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Developing sustainable freight transportation

Primary barriers encountered when freight intensive companies implement and develop sustainable oversea freight transportation in Europe

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Abstract

Transportation is a key factor in today's society, since it enables trade and thereby foster our economy. However, it also generates negative externalities, which leads to increasing global temperature and an indirect GDP related cost. Freight transport is a large contributor to this related problem, and is expected to quadruple in the nearest 30 years along with an increase in global population. Hence, there is an urgent need for change. This study will contribute to highlight this need by increasing the knowledge regarding primary barriers that freight intense companies encounter when implementing and developing sustainable oversea freight transportation in Europe. This is done by answering the question regarding what primary barriers there are for companies when developing more sustainable oversea transportation, and, how a company possibly could cope with these potential barriers.

This study is based on a qualitative research method and conducted as a case study, using freight buying and supplying companies who have an interest in sustainable development. By interviewing a variety of companies who play different roles within the industry, the hope is that this will somewhat reflect the reality for a common actor in the industry.

The result shows that barriers could be derived both internally and externally. Internally, a company might have an inconsistent mindset towards sustainable development, which may lead to contradictory goals between different departments. This in turn could be a result of uncertainty. Externally, technical difficulties, aggravated infrastructure, the non-environmental-prioritizing procurement process, the *just-in-time* demand from customers, along with dissimilar regulation between countries, all hinder the sustainable development. A change in way of thinking and prioritizing must be put to action in order to develop sustainable transportation.

Keywords: Sustainability, sustainable development, freight transportation, internal- and external barriers, overcoming barriers

Table of contents

1. Introduction

This section aims first and foremost to present the reasons for the issue in question being relevant and addressed. Additionally, the purpose and the following research question, which this thesis aims to answer, will be described.

1.1 Background

Transportation has been a key factor in the development of the human society through history, due to it enabling movement and trade worldwide, which have contributed to our current globalized civilization. However, along with this development comes costly negative externalities, in terms of GHG emissions[1] (United Nations, 2016), of which CO_2 accounts for 65% (EPA, 2017). With increasing knowledge about the impact of these negative externalities evolves a global environmental concern (European Commission, 2011). Emerging from this concern, 195 nations to date have signed what is known as *The Paris Agreement*, which aims to strengthen the global response to the threat of climate change (United Nations, 2018).

1.1.1 Freight transportation in Europe

At this time, 23% of the global energy related GHG emissions derives from transportation (United Nations, 2016), which has become an increased burden on the economy. In Europe, this burden currently accounts for 2% of the GDP (ibid). Of these GHG emissions, 30% derives from freight transportation – movement of goods – which is further divided into different types of mode, such as sea-, air-, rail-, and road freight (European Union, 2018). In Europe, road freight represents 75% of the freight services (ibid). However, despite the upcoming trend of integrating sustainable development into companies' businesses, it has failed to do so within the area of freight transportation.

1.1.2 Freight transportation and the industry structure

The generally known reason for the inadequate development of sustainable freight transportation is the technical difficulties due to the lack of innovation (Institute for Transport Studies, 2010). The challenge is the structure of the freight industry combined with long-distance movement of heavy goods, which adds complexity to the issue (ibid). Due to time persistence demand from customers, companies have developed strategies such as *just-in-time*,

[1] Greenhous gas emissions – gas that have a greenhouse effect and contributes to global warming. Includes gases such as Carbon dioxide, Methane, Nitrous oxide and Fluorinated gases

whereby inventories and storage are minimized and goods are moved closely in line with when they are required (Institute for Transport Studies, 2010). This tends to reduce consignment size[2], and hence, can increase the number of road freight movements (European Union, 2018).

Within the freight service industry, most companies outsource all or parts of their freight transportation to third-party logistic suppliers, also known as 3PL (Lammgård, 2007). Since this procurement process, as described in figure 1, is a service, it is more complex, takes more time to specify and it is harder to compare the quality of the service amongst the suppliers.

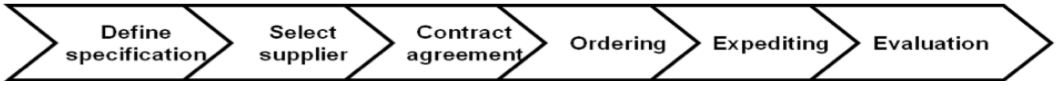

Figure 1: Purchasing process approach: managing interfaces (Source: Van Weele, 2014)

The selection process of suppliers often starts with the company sending offers of collaboration where potential suppliers composes proposals for the company to select amongst. These proposals are most often based on the preferences of the buying companies, which in general prioritizes price and time precision, and thus trade-off preferences such as the environment. (Lammgård, personal communication, 1 February 18)

1.1.3 Environmental aspects and development

Currently, the EUs sustainability work on transporting issues emphasizes the development of TEN-T corridors[3] (Institute for Transport Studies, 2010). The goal is to eliminate bottlenecks and technical barriers that exist between different EU member states, to promote intermodal and alternative fuels (ibid). When considering the triple bottom line[4], the combination of road-rail is the most sustainable alternative due to rail having a lower environmental impact, as well as being less cost intense per km (Flodén & Williamsson, 2015). Regarding road freight, environmental aspects often refer to renewable sources of fuels with a lower rate of CO_2 emissions per km, such as biofuels and electric vehicles (Institute for Transport Studies, 2010). However, for instance HVO[5] – a type of biofuel – is also known to cause deforestation of rainforest to make space for palm trees for its production (Nelsen, 2017).

