company F
Secondary factors when the interviewed companies get an offer					
Service level, environmental sustainability	Time table	Emissions / sustainability increasingly important	2. Availability, 3. Environmental Sustainability	Frequency of departures, environment	-
How important Environmental Sustainability is in the offer					
Depends on customer's demands	Depends on customer's demands	More in the future, customer's goals	Considered, but the price is more important	Total concept, environmental sustainability increasingly important	Environmental sustainability will become more important
The customers' readiness to pay more for environmental sustainability					
Yes, if their customers cover the costs	Yes, if their customers cover the costs	Yes, if their customers cover the costs	Yes, if their customers cover the costs	Yes, if their customers cover the costs	Yes, already doing that by paying for electric meters

Table 6. Other factors when the interviewed companies get an offer

Company A answers that the cost is the most important factor. After that comes other factors such as service level and environmental sustainability. A1 would say the price is of 70 percent importance and the other factors stand for the rest. They provide services that are according to the customer's demands and wishes but they promote environmentally sustainable options to them. A1 says that they would be ready to pay more for such services as long as they to a large extent could take these costs from our customers. As a freight forwarding company, they are living on very small margins and can't pay for this themselves. The best solution is cost-effective and environmentally sustainable at the same time.

Company B says that first, they look at the price and then they look at the timetable which is offered. About the importance of environmental sustainability in the offering, they say that it mostly depends on the customer and their needs. Sometimes, the customer sees it as an advantage when they, for example, use this environmentally friendly ferry. About the possibility of paying more, they say it depends if the sender is willing to compensate for this. As they see now in general in the market the freight rates are going down, but the costs, for example for fuel and spare parts, have gone up, so they need to be cost-effective. They see that they have no possibility of paying more for a more environmentally sustainable service as long as it is not covered by the freight rate they get from their customers.

From Company C, Respondent C says that he is not personally involved in this specific process, but he thinks emissions and other environmental factors will become more important in the future. The demand will come from their customers who need to look over their "Scope 3" emissions which means Company C needs to offer environmentally sustainable solutions which include the ferries.

Company D says that the most important factor is the price. Secondly comes availability, how well the company can offer space on the ferries. Then comes other factors such as environmental sustainability. They say, about the importance of environmental sustainability, that they consider it, but most often, the price is the decisive factor. They say that they are not able to pay more for these kinds of services unless their customers are paying for them.

Company E answers that they think from a holistic economic perspective. They consider the total cost and compare it with other options. The frequency of departures might be important to avoid waiting time and optimize the work times of the drivers. The environmental footprint is also an important factor and will become even more important in the future. We look at the total concept of the offer. There is a possibility of paying a little more, but the difference can't be too large. In the end, it is the customer who will have to pay for this.

Company F answers that when it comes to the case company, there is no direct competition on this route, but the price is compared for example with ferries from south Finland. The electric option that is offered is important for Company F. When the emissions trading system becomes more and more important environmentally sustainable offerings will also have greater importance. They prefer to pay for the electrical service instead of paying for emissions because they see it as a real green option. They see that costs and emissions are connected. They are already paying extra for a more environmentally friendly service by buying the electrical service of the case company, however, the cost must be reasonable.

The final question in this part of the interview is whether it would be an option for the interviewed company to use the ferry to reduce CO2 emissions even if it would be a more expensive option than the alternative, for example going by land via Haparanda.