[2]Each product has a particular size in which the product may be transported in the most economical way
[3] Trans European Transport Network - a European Commission policy, which main task is to connect Europe with roads, railway lines, railroad terminals, shipping routes etc.
[4] Concept to broaden the focus on financial bottom line by business to include social and environmental responsibilities. It measure a company's degree of social responsibility, economic value and environmental impact
[5] Hydrogenated vegetable oil, can be produced from different residues such as waste cooking oil and animal fat, and additionally also vegetable oil such as sunflower, soybeans, palm or pine oil, which is favorable for sustainability. (Lindström, et al., 2017)

1.2 Problem statement

Even though transportation is key, it has inferior priority compared with other factors within the business in terms of sustainable development. This can partly be explained by the fact that it often represents just a small portion of a company's environmental impact (Lammgård & Andersson, 2014). Another explanation is that the more sustainable alternatives that exists today, such as electric cars (or something simple as bicycling), are not applicable to freight transportation due to the complexity in terms of long-distance movements of heavy goods (Institute for Transport Studies, 2010). Along with internet accessibility and the globalization of businesses, companies are no longer bound to their country of origin, in the same way as before, but rather reach out to a global market. While this results in more affairs and better competition it also has, along with the increasing populations and its consumptions, a negative impact on the environment due to the increasing oversea[6] freight transportation. Hence, if *The Paris Agreement* is to be followed and any further growth of these emissions and their related costs should be prevented, there is an urgent need for action in terms of sustainable development of oversea freight transportation (United Nations, 2016).

1.2.1 The problematic conditions and structure of the freight industry

The traditional approach of meeting the increasing demand of freight transportation has been to increase the infrastructure, but the supply-side oriented approach has not delivered sustainable outcomes (United Nations, 2016). Since the freight transportation is large, diverse and complex, combined with the long lifespan of infrastructure investments, today's decisions are critically important for tomorrow (ibid). Thus, rather than a substantial increase in infrastructure, a redirection is required in order to develop freight transportation in a sustainable manner. However, there is an absence of players within the freight industry who advocate a sustainable development (Lammgård & Andersson, 2014). Along with the globalization of these players' businesses, comes complications in terms of the oversea freight transportation crossing more borders and thereby facing additional barriers due to that the regulations and fuels accessibility differ amongst the countries within Europe (ibid).

The development of alternative modes and fuels is not without problems. According to Adams (2017) electric alternatives more than fulfill the propulsion criteria. However, they requires long

[6] International transportation

recharging time, recharging stations, added weight in terms of batteries and it lack range (Tryggestad, et al., 2017). Despite the development of alternative fuels, such as HVO, the accessibility is restricted, especially beyond the borders of Sweden. Even if such refill grid and infrastructure were to be expanded, the problem remains due to a limited supply. Thus, actions to meet the current demand of fossil fuel with HVO will not be a long-term sustainable option (European Union, 2018). This is a recurring issue for most of the renewable sources of fuel. Because of the already established fossil fuel grid the transportation industry will have a hard time to move away from the fossil fuel combustion engines.

Road freight is currently the dominating freight mode (Flodén & Williamsson, 2015). This combined with the described barriers of technical difficulties, different regulations and accessibility of renewable fuel, along with the increasing demand of road freight, thereby it generally has a higher impact in terms of CO_2 emission. This study will therefore be focusing on this issue within and around the area of northern Europe. In addition, the focus of road freight will be directed primarily towards *the first mile*[7].

1.2.2 Problematic conditions and structure from an operator perspective

Because of the extensive complexity and barriers, as described, regarding sustainable solutions of freight transportation, the required investments may be greater for a company compared with other sustainable development investments of business (Lammgård & Andersson, 2014). In addition, some of the alternative modes, such as rail- and sea freight, may be economically and environmentally beneficial (Flodén & Williamsson, 2015). However, they lack flexibility in terms of custom service terminals, developed infrastructure and expensive fixed costs (ibid). This, combined with certain business strategies (such as just-in-time), results in companies often preferring road freight (United Nations, 2016).

Additionally, the decisions makers seems to lack knowledge regarding the freight service that they purchase (Santén & Arvidsson, 2011), along with an uncertainty with regards to what is the most sustainable choice or how environmental considerations can be incorporated into the selection process of freight suppliers (Isaksson, 2012). A miscommunication has also been detected between the buyers and suppliers of freight transportation, whereby some preferences of the buyers, such as environmental ones, have not been perceived by the suppliers. If the

[7] Road freight in a single stretch mark, from point A to point B, excluding distribution to the final consumer

suppliers base their services on the preferences of the buyers, but the buyer neither demand environmentally preferable freight service nor do they properly communicate their preferences, the providers will not make any further efforts to include environmental aspects into their services (Lammgård & Andersson, 2014).

All this has resulted in an increased amount of shipments, and thereby an even further increase in number of road freight movements, which increases the amount of CO_2 emitted (Institute for Transport Studies, 2010). Since the companies seemingly play a significant role in the lack of sustainable development of freight transportation, this study will be designed from these companies' perspective. These actors seemingly face difficult internal and external barriers, hindering such sustainable development.

1.2.3 Significance of the issue

Despite the critical state, sustainable development of transportation has not been given adequate recognition. There is a lack of research and reports regarding the importance of sustainable transportation and the process of its development, especially from a company's point of view. With this study, we aim to raise awareness of the subject as well as uncover and provide information regarding barriers that freight intensive companies most likely may come across during their development of sustainable transportation.

1.3 Purpose of the study

The purpose of this study is to increase the knowledge about barriers that freight intensive companies may encounter in their implementation and development of sustainable oversea freight transportation in northern Europe.

1.4 Research questions

Based on the presented background, problem statement and the purpose of this report, the following research questions have been formulated, which we aim to answer. These are:

- What primary barriers do freight intensive companies encounter when developing sustainable oversea freight transportation?
    - How can a company possibly cope with the barriers uncovered?

1.5 Scope

This report includes an overview of the oversea freight transportation system in northern Europe and the different barriers freight intensive companies encounter when implementing and developing freight transportation in a sustainable manner. After identifying primary barriers, plausible actions to overcome and cope with these barriers will be presented. Since organizations and their priorities differ, some of the barriers illustrated may or may not be general for all businesses and may therefore be more or less hard to overcome.

To answer the research questions the following delimitations have been made:

- Road freight in a single stretch mars, also called *the first mile*
- Environmental aspect of sustainability, focusing on CO_2 emissions
- The area of, and nearby, northern Europe

2. Previous Research & Theoretical framework

In this section, the reader is introduced to the theoretical reasons of why sustainable development of road freight transportation is needed. Furthermore, previous research and scientific theories, relevant to the subject, will be presented. Finally, a summarizing section of this research and theories will be presented.

2.1 Freight transportation and its environmental impact

During late 20th century, the negative impact of GHG on the environment began to get recognition. This led to the founding of UNFCCC[8] in 1992 and the establishment of the international agreement *Kyoto Protocol* in 1997, which both aim to reduce GHG emissions (Naturvårdsverket, 2018). This agreement became the forerunner to the 2015 *The Paris Agreement*, which also aims to reduce GHG emissions, in order to keep a global temperature rise below 2 degrees Celsius this century (United Nations, 2018). The European Commission (2011) explains that a reduction of at least 60% of GHG – including CO_2 – by 2050, with respect to 1990, is required from the transportation sector in order to reach this goal (ibid). However, International Transport Forum (2016) estimates that the CO_2 emissions from freight transportation will increase by a factor of 3.9[9] during that time. These estimations do not meet the required reduction stated by the European Commission (2011). Hence, the global concern for the increase in freight transportation.

Despite the development of more fuel efficient vehicles with reduced CO_2 emissions per vehicle-km, McKinnon (2010) states that nevertheless, such reduction is eroded by the underlying growth in road freight traffic. Since the CO_2 emission derived from road freight traffic is expected to almost quadruple in the nearest 30 years fuel efficiency alone will not be enough. More radical measures to contain the growth of road freight traffic are required (ibid). For instance, a carbon tax is one way that governments can promote sustainable development, thus, individuals and organizations get an economic incentive to choose sustainable options (Vierth, 2013). However, this is difficult to achieve without jeopardizing the future economic growth, since it so far has gone hand in hand with the increase in freight transportation (ibid).

[8] United Nation Framework Convention of Climate Change
[9] From 2 108 million tonnes to 8 131 million tonnes

2.2 Sustainable freight transportation

McKinnon (2010) states that making logistics, and thereby transportation, sustainable in the long-term involves reconciliation of environmental, economic and social objectives. Further, McKinnon (2010) describes the process of improving environmental sustainability of logistics by the following three methods of decoupling economic growth from road freight traffic levels:

1. *Reducing the transport intensity of the economy*

Generally, this is defined as the ratio of road tonne-km to GDP[10]. During the 90s this ratio was equivalent to the development of GDP in Europe. However, since then, the trend has shifted, with freight tonne-kms growing at a faster rate than the European GDP. McKinnon (2010) argues that both the economic cost and savings of the CO_2 emissions needs to be included.

2. *Altering the split modal*

The modal split indicates the proportion of freight carried by different freight modes. Thereby it advocates the possibility to displace freight on to alternative modes (McKinnon, 2010). The EU has developed a FAP[11] (European Commission, 2007) as an attempt to facilitate business possibilities to switch freight mode to a more sustainable transport system (McKinnon, 2010).

3. *Improving vehicle utilization*

Vehicle utilization refers to reducing the ratio of vehicle-kms to tonne-kms. This requires an increase in energy efficiency – changing the vehicle characteristics, traffic conditions and driving behavior – and a decrease of emission per unit of energy – changing type of energy/fuels, the engine converting this energy and the exhaust filtration system. (McKinnon, 2010)

These three stages can also be referred to as the Avoid-Shift-Improve (ASI) approach. According to the High-Level Advisory Group to UN (2016), this is the most applicable approach when it comes to long-distance or oversea freight transport, which is the scope of this thesis. However, in addition, the industry has to be addressed in a holistic manner, corresponding to the size of the challenges, along with a wide range of stakeholders working together to advocate sustainable transportation, in order for it to be successful (ibid).

[10] Road tonne-km to GDP: the link between road freight in terms of tonne-km (the transport of one tonne of goods, including packaging and tare weights of intermodal transport units) and growth in GDP
[11] Freight Action Plan

2.3 Sustainable freight transportation barriers and how to overcome them

2.3.1 Barriers to sustainable transportation

Numerous barriers that hinder or have hindered sustainable development of the transportation – freight, individual, private and public – sector have been pointed out by the STELLA-STAR[12] initiative (Rietveld & Stough, 2005). However, only freight related barriers will be presented. The authors present the following definition of sustainable transportation:

> *Actions that improve environmental quality and increase efficiency in both transport and energy usage are contributing to sustainability. Hence, evolving transport towards more efficient, less energy usage and are compatible with both better environmental quality and the general concept of sustainability, is sustainable transport…* – (Rietveld & Stough, 2005, p. 2)

Banister (2005) discuss the level of public policy making and behavioral patterns to illustrate common effects of legislation and regulations. He argues that it is generally taken for granted that a policy will be successfully implemented, but the behavioral changes might fall short. According to Banister (2005), part of the explanation can be derived from six categories of *forces*:

1. *Resource barriers*

If a measure or action is to be implemented, an adequate amount of resources of financial and/or physical character is needed. In case of insufficient resources, implementation will be delayed. This type of barrier is closely linked to the institutional barriers since authorities are less likely to subsidise implementation if it is not in line with their policy makings.