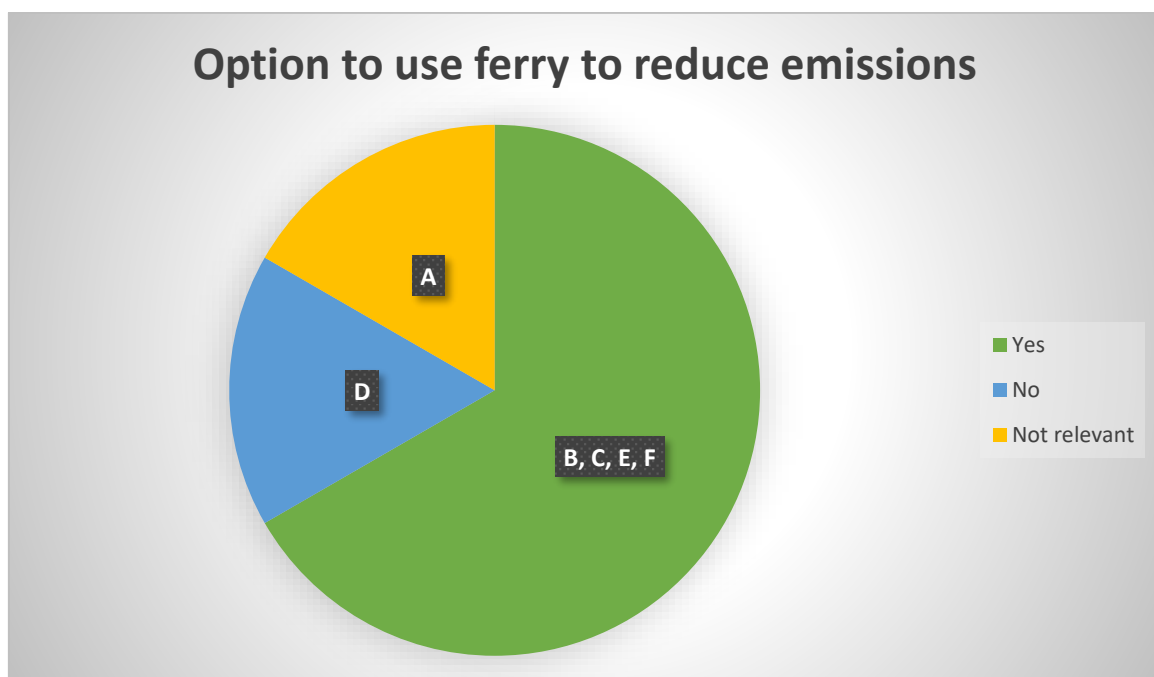


Figure 14. Interviewed companies' opinions on using the ferry instead of road to reduce CO2 emissions

Company A answers that your example is not an option for us since we don't do these kinds of road transports that can go via Haparanda. Straight railroad freight is also impossible between Finland and Sweden because of the different track gauges between the countries.

Company B answers that again, it depends on the customer's needs and wishes. Some customers have specifically asked them to use the vessel so in this case it could be an option.

Company C says that it depends on what the customer wants. They believe that CO2 emissions will have a larger importance in the future. Company C needs to know which route is more environmentally friendly. It can also be a matter of transportation time when they decide which option to choose.

Company D doesn't see this as an option for them in today's market.

Company E sees that it can be a possibility to use the ferry to reduce emissions. There are also other advantages of using the ferry such as reducing kilometers on the trucks and the working times of the drivers. Fewer kilometers means that Company E's trucks will last longer which also is a sustainability factor.

Company F answers that it can be actual that they could do this, but it is also connected to the working times of the drivers and how well the timetable suits them. For example, if going to Luleå it can be easier for the driver to just load his personal car on the truck he delivers and drive home by land.

5.3 What the interviewed companies need to offer their customers

This part of the interview aims to investigate what the interviewed companies feel they must provide to their customers. The needs of the interviewed companies' customers are connected to the interviewed companies' needs as customers of the case company. The first part of this section is about what the customers of the interviewed companies ask for when asking for a quotation and the importance of environmental sustainability in these. This part is concluded with a question of what the case company could do to help the interviewed companies meet the needs of their customers.

The first question is about what the interviewed companies' customers have as their main concerns when asking for a quotation for freight. The question is followed up by a question of whether the customers ask for environmentally sustainable solutions and if the customers are willing to pay for such services.

Company A	Company B	Company C	Company D	Company E	Company F
Customers of the interviewed companies' main factors in RFQs					
Price, service, functionality, reliability	Price	Lead times, price, reliability	Price and possibility	Classic = price, capacity, and quality	Whole package, suitable for needs, measurements, fit with existing equipment
Customers of the interviewed companies' secondary factors in RFQs					
Environmental sustainability	Quality, environmental sustainability, financial status	Capacity, suitable units, safety, tracking, reporting, sustainability	Environmental sustainability especially from larger customers	Environmental sustainability more and more important	-
Customers of the interviewed companies asking for env. sustainable solutions					
Few, but sustainability demands in the RFQs	Yes, alternative fuels	Yes, alternative fuels	Larger customers ask for certificates, euro-class, alternative fuels	Yes, more detailed requests coming	Started coming, electric cooling machines for example
Customers of the interviewed companies willing to pay for env. sustainable services					
No, possibly very small charge	Depends on economic situation / goals of the customer	Not now, but in the future	Not much, some pay for alternative fuels	Most not, maybe more in 1-2 years?	Hard to tell because included in normal offerings, interest exists = competitive advantage

Table 7. Customers of the interviewed companies' factors and environmental sustainability in RFQs

Company A would say price, service level, functionality, and reliability seem to be the most important factors. After that comes other factors such as environmental sustainability.

Very few ask for a specific environmentally sustainable solution but many of them have wishes and demands such as GHG reports about environmental sustainability. Unfortunately, they seem not willing to pay more for more environmentally sustainable solutions, possibly they could accept only a very small extra charge.

Company B says that the most important seems to be price but that is not everything. They also ask for quality and environment certificates and checks about the LSP's economic status to ensure that it is possible to engage in a long-term relationship, there can also be demands on environmental sustainability for example that the vehicles must be of EURO 6 emission class. In some requests, they ask what environmentally sustainable solutions Company B can offer, for example, if we have trucks using alternative fuels such as biodiesel, natural gas, or electricity. According to Respondent B, unfortunately, they see that there is a lack of infrastructure for other options than biodiesel in the areas where they operate. Regarding customers paying more, it depends but to Respondent B it seems it would have been easier two years ago. Nowadays many businesses are struggling with rising costs and have a tighter financial situation which makes them less willing to pay extra. On the other hand, many businesses have set goals to be carbon neutral until 2030 which should encourage them to invest in environmentally friendly solutions.