2. *Institutional and policy barriers*

These types of barriers often occur due to coordinated actions between different levels of organizations or government failing. In the freight transportation sector both public and private organs are involved. The cultural differences and/or the uneven distribution of legal powers may results in difficulties to achieve coordinated actions by the implementing agency.

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[12] - STELLA (Sustainable Transport in Europe and Links and Liaisons with America) is a Thematic Network Project of the European Commission's 5th framework programme for Research and Development
- STAR (Sustainable Transport Analysis and Research) is the North American sister thematic network

3. *Social and cultural barriers*

The public acceptability and behavioral changes are critical if a measure, legislation or regulation is to be successfully implemented. This, due to if the proposed strategy being implemented compromises as *push* or *pull* effect, meaning, either having a discouraging or encouraging effect, where the latter tends to be more popular.

4. *Legal barriers*

Since freight transport stretches across borders and legal requirements and laws differ between nations, adjusting the existing freight policies is far more complicated. While some of the existing regulations and directives may be beneficial in terms of standardization, others constrain innovative solutions. Therefore, additional effort is needed to facilitate change.

5. *Side effects*

Due to freight transportations close connection to societal and economical systems, implementation or change can entail extensive side effects that make the changes obsolete. Anticipation of these side effects might be difficult, making them unpredictable and a significant barrier.

6. *Other physical barriers*

These kinds of barriers may for instance be the topography of an area or insufficient space for an overnight parking space.

2.3.2 Overcoming barriers to implementation

Banister (2005) states that in order to successfully implement a policy, leadership that is committed to change is needed, which is illustrated with *The five framework conditions:*

1. *A national policy framework*

On spatial development[13], a framework for national policy making should be established with a long-term perspective. The framework provides consistency for individual decisions which can be placed within the framework.

[13] Spatial development – the development approach used by the public sector to influence the distribution of people and activities in space and various scales

2. *A sustainable transport strategy*

A well communicated strategy, which should include maximizing the use of green modes of transport and improving air quality by using less fuel and thereby minimizing CO_2 emitted.

3. *Decentralization of powers and responsibilities*

The level of implementation together with the necessity of resources or revenue raising power should be proportional with the responsibilities for transportation. Provided guidelines help in a decentralized determination system and enable decision making organs on a local and regional level to include their own priorities. However, this kind of supportive and flexible national framework has, due to limitations of the power of local fundraising mechanisms, been compromised.

4. *Prevention of "perverse effects"*

To prevent *perverse effects*[14] from occurring, consistency in policy directions is needed. Local authorities have limited options to increase their revenue based on taxation of business on a local level and are therefore often positively set to develop and improve local employment.

5. *Public and private acceptability of policy underlies successful implementation*

Public and private acceptability is significant if implementations are to be successful. If the implementation aims to make behavioral changes through controversial transport and spatial policies, involvement is key. Thus, if decisions are to be accountable for the users, participation must move from manipulation and from low to greater levels of information and empowerment.

2.4 Governmental agencies' role to facilitate actors implementation of intermodality

In order to achieve sustainable transportation, a more balanced use of present capacities throughout the European Transport system is key. Therefore, policy instruments used for a *business as usual*[15] approach must be dismantled. The fragmentation of the modal and national systems in the EU, and the lacking interoperability between systems hinder the development of intermodality. The transfer between modes currently creates too many additional costs for it to

[14] An unforeseen negative consequence of an action of policy that produces exactly the opposite to the intended effect
[15] A phrase which refers to the normal conduct of business of current circumstances, especially difficult events which pose a potential negative impact

be economical compatible, which means that integration of existing and planned transport systems in terms of infrastructure, technologies, pricing, legislation etc., is not executed in an efficient manner. This global integration will, according to the author, not be achieved by each shipper on its own, but requires a top-down approach provided by the European Commission. Improving railway performance and promoting intermodality will help to overcome congested road networks and, according to Tsamboulas (2005), an overall strategy for sustainable mobility. (ibid)

Introduce legislation and regulation to promote intermodality

Tsamboulas (2005) considers The European Union to possess the most power to influence the transport sector in the member states. Introducing legislation and regulation that standardize and promote intermodality must be the core of EU policies in order to facilitate a sustainable development (Rietveld & Stough, 2005). EUs remedy to the issue of increasing road freight has been to provide the policy tool for a systems approach[16] to transport for integration of different modes into one coherent transport system. Tsamboulas (2005) notes that the market response to this kind of integration is the main challenge. Therefore, EU must define a framework, where the conditions must level the playing field for all operators and thus stimulate innovation (ibid). To accomplish this objective, an action program promoting intermodal freight transportation in Europe has been established. However, its implementation requires the co-operation of transport operators and users, the relevant supply industries, the national governments of the member states, and regional and local authorities. (Rietveld & Stough, 2005)

2.5 Actors' role and behavior in the freight industry

2.5.1 Environmental considerations in procurement process of freight

The research made by Lammgård and Andersson (2014) examines the importance of large shippers' preferences to environmental aspects when purchasing freight transport services and the possible trade-offs with other aspects. It is shown that the purchasing process as whole does in fact work as a barrier for developing sustainable freight transportation.

[16] A line of thought in the management field which stresses the interactive nature and interdependence of external and internal factors in an organization. A system approach is commonly used to evaluate market elements which affect the profitability of a business

It is not just the different preferences that the buyers have, but also the procurement process itself that affects the conditions for sustainable development. The process includes seven different variables by which it is affected by: (1) characteristics of the product, (2) sums of the money involved, (3) strategic importance, (4) characteristics of the purchasing market, (5) degree of risk, (6) role of the purchasing department in the organization, and (7) effect of purchase on existing routines. Lammgård and Andersson (2014) state that these variables affect a company's possibility to make more sustainable choices, and thereby often hinder a sustainable development of their freight transportations. (Lammgård & Andersson, 2014)

Furthermore, between 2003 - 2012, Lammgård and Andersson's (2014) research showed a trend in the preferences of the transport-buying companies where *environmental efficiency* was considered fourth place, after *price*, *punctuality*, and *transport time* (see appendix 1). Notably, it is also stated that this trend could have been affected by the financial crisis in 2008. However, the offers from the freight supplier are based on the primal preferences, working as trade-offs for environmental aspects and hindering the accessibility of environmentally preferred freight services, which some companies may desire. (Lammgård & Andersson, 2014). Therefore, an environmental approach needs to be homogenized amongst all companies involved.

2.5.2 Homogenizing actors within industries - Isomorphism

DiMaggio and Powell (1983) describe how companies become similar and hence, the development towards homogeneity. They state that once a set of organizations emerge as a field, a paradox arises through rational actors pushing towards making organizations similar as they attempt to change them. This process is what the authors call *isomorphic processes*. Further, DiMaggio and Powell (1983) describe the following three different types of isomorphism:

Coercive isomorphism

Stems from political influence and issues with legitimacy. This is a result of formal and informal pressures exerted on organizations by other organizations which they are dependent upon.

Mimetic isomorphism

Result of a standard response triggered by uncertainty. This leads organizations to imitate other organizations that have been successful in their field.

Normative isomorphism

Pressures from professions and norms within these professions. Therefore, individuals who have the same education are more likely to address issues in the same way. Thus, the professionalization spreads these norms regarding how to organize amongst the different organizations within the industry.

2.6 Summary

In order to successfully reach the set goals for CO_2 emissions, the freight industry needs to develop in a sustainable manner. However, since the freight industry is continuously increasing and the CO_2 emissions are currently estimated to quadruple in the next 30 years, it is now more urgent than ever, and needs to be addressed sooner rather than later.

McKinnon's (2010) ASI approach will be used to compare and analyze the empirical results of companies possible attempts to develop sustainable freight transportation, and what may have affected that development. Further, the six forces presented by Banister (2005) will be compared, along with the results from Lammgård and Andersson's (2014) research, with the uncovered barriers from the empirical result to see whether or not there is consistency amongst previous research and this research. This in order to answer the research questions of what primary barriers freight intensive companies encounter when developing oversea freight transportation, as well as presenting the issues from an actors point of view rather than from a macro perspective, which most previous research possesses.

In addition Banister's (2005) *five framework conditions* and Tsamboulas' (2005) view of governmental agencies' role to facilitate sustainable freight development, are going to be analyzed along with the empirical result. This in order to investigate whether companies alone have the resources and possibilities to successfully develop sustainable freight transportation, or if it needs to be facilitated from governmental agencies through regulation, legislation and standardization within the EU and its member states. Moreover, the isomorphic theories by DiMaggio and Powell (1983) will help us understand and explain why certain behavior occurs and how a behavioral change could lead to fostering a sustainable development. This previous research and theories will be used to answer the follow-up question of how a company possibly can cope with the uncovered barriers.

3. Method

In this part of the thesis, the chosen method approach will be presented, followed by a thorough description of how the interviews were conducted; selection of interview objects, collecting relevant information, interview structure and interpreting data. Lastly, credibility, validity, reliability and critic of the chosen method will be discussed.

3.1 Research method

Sustainability has been highlighted as our, and following generations, most challenging issue to date, partly because of its complexity and multilateral presence within different sciences. Knowing this, we wanted to further examine what prevents or slows down sustainable development within organizations. Therefore, due to connections in terms of previous employment, *The Absolut Company (TAC)* was contacted, and it was highlighted that seemingly there exists a general issue of integrating sustainable development into the freight transportation sector, despite the willingness to change. Thus, we found it natural to further investigate why this is the case, which resulted in the purpose being to increase the knowledge about barriers that freight intensive companies may encounter in their implementation and development of sustainable freight transportation.

To further clarify the purpose, through suiting research questions, a literature review based on previous research, articles and reports was conducted. These were written by either established governmental agencies, such as the EU and UN, or environment related organizations and researchers within the field. Furthermore, the literature was mainly searched through *Google Scholar* and *Supersearch*, in order to ensure its scientific background or generally accepted credibility. Along with the increasing knowledge from this literature review, the current research questions were formulated regarding what primary barriers freight intensive companies encounter, and how to cope with them, when developing sustainable oversea freight transportation.

Since it became clear that the issue in question, despite its importance, seemingly lacks research, reports and recognition, especially from an actor perspective, we chose to execute our research in a way where we emphasized words and expressions from the companies. This, in

order to highlight their point of view of the issue. This approach is what Bryman and Bell (2017) calls a qualitative research method.

Since we already were in contact with TAC, and the company had shown a significant willingness to develop towards sustainable development throughout their entire business (see appendix 2), we chose to execute our qualitative research method in terms of doing a case study of the company, in order to exemplify the situation of the issue.

3.1.1 Case study

A case study is a research strategy focusing on a single example of a broader phenomenon (Gerring, 2013) in order to gain an in-depth knowledge of the subject in question. TAC's affairs are 99 % export based, the management dedication to sustainable development is extensive and the company's financial situation is by all means favorable. Nevertheless, the company still struggles to develop their freight transportation towards sustainability to the desired extent. The organization is therefore an excellent case to study in its implementation of sustainable development regarding oversea freight transportation. Because of these favorable circumstances, we assume that the barriers that TAC has to overcome in their sustainable development will to some extent be the same or similar barriers that other, similar organizations have to overcome in their sustainable development.