Company C says It seems to be a demand for very short lead times, it is also important to keep the agreed times for delivery. Price also seems to be a very important factor for especially new customers, it can be a challenge to "get in" and show what they are able to do since they are not aiming to be the cheapest option and might be a few % more expensive than the cheapest option, but instead they want to keep what they promise and offer high reliability when it comes to fulfilling delivery times, Respondent C says "*once we are in, the customer often stays with us*" (Author's translation). Other factors that customers might have are reliability and capacity all year around, suitable transport units (good condition, flexible/adaptable), fulfilling demands when it comes to safety gear on the drivers, digital systems/tools for real-time reporting and tracking of shipments, meeting sustainability requirements which according to Respondent C will be more important in the future. Some customers ask for alternative fuel solutions, for example, they can ask for one price with conventional diesel and another with HVO. As Company C sees the situation now there are no other options than HVO for their business. For example, electric vehicles are not suitable for heavy loads and long distances. The customers are not very willing to pay

more in Respondent C's opinion. He believes that the economic situation in the market today has an impact on this, but he believes that the customers will have to change their minds because of the climate goals they have set until 2030.

Company D would say price and possibility are the most frequent factors they are asking for. In more extensive Requests for Quotations, from mostly large companies, other factors such as environmental sustainability can be of importance but in requests for spot loads or loads with less frequency environmental sustainability is according to Respondent D more or less never a factor they are asking for. These larger customers are asking for environmental sustainability certification, which kinds of trucks we are using (emission classification), and also for solutions involving alternative fuels. About paying more, it seems to Respondent D that the customers are not so willing to pay more in general, but some customers are willing to pay a bit more for the use of alternative fuels such as HVO, but the extra charge is quite limited. The customers expect the solutions to be environmentally friendly without extra charge.

Company E says that before it was price, capacity, and quality but in recent years environmental sustainability has become more and more important. When the customers are asking for a quotation, they ask how and with what environmental footprint you can deliver this service, and I see that this will become more and more important in the future. One must show how we are working with environmental sustainability. The requests are also more detailed, you must show exactly which routes, with which ferries you are planning to use, and the environmental impact per distance. This seems especially important when dealing with large, global customers. As Company E sees it, right now the customers are not to a large extent willing to pay more with a few exceptions. They see that it has just begun to come request for quotations with different options, in 1-2 years Respondent E thinks we can be wiser about how it develops.

Company F says that their customers ask for a whole package to suit their needs. For example, specific measurements such as height and tire sizes, larger tires will reduce the inner height but give better fuel economy. Often, they also see that the trailer should be suitable for their existing transport equipment, so they don't have to renew everything at once. They see recently that there have been requests for environmentally sustainable solutions, especially from the Norwegian market, for example about cooling machines that

are fully electric. There are upcoming limitations within some larger cities that don't allow diesel engines. According to Respondent F, it is in general hard to tell if customers are willing to pay more for environmental sustainability because most of it is included in their normal offerings. The customers seem interested in environmental sustainability and they see it as a competitive advantage to be climate neutral. They believe that they can sell more products by being sustainable. If their customer is choosing between two products that cost the same, Company F sees that they might choose their product instead of the competitors because it is more sustainable.

The following question is about whether the customers are asking for intermodal transport solutions. Company D answered that their customers don't, and Respondent C from Company C answered that not that he knows of. Company F was excluded from this question since they are not an LSP.