In order to gain a broader understanding and more holistic view we choose to include additional companies that are related to TAC, from both the freight-buying and -supplying side. This, also in order to answer our research questions and fulfilling our purpose in a more industry-overarching way. Therefore, through TAC's connections we were able to include its parent company *Pernod Ricard* and their currently contracted 3PL, *Girteka Logistics*, one of Europe's largest road freight provider. Additionally, due to personal connections, an external 3PL provider, *Nordic Bulkers,* a Swedish intermodal bulk company, was included which could provide a more independent view. These companies also fulfill the requirements of being freight intensive, having interest in or already working with sustainable development, and either being transparent or willing to share information. These three requirements were necessary in order to assure the relevance for this research. Lastly, an associate professor with a PhD in the subject was included to get further external information from a broader perspective in order to analyze the interconnection between our single example and the general issue of the industry.

In order to collect their views and perspectives on the issue in questions, we chose to conduct personal interviews with each of the chosen companies and respondents, which were to be used as our primary data.

3.2 Primary data, interviews

The collection of primary data with the help of interviews was used to obtain a greater in-depth knowledge and flexibility, compared to surveys, by enabling follow up questions and discussions rather than strict questions and answers. This seemed essential in order to prevent any misunderstandings in communication between the interviewers and the respondents that could askew the outcome. This is in accordance with Bryman and Bell (2017) who states that flexibility that comes with interviews is what makes it attractive to the researcher when conducting a qualitative research strategy.

3.2.1 Selection of respondents

As the selection of the companies, the selection of respondents had to fulfill some requirements in terms of having some direct connection to either the logistics and transportation department or sustainability department. This in order to ensure that the respondent in questions had some experience or knowledge about the subject. In order not to compromise the integrity of our respondents, we chose not to disclose their names. Altogether, this resulted in the following interview layout and details, presented in figure 2.

	1	2	3	4	5
Company	The Absolut Company	Nordic Bulkers	Gothenburg University	Pernod Ricard	Girteka Logistics AB
Respondee title	a) Director Supply Chain, Quality and Environment b) Manager Logistics Procurement	a) Logistics Coordinator b) Project Manager	Senior lecturer: Assosiate professor, Industrial and Financial Management and Logistics	Group Environmental Manager	Chief Communication Officer / Key Account Director
Date	2018/03/27	2018/04/03	2018/04/18	2018/04/25	2018/04/25
Course of action	Face to face	Face to face	Face to face	Video conference call	Phone
Duratation of interview	4 Hours	3 Hours	1 Hour	1 Hour	1 Hour
Recorded	Yes	Yes	Yes	Yes	Yes
Pre-sent questions	No	No	No	Yes, on request	Yes, on request
Transcribed	No	No	No	No	No

Figure 2: Interview layout and details

3.2.2 Collecting relevant information

By informing the respondents about our general purpose of this study, they were given a point of direction towards what information we were looking for, enabling the respondents to provide us with information they believed to be of relevance or data which we asked for. Some of this data was given, by the initiative from the companies before the interviews in order for us to gain basic knowledge about their business, sustainability work, and comprehension of their freight transport activities, thus eliminating precious time spent on this during the interviews.

In addition to this provided data, prior to conducting the interview, the data was supplemented with secondary data. Bryman and Bell (2017) states that in order to collect relevant data from the interviews it is critical to formulate the interview questions and structure thoroughly, as well as carefully choose and analyze theories that are relevant to the purpose through extensive research as highlighted above.

3.2.3 Interview structure

The complexity of transportation, sustainability and their multilateral presence make the issue in question easily miss-interpretable. Therefore, the interviews needed to be conducted in a manner that allowed follow up questions to be asked. Additionally, our inexperience regarding conducting interviews led to the design of proper interview guides (see appendix 3-7), ensuring that appropriate and relevant questions were asked, in terms of freight industry structure, sustainable development and possible barriers experienced, based on the knowledge gained from the literature review. Our belief was that the information uncovered from these interviews would be greater and less biased if the interviews were conducted in a more relaxed, dialogical manner, built on specific topical questions followed by a dialog and discussion. This also enabled additional questions and topics to be formulated during the time of the interview since our respondents potentially could highlight issues not thought of.

This is in accordance with Bryman and Bell's (2017) description of semi-structured interviews, whereas an interview is based on main topics which are to be addressed during the interview but may be altered along the way. According to Bryman and Bell (2017), this approach gives a flexibility were the emphasis is on the interview object in question. Further, the focus lies partly on what the respondents experience being important in explaining and understanding, but also what the respondents choose not to disclose.

Despite the interviews having a semi-structured layout, the importance of having well formulated and by the interview object(s) easily understandable and interpretable questions, is not to be underestimated. Therefore, the questions were re-written several times to reassure their relevance before the interviews took place. Additionally, to keep the structure and still make space for both interpretation and sharing of that individual's experience, it was important to formulate different types of question that generally were open-answer questions.

The interviews were introduced with a question on a specific topic, follow-up questions based on the previous statement made by the respondent and relevant to the subject in question. Lastly, before moving on to the next topic, more specific questions were asked relating to answers from other respondents or previously published research, to get that person's opinion and experience on the matter.

3.2.4 Analyzing data

When all the interviews were conducted, the collected data was analyzed in terms of continuous comparisons with previous research and by coding the result. Thereby, the data was categorized in terms of different barriers that the transport-buying and/or providing companies encountered when in some matter moving towards sustainable development of the freight transport system.

3.2.4.1 Coding

The primary empirical data was coded according to their character originating internally or externally. This, due to the ability of an organization to overcome barriers to implement sustainable freight transportation, varies significantly depending on the origin of the barriers. To illustrate, if the uncovered barrier originates internally from the organization, for instance in terms of a resource barrier, the ability and the means to overcome this barrier could be found internally as well. Further, subcategories within the internal and external categorization were made according to the six *forces/barriers* that Rietveld and Stough (2005) highlight in section 2.3.1. Thus, the coding scheme is as illustrated in figure 3.

	Internal	External
1. Resource barriers	X	
2. Institutional & policy barriers		X
3. Social & cultural barriers	X	X
4. Legal barriers		X
5. Side effects	X	X
6. Other physical barriers	X	X

Figure 3: Coding scheme of barriers categorized as internal and/or external.

3.3 Source criticism

Each respondent on which the primary data is based most likely comes with a company-related biased view, where they interpret what they think is most relevant to the subject. In addition, company 4 and 5 also received the questions from the related interview guide in advance upon request, which may or may not have resulted in skewed answers. Also, these interview guides may have affected our own interpretation of the interviews. Nevertheless, as we are inexperienced interviewers, the interview guides most likely resulted in obtaining more relevant information of the subject matter, than we would have received without one. Notably, all qualitative research is based on bias-interpretation. However, it also leaves room for interpretation of what is not disclosed (Bryman & Bell, 2017).

The collected secondary data is based on statistical data from international government agencies, previous research, a few generally accepted theories and articles. Since these are peer reviewed, it gives them a certain credibility compared to if they were not. Since this data are interpreted by us, it might become biased. Moreover, this research includes few generally accepted theories (but no contradictory theory). This can partly be explained by the fact that the subject matter is relatively newly illuminated, meaning that there in general are few accepted theories published, which needs to be taken in consideration.

3.4 Method criticism

Qualitative research, such as this study, has often been criticized by those who advocate a more quantitative research approach (Bryman & Bell, 2017). The criticism is foremost in terms of

the reliance on words rather than numbers and how these words are perceived by the researcher, which creates an uncertainty of the result (Bryman & Bell, 2017). However, since there is a mutual criticism between those who advocates a quantitative respectively qualitative research approach, one could discuss whether one approach is preferable over the other or if a mix of these two is superior.

Nevertheless, there are several aspects of the qualitative approach that have to be considered and that could affect the outcome of the results, including the result of this study. In general, there are three main criticisms; (1) the research being far too subjective, (2) difficulties with replicating the research, and (3) problems with generalization. (Bryman & Bell, 2017)

Firstly, it is argued that the researcher is far too impressionistic and subjective and the gathered data relies on the author's unsystematic perceptions of what is relevant data (Bryman & Bell, 2017). Secondly, the difficulties with replicating are mostly due to un-structured interviews and based on the author's perception and interpretation of these interviews. If other researchers were to conduct the research and interviews, the result would most likely differ (ibid). In addition, the respondents might give answers they think are relevant to the subject in question, which also most likely will differ. Thirdly, it is argued that qualitative research cannot be generalized to represent a population, but rather should be generalized to theory (ibid).

3.4.1 The credibility of the study

When there is more than one kind of description of the social reality, the credibility of the study in the eyes of others revolves around the trustworthiness in a description (Bryman & Bell, 2017). In order to gain this trustworthiness, it is important that the research has been carried out according to the set rules and framework specified to that kind of research. Further, the result must be reported according to the persons involved in the social context that has been researched, in order to ensure that the reality has been correctly reflected.

Since this research has been conducted according to the six steps framework[17] presented by Bryman and Bell (2017), this research gains, to some extent, trustworthiness. Accordingly, each of these six steps has also been linked to a generally accepted framework presented by Bryman

[17] (1) General research questions, (2) choosing relevant persons to interview, (3) collecting relevant data, (4) interpreting data, (5) choosing relevant theoretical framework, and (6) writing the research paper

and Bell (2017). However, there are few specific research rules and frameworks regarding qualitative research, thus, this research can only provide a somewhat certain credibility.

3.4.2 Validity

Validity refers to whether the researcher actually observes, identifies or measures what is said to be measured. This can be divided into *internal* and *external validity*, which refers to the correlation between the gathered information and the developed theories, and the extent to which the results can be generalized to other social environments and situations within the area. (Bryman & Bell, 2017)

The gathered information in this report is directly linked to businesses circumstances to develop the freight transportations sector in a sustainable manner. Since the respondents, like so many other actors, have not yet managed to reach the sustainable development goals, which is with the developed theories, this paper brings a significant level of internal validity.

By using the collected data we try to draw somewhat generalized conclusions. However, like with most qualitative studies which usually are based on a limited sample, it is difficult to reach fully generalized conclusions. By including different types of actors – transport buyers and 3PL suppliers – we aimed to limit specification and make it as generalized as possible, at least to similar transport situations. Nevertheless, it must be taken in consideration that the result most likely will differ if put in other contexts and that the result of this research may not be the case for all actors within the transportation industry, thus this research alone lacks external validity.

3.4.3 Reliability

Reliability mainly refers to whether the results are reliable in terms of if repeated, the research would have the same outcome. As validity, reliability is divided into *internal* and *external reliability* by Bryman and Bell (2017), which refers to the degree of agreement between two or more raters in their appraisals – also called *inter-rater reliability* –, and the extent to which the research can be repeated (Bryman & Bell, 2017).

In a qualitative study, reliability is challenging since one must take diverse paradigms and definitions to account. Therefore, it was important that there was a continuous discussion

amongst the authors of this thesis to ensure there was an agreement of how to interpret the gathered information and whether it was applicable and relevant.

Consistency between previous research and primary empirical data would strengthen the reliability of our study since it is generally known that qualitative research and conclusions derived from this kind of research are based on the author's interpretations. Therefore, there has generally been some critique aimed at the reliability of this kind of studies, because it is based on a specific sample of actors that is seen to represent a whole industry. Due to the fast changing environment combined with a specific chosen sample of actors, it is hard to argue for the outcome to be the same if the research were to be repeated. It is therefore critical that the scope and delimitations of these observations are explicit and clear in order to identify significant patterns and conclusions from these.