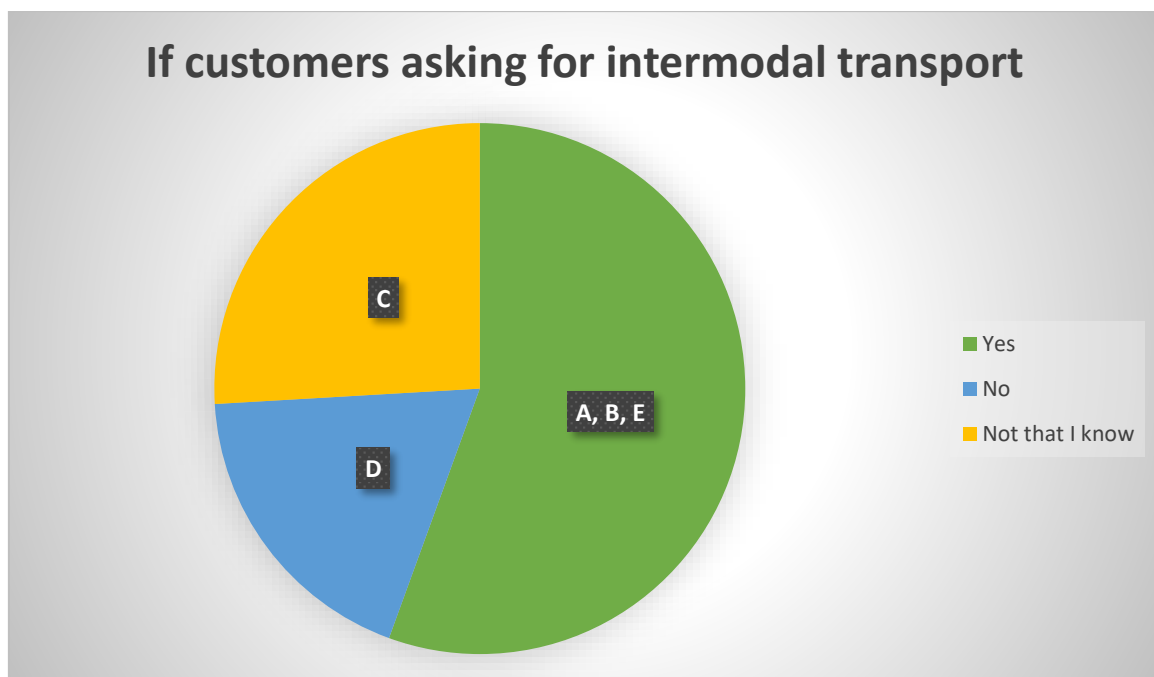


Figure 15. Diagram of customers of the interviewed companies asking for intermodal transport

Company A says yes, they are interested in intermodal solutions, and they have seen an increase in the demand for these services for the reasons previously mentioned, for example, to not have to pay road taxes and to get higher weight on the transport unit. They see that these kinds of taxes and the European Union's Emission Trading System (ETS) are

rapidly making transport modes with less emissions also more competitive in price compared to other transport modes with higher emissions.

Company B answers yes, they are asking for these kinds of solutions but Company B has investigated the opportunities and with the kinds of goods Company B is transporting today it is not possible to provide intermodal transports by train for example because of the height limitations on the trains, many of the customers require a larger than the European standard inner height which means the total height of the trailer will be too high for the train.

Company E says yes, especially in international traffic. Where there is a sea route available Company E will use it. And in the future, they see that intermodal transport including railroad will become more important. The infrastructure and capacity are problems with railroad freight in today's situation. There are growing economic factors like the German road tax which has gone up by 73 % which are making intermodal solutions more beneficial.

The final question to sum up the interview is if there is anything that the case company could do otherwise to help the interviewed companies meet the needs of their customers.

Company A	Company B	Company C	Company D	Company E	Company F
Increased flexibility, grow network	Alternative routes, trucks longer time onboard ferry on night departures	Reliable and accurate emissions reporting	Reliable and accurate emissions reporting	Become zero-emission over time	Offer more environmentally sustainable services such as electric meters at good price

Table 8. What the case company could do to meet the needs of the interviewed companies' customers

Company A answers that they have found that the case company is very interested in discussing different transport solutions with them and they are overall satisfied with the co-operation. However, there are some problems because the freight happens between two countries so they could wish for a more flexible way of for example handling containers on the Swedish side. Company A depends on how well the transport network works also on the Swedish side and the case company could help with that by involving other companies in the market for example creating a container depot in Umeå that could be

used by many companies including Company A. Company A has found so far that the case company has been good on finding co-operation partners to build this network they need.

Company B says that they have some wishes that we know might be very hard to implement but still, we would like to suggest that at least some departures could be to and from Sundsvall instead of Umeå which often would suit our cargo flow better. Also, the night departures could take longer (at least 9 hours) to help the drivers get proper rest onboard the ferry. Overall, we think we have good cooperation with the case company and put priority on using this route. Also, we can't complain about the pricing, we understand that it costs to run a ferry company.

Company C answers that they find it important to get reliable and accurate reporting of emissions. The demands on Company C are also increasing and they are working with digital tools for accurate reporting of emissions.

Company D is quite satisfied with the service level of today. The ferry is fast with frequent departures. Some things needed in the future are more accurate and clear reports of emissions to help Company D's reporting to their customers.

Company E says they find that in today's market, they are offering what they need. In the future, they are looking forward to working with the case company towards a zero-emission goal when the necessary alternative fuels are available on the market. In the future, it will become even more important to offer services with a as small ecological footprint as possible.

Company F finds that the co-operation works well as it is today. In the future for the sea freight business in general, it should be wise to offer more services like the "electric meters" at a competitive price. For us, this cost is calculated in the price of the product, but I understand that freight forwarding companies might look at things differently.

5.4 Key findings from the results of the interview

This part discusses similarities and differences between the answers of the interviewed companies and connects them with the theoretical framework.

In the theoretical framework, Björklund (2012) and Sallnäs (2017) mention ISO 14001 as a common environmental management system that purchasing companies can require from a supplier. All the interviewed companies except Company B have already been certified for the ISO 14001 environmental management system, and Company B is in the process of certification. No other environmental management systems were mentioned by the respondents so ISO 14001 can be considered the preferred option in this selection of companies. All companies also mentioned that they also have or in the case of Company B are in the process of getting ISO 9001 certification for quality management, so the study found a connection between ISO 14001 and ISO 9001 certifications. The case company is also certified for both ISO 9001 and ISO 14001.