4. Empirical result

This section presents the empirical findings collected through the case study of The Absolut Company and the interviews with key individuals from the organizations listed in the previous section. Each organization with related key persons is divided into separate subsections, which will include internal and external barriers encountered or observed when developing sustainable freight transportation.

4.1 Presentation of the companies and their respondents

4.1.1 Case Study: The Absolut Company TAC

In 1917, L.O. Smith created Absolut Vodka, which was later owned by Wine & Spirits and then sold to Pernod Ricard in 2008. Absolut Vodka, as we know it today, has turned into one of the most well-known brands in the world. (The Absolut Company, 2018e)

The entire production is done in and around the small village of Åhus, Sweden, based on resources and knowledge from the local community (The Absolut Company, 2018c). The company produces approximately 650,000 bottles of Absolut Vodka each day (The Absolut Company, 2018d), 99% of which are shipped and sold outside of Sweden. This freight represents 15% of the company's carbon footprint (The Absolut Company, 2018b), shown in Figure 4. Since the company aims to reach the level of *Climate neutral product*[18], the company strives to minimize the negative environmental impact deriving from their oversea transportation by shipping 75% of the products with sea-freights (The Absolut Company, 2018a). The remaining 25% are mostly transported by road freight, which runs mainly on fossil fuel. Previously, attempts to reduce the usage of diesel, and thereby CO_2-emissions, were been made by switching to rail-freight (ibid). However, due to issues later highlighted in section 4.2, TAC chose to switch back to fossil-fueled road freight (Director, Supply Chain, personal communication, 27 March 18). However, despite willingness to minimize their environmental impact, the company finds it difficult to implement any further actions because of the complexity and the problem which the freight industry faces regarding sustainable development (ibid). The two respondents are the *Director supply chain, Quality & Environment* and the *Manager Logistics Procurement*

[18] Near zero emissions (including distribution to the market)

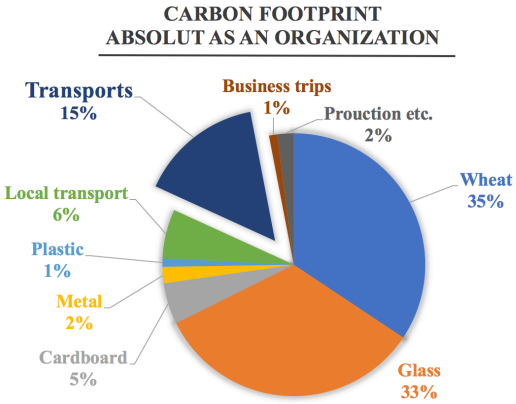

Figure 4: Carbon footprint of TAC as an organization (Source: The Absolut Company, 2018a)

4.1.2 Complementary companies to the case study of TAC

Nordic Bulkers

Nordic Bulkers is a 3PL provider specialized in national and international bulk transport and logistics service. The organization is striving to take responsibility and want to do this by promoting intermodality. The two respondents are the *Logistic coordinator* and a *Project Manager*.

Associate Professor X

Has a PhD in Business Administration focusing on logistics. He is a senior lecturer at the Department of Business Administration, School of Business, Economics and Law at University of Gothenburg. His main research areas are intermodal freight transport and business models.

Pernod Ricard

Pernod Ricard was founded in 1975 by a merger of the leading French anis producers (Pernod and Ricard). The Pernod Ricard Group owns several different wine and spirits brands, including TAC. The company has set main sustainability goals, which are complemented by additional goals at a local level by each individual organization. The respondent is the *Environmental manager*

Girteka Logistics AB

Girteka Logistic AB, business partner of TAC, is a fully asset owned[19] 3PL, which differs from other 3PL. The company currently has 4000 trucks and 4300 trailers operating in Europe. The respondent is the *Chief Communications Officer/Key Account Director.*

[19] organization owns both the trucks and employs their own drivers

4.2 The Absolut Company

Internal barriers

The trucks that TAC are currently using as road freight transportation from Åhus, have the Absolut logotype printed on their trailers rolling in and out of the small village of Åhus. This, according to both respondents, creates an emotional value and mythical feeling of the connection between Åhus and TAC as a brand. To minimize the negative externalities from these trucks, HVO is used. They are operating in Sweden between factories, which is a significant progress towards their goal regarding carbon neutral business. The next step will be to integrate the HVO fueled trucks not only in Sweden but oversea as well. According to the manager of logistics procurement, all routes that can be made on one tank of fuel shall be HVO in a near future. However, they add that the further these trucks go beyond the borders of Sweden, the accessibility of HVO decreases. This shows that the use of biodiesel internationally is very limited. However, HVO can derive deforestation which the respondents stated is an issue. Therefore they demanded that the HVO they use should under no circumstanced correlate with deforestation.

As an alternative solution to the limited accessibility of alternative fuels, railway could be used, as it is considered to be more sustainable than road freight in terms of pollution. The respondents however listed several arguments they considered more or less represented legitimate reasons not to use the railway. Amongst these were the need of extensive renovation if cargo trains were to be used between Kristianstad and Åhus. Furthermore, because of the rails' location, cargo trains might make too much noise, making them an inconvenience for human health according to the law. However, these are merely assumptions and a further investigation might shed light on issues and overcoming them. Another reason explained by the respondents is that the warehouse in Åhus currently is not compatible with the standardized railway cart and that a rather extensive renovation of the warehouse is also needed if railway is to be viable.

Intermodal transportation modes, considered as a more sustainable freight solution in terms of railway promotion, have been used by TAC before. However, our respondents state that due to security issues and costs revolving around these issues, railway is no longer viable. Since TACs products are alcohol, which has a relatively high taxation in Sweden and considered consumed if stolen, a stolen container of Vodka results in approximately 3 million SEK in taxation