When it comes to environmental reporting the study found a greater variation in the answers. Company B does not do environmental reporting at all for the moment, but they are checking options for how to do it. All other companies mention CO₂ and/or CO_{2e} reporting according to the requirements of customers, so CO₂ and/or CO_{2e} reports can according to this study be considered the most common environmental reporting. Only Company C and Company F are working with environmental reporting by specific standards. Company C is working with the NSRS standard, which is as mentioned in the theoretical framework specifically designed for SMEs, which Company C is since they have 50 employees. Company F being a large company they are obligated by European law to do sustainability reports according to CSRD which is also explained in the theoretical framework. Company E is also working on a more extensive environmental report for the whole company that should be published annually. Company A mentions they are involving a consultant company in the environmental reporting process to be able to give more accurate reports in the future. Company A, C, and E are all considered medium-sized companies and Company F is a large company, this shows that the medium-sized and large companies are putting more effort into environmental reporting than the small-sized companies B and D. This confirms the statement of Multaharju et. al. (2017) that larger companies have more advanced sustainability programs.

The theoretical framework mentions that according to Björklund (2012), GRI standards are widely used among companies but none of the interviewed companies used this standard. In general, the study found that the LSPs make reports according to their customers' demands and wishes and not by a standard specified by the LSP itself.

The companies are mentioning different other methods for improving their environmental sustainability, here are some examples where the companies mention the same measures. Company B mentions longer trucks that can carry more goods with only one engine. Company F also mentions that they manufacture longer trailers and HCT combinations with the same motivation to get more goods transported with the same truck.

Company B, C, and E mention optimizing goods flow, to avoid empty driving which causes unnecessary fuel consumption and emissions. Company F also mentions that the design of their trailers with opening side can help the LSPs to optimize their goods flow. Optimizing goods flow is also mentioned in the theoretical framework by Björklund (2012).

Björklund (2012) and also the European Commission (2023) mention alternative fuels as an option for reducing emissions. Company C, D, and E mention alternative fuels as an option. Company F is also using HVO in their transport equipment and other vehicles. Company C and D are offering renewable diesel solutions using HVO for an additional cost, which is also an option at Company E, Company E is also the only company in this study offering LNG as an option. Company E also mentions possibilities with alternative fuels in the future that they can be both a transporter and user of these.

Interesting is also that Company E is the only company mentioning green transition in their daily work, to change the mindset of the staff and how they work to become more sustainable. According to these findings, Company E, being the largest LSP in this study, has come further in the process of becoming more environmentally sustainable than the others.

To conclude, the environmental management system ISO 14001 and reporting CO₂ or CO_{2e} is according to the study the standard in the industry. Other measures used by more than one company are longer trucks to carry more goods with one engine, optimizing the goods flow and avoiding empty driving, and alternative fuels such as renewable diesel (HVO) or LNG.

In the theoretical framework, the study mentioned by Khan et. al (2021) air pollution from burning fossil fuels is a major concern for Environmental Sustainability, however, the result from this study shows that the transport industry and governments focus on the GHG emissions CO₂ or CO_{2e}.

Björklund (2012) mentions four ways to reduce CO₂ emissions from transports and we can see in this study that the interviewed companies are working on reducing consumption, for example, Company B mentions the “Ecodriving” program with the drivers, replace fossil fuel fuels with renewable sources is a part of many of the interviewed companies and the case company’s strategy and also replacing fuels with high hydrocarbon levels with other fuels with lower hydrocarbon levels such as natural gas is in some extent adapted by Company E and the case company. Capturing carbon dioxide emissions seems still today 12 years after Björklund’s text was written to be technically very challenging but there are compensation methods in use mentioned by Company C that you can buy forest to compensate your emissions, however, Respondent C was questioning if this is genuine sustainable development, instead according to Respondent C the real emissions should be minimized instead of compensating, Respondent F also mentioned that they prefer minimized emissions in front of compensating, but still, they are not carbon-free, so they use compensating for the emissions that they haven’t been able to eliminate.

Macharis et. al. 2014 mention the model of the four A’s “*Awareness, Avoidance, Acting and shifting and Anticipation.*” The first two A’s Awareness and Avoidance are steps in the purchase chain that should be clear before the customer contacts the LSP and are not so relevant for this case study, but this study finds “*Acting and shifting*” relevant since it includes intermodal transport and promotes the use of environmentally friendly options such as the case company’s ferry. “Anticipation” of new technologies is used by the case company and the interviewed companies using alternative fuels and for example, computer systems for reporting and optimization of transports.

In the theoretical framework of this study, Björklund (2012), Macharis et. al. (2014), and the European Commission (2023) all mention intermodal transport solutions as a possible measure to improve environmental sustainability in the transport chain and this study found that all the interviewed companies are using ferries (sea freight) combined with road transport. Company E emphasizes that they are always using a sea route where possible instead of going via road.

When it comes to other combinations such as road and rail the study finds that there are challenges in the infrastructure, capacity, and the network. The combination of road and

railroad is used only by Company A and E and the areas where a combination of road and railroad are in Sweden and continental Europe.

As mentioned by Company B, C, E, and F there are special requirements on the units that are to be transported by train which causes issues specifically in the Nordic market where the trailers often are higher and have a different design than European standard trailers, so they are not suitable for transportation on the trains. Here I can see a conflict between the idea of optimizing the transport units to make them fit more goods in the same unit, and the standardization of transport equipment so that it would fit the train standards.

The factors mentioned by the interviewed companies when they are choosing an LSP for example the case company or similar in the *“selection phase”* in the procurement process as by van Weele (2018) are answered by every company despite Company C where Respondent C felt he was not qualified to answer the question but says that environmental sustainability will become a more important factor in this process in the future. As most important factor price or cost is mentioned by all other interviewed companies except Company E which mentions a *“holistic economic perspective”* looking at not just the price of the ticket but other factors as well such as if the ferry reduces kilometers on the truck to make the truck last longer. Other factors are environmental sustainability mentioned by Company A, C, D, E, and F, and availability/frequency of departures mentioned by Company B, D, and E. Service level is a factor mentioned by Company A that includes available services in the harbor and network for further transport which is specific for their business type when they are mostly sending goods on the ferry by cassette, they will often need reloading into some other transport mode at the harbor for the final transport to the destination.

All interviewed LSPs emphasize at one or more points within the interview that they are offering the kind of services that are requested from the customer. The case company is also a special case since as mentioned there is no direct competition, only indirect competition from companies in other parts of the country or options such as going via road instead of using the ferry. For the study to answer RQ1 more extensively the interviewed companies are asked what their customers need from them since this can be connected to the interviewed companies' needs towards the case company.

All LSPs mention price as one main factor. Reliability is mentioned by Company A and C, possibility or capacity is mentioned by C, D, and E, Quality is mentioned by B and E, and functionality by A. Company B mentions that they ask for financial status to ensure a long term co-operation which can be referred to “Risk management” mentioned in the theoretical framework and indicates that the customers asking for this are using an extensive purchase model (van Veele 2018). Short lead times, drivers using correct safety gear, real-time tracking, and environmental reporting are other factors mentioned by Company C.

5.5 Comparison with previous research

This part of the chapter compares the results of this thesis with the results of some of the previous studies mentioned in the theoretical framework.

Maack (2012) mentions environmental efforts beyond legislation and this study also found that all the interviewed companies are doing these kinds of efforts, but the extent widely differs between the companies. As mentioned, according to the empirical part of this thesis, the larger companies seem to put more effort into working with environmental sustainability than the smaller companies. The three companies in the study by Maack (2012) were all large companies, two of them global actors.

The largest companies interviewed in this thesis, Company E and Company F both mention that they can gain a competitive advantage by making efforts in environmental sustainability and the result from Maack’s (2012) study also points out this in the results of her study. Saving costs by putting efforts into environmental sustainability is a part of the result of Maack’s (2012) study and was mentioned by Company B with their “Ecodriving” program which aims to reduce fuel consumption which reduces emissions and at the same time, reduced fuel consumption means reduced costs.

The study by Maack (2012) found that the interviewed companies had both internal and external programs for environmental sustainability. As mentioned in the theoretical framework, the internal programs aim to make the internal operations more efficient, and the external programs are marketing their environmentally sustainable solutions to the customers. There can be both internal and external demands for sustainability. The results

of this thesis show that larger companies have more extensive internal and external programs and internal demands than smaller ones. However, all companies mention the external demands from, especially larger, customers as something the interviewed companies are working on to fulfill the environmental requirements set by the customers.

Maack (2012) found that there were no specific demands on environmental sustainability from the customers, but they wanted to see that the LSPs were somehow working with environmental sustainability. The results of this thesis show that to some extent, again especially when it comes to larger customers, they can have a lot of requirements regarding environmental sustainability so the results of the studies differ here, my analysis of this is that this thesis is made 2024 and the study by Maack 2012, so we can during these years see a development in the environmental sustainability programs of especially larger customers that are also by legislation obligated to follow up the environmental sustainability of their suppliers.

The study by Maack (2012) also found that customers were not willing to pay extra for a more environmentally friendly transport service. This thesis somewhat confirms this but there are a few exceptions which again show that there might have been some development in the past 12 years between the studies.

Tran (2015) found in her research that the LSPs in her study found that their environmental sustainability programs had great appreciation among their customers and saw them as a competitive advantage. The result of this thesis shows that all the interviewed companies find the environmental sustainability efforts done by the case company as positive, but same as in the Tran (2015) study, other factors such as price are more important than environmental sustainability when they choose their service provider. The same conclusion can be made when we look at the interviewed companies and their customers, for example especially the larger interviewed companies Company E and Company F see their environmental sustainability programs as a competitive advantage but still they mention that the customers see other factors such as price and service quality as more important factors.

The study by Tran (2015) also mentions that by the time of her study, it was becoming the standard in the business field to have an environmental sustainability program and this

thesis confirms this theory since all interviewed companies have their environmental sustainability programs and all companies are certified or in the process of being certified to the ISO 14001 environmental sustainability management system. Tran (2015) also mentions that the governments and EU are forcing companies to improve their environmental sustainability, and this is also confirmed by this thesis that the regulations are getting stronger which have forced the interviewed companies and the case company, in smaller or larger extent depending on the company, to take actions for improving their environmental sustainability to stay competitive in the market.

Ahopelto (2022) found that especially the freight cost but also *“Reliability, customer service, and availability”* are still more important than environmental sustainability in freight procurement. This is confirmed by the results of this thesis.

Ahopelto (2022) also mentions *“Transparent data sharing”* as one factor which is mentioned by several respondents (A, C, D) in this thesis as something that they need from the case company to give accurate reports to their customers when it comes to CO₂e emissions.

According to Ahopelto's (2022) study the companies in her study say that *“global political and financial uncertainties”* don't have a significant impact on the companies' environmental sustainability goals. This thesis found that according to Respondents B, and C, the current financial situation on the market decreases the customers' willingness to invest in environmentally sustainable solutions and are instead prioritizing lower prices on the transport to cut costs. Respondent B answers this when asked if customers are ready to pay more for more environmentally sustainable solutions:

“They are but it depends on the timeline I would say because, two years ago, almost everyone was ready to do that. Nowadays they start to count every single euro in their pockets as well so it depends if they can allow themselves to do it or not. Or what kind of aims or goals they put in, like inside the house because there are some customers say that they want to be carbon neutral until 2030, and I asked how you are going to be carbon neutral, in such a short period of time when you deliver goods to Norway. I haven't got any answer.” (Respondent B)

Bask & Rajahonka (2017) found that environmental sustainability and intermodal transport are emerging topics within the industry which this thesis also found. There has been some

development in the field since the study in 2017 by Bask & Rajahonka but according to the results of this thesis, there is still much work to be done to meet the environmental sustainability goals and requirements of the governments, EU, and customers. This thesis found that intermodal solutions except with the ferries are not so common, especially in the Nordic countries and even if the situation in some other parts of Europe is better Respondent E mentioned limitations of capacity and infrastructure for example to move the transports from road to railroad. Company A, B, and E mentioned that the customers are asking for intermodal transports but Company B has found that their trailers are not suitable for trains because of the measurements.

Borowicz & Cezerpko (2023) found that CSRD will put demands on the LSPs to make adoptions to become more sustainable and be able to make the environmental sustainability reports required by large and listed companies. Company F, the manufacturing company in this thesis, as a large company is affected by the CSRD and they are already taking actions to improve their reporting to meet the standards required by CSRD. The LSPs and the case company, which are not large or listed companies, will need to be able to report the required data according to CSRD to those of their customers who are affected by CSRD.

5.6 Answers to the research questions

This part of the chapter explains how this study through the presented theoretical and empirical framework answers the research questions.

RQ1: What is Environmental Sustainability and how important is it compared to other factors such as cost, time, and reliability when a customer is selecting a Logistics Service Provider (LSP) in the freight procurement process?

The theoretical framework explains that environmental sustainability is a part of sustainable development alongside social and economic sustainability. Environmental sustainability in logistics can according to the theoretical framework and the findings in this study be concluded as a reduction of emissions with a focus on CO₂ or CO₂e, optimization of the design of the transport units and goods flow, using alternative and/or renewable fuels with less impact on the environment, and using intermodal transport with a

combination of more environmentally friendly transport methods such as sea and railroad transport.

The result of the interviews shows that price is the most important factor when selecting an LSP, but price is not everything. It is also important to live up to the expectations of the customers regarding availability, quality, reliability, functionality, customer service, lead times, tracking, reporting, and environmental sustainability. All the interviewed companies see that environmental sustainability is becoming a more and more important factor in the requests from the customers, but most customers expect environmental sustainability to be a part of the standard package and are most often not willing to pay more for a more environmentally friendly service. Some extra charges for using alternative fuels can be accepted by some customers. The result of the study shows that larger customers with larger contracts are more interested in environmental sustainability than smaller customers or spot requests. The respondents also see that government actions such as the increased road taxes and the EU's emission trading systems are making environmentally sustainable solutions more profitable compared to other options.

RQ2: What measurements are used and how can a customer measure the Environmental Sustainability of a potential LSP in the Selection phase of the freight procurement process?

According to the results of the study especially larger customers have their own Environmental Sustainability Management systems such as ISO 14001 which put demands on their suppliers such as LSPs. The suppliers must comply with the Environmental Sustainability Management system used by the customer.

The customers can also have their own Environmental Reporting Systems using different standards which put demands on the LSPs to report their emissions for the customers' environmental reports.

When sending a Request of Quotation for freight for specified destinations the customers can ask not only about the freight rate but also what route the LSP is planning to take and what the environmental footprint such as CO₂ emissions will be for the specific trips. This study shows that the case company must be able to provide accurate information about CO₂ emissions so that their customers, the other LSPs, can use accurate data in their offerings and reports. For the case of Company F, a manufacturing company with a direct

contract with the case company, they are also depending on correct data for their environmental reporting.

The customer can also check when it comes to road freight, that the company is using trucks of a certain EURO emissions standard and if they have possibilities to use alternative fuels and/or intermodal solutions to reduce emissions. When it comes to sea freight as with the case company the customer can compare emissions with competitors by retrieving data from the EU THETIS-MRV CO2 Emission Report mentioned in the theoretical framework.

The customer could use the *“Smart Freight Procurement Guidelines”* mentioned in the theoretical framework to help them in this work. Also, understanding and using the model of the four A’s: *“Awareness, Avoidance, Acting and shifting and Anticipation.”* can help them in their journey towards sustainable procurement.

To conclude this, for the general freight purchaser, I would suggest asking at least the following questions from the potential LSP. Do you have an environmental sustainability management system? Do you make environmental sustainability reports? In what ways are you working with environmental sustainability? What kind of transport equipment do you use, emission standards, alternative fuels, intermodal solutions, and similar?

5.7 Conclusion

The result of the thesis shows that environmental sustainability is a rising topic within freight procurement and the initiatives come from governmental and EU regulations as well as from the customers and their internal sustainability programs which causes a need for environmentally friendly transport solutions.

The environmentally sustainable efforts by the case company are highly appreciated among the customers. Some of the respondents mentioned that the case company could market itself even more as an environmentally friendly company. They see environmental sustainability as a competitive advantage for the case company when they are choosing between the options they have when it comes to transporting their equipment from Finland to Sweden or vice versa.

However, they are not in general able to pay much more for environmentally friendly services and appreciate when environmental sustainability is included in the normal freight rate. The study shows that in some cases companies were more willing to pay extra a couple of years ago compared to today because of the financial situation in today's market.

Some of the respondents mentioned that they appreciate the case company's ability to cooperate with other companies to create a transportation network with intermodal transports such as a railway connection to southern Sweden. Intermodal transports are found in the theoretical framework as a part of a more environmentally sustainable transport chain. However, the study found that there are many practical issues with intermodal transport including railways such as lack of capacity and infrastructure, and requirements on the measurements and specifications of the units transported onboard a train.

Some of the interviewed companies emphasized that accurate data reporting will become even more important in the future and would appreciate it if the case company would be able to deliver as precise data as possible for their environmental reporting. The CSRD will put pressure on the case company and their customers in environmental reporting even if they are not large or listed companies themselves, the large and listed companies require the emissions data from their suppliers to report their Scope 3 emissions.

Because of the rising demands for reducing emissions and more detailed reporting of GHG emissions the companies might be even more interested in choosing transport modes with lower GHG emissions, such as the case company in the near future.

5.8 Suggestions for further research

Here are some suggestions for further research on the topic based on the findings from this study.

This study has shown that alternative fuels are an actual topic in the field of environmental sustainability in goods transport, but it seems unclear today what will happen in the future and which alternative fuels will make it to the market. I find that it would be interesting to follow up and research the phenomenon of the development of alternative fuels.

Another phenomenon that I find interesting to research is the potential growth of intermodal transport solutions for example by railroad especially in the Finnish market where the development seems to be behind Sweden and other European countries.

This study focuses mainly on the Nordic and European markets. Similar studies from other parts of the world could be interesting to compare with how they are working to improve environmental sustainability in freight procurement and how important it is for customers in other parts of the world.

It would also be interesting to research how the EU Emissions Trading System (ETS) that fully takes force in 2026 affects the environmental sustainability within the shipping industry. The interviewed companies also mention that several companies have goals to reduce emissions by 2030, it would be interesting to follow up the process to see how they will do this and see if they reach their goals as planned by 2030.

This study shows that larger companies have more demands on them from authorities and the public to be environmentally sustainable and that can be a reason why they have more extensive environmental sustainability programs than smaller companies. It would be interesting to make a more thorough study about the differences between smaller and larger companies when it comes to environmental sustainability programs.

The majority of respondents in this study are LSPs who work as a middleman between the goods owner and the goods buyer. It would be of interest to find a larger sample from a different case of manufacturing companies and research their view of the topic. For this case company, a quantitative study with more respondents could be interesting to compare with this qualitative study. There could also be a similar study including consumers since that group is excluded from this study.

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APPENDIX 1: Semi-Structured Interview Guide

Introduction of the interviewed company

Can you please briefly describe your company?

What is your role in the company?

Does your company have an environmental management system, for example, ISO 14001 or similar, if so, what?

Does your company do environmental sustainability reports, if so, according to which standard?

Are you working with environmental sustainability in other ways, if so, please explain how?

Do you use intermodal transport, for example combination of road, sea, and railroad or some of them?

Questions about the relationship between the interviewed company and the case company

Can you please describe your relationship with Oy NLC Ferry Ab?

Do you think Oy NLC Ferry Ab is an environmentally friendly company?

When you get an offer from Oy NLC Ferry Ab and similar companies what are the most important factors you look at?

How important is environmental sustainability when you decide which service to use?

Are you prepared to pay more for more environmentally sustainable service?

Would it be an option for you to use the ferry to reduce CO2 emissions even if it would be a more expensive option than the alternative, for example going by land via Haparanda?

Questions about what the interviewed company feels they need to provide to their customers

What factors are your customers' main concerns when asking for a quotation?

Are your customers asking for environmentally sustainable solutions?

APPENDIX 1: Semi-Structured Interview Guide

Are the customers willing to pay more for such services?

Are the customers asking for intermodal transport?

Is there anything that Oy NLC Ferry Ab could do otherwise to help you meet the needs of your customers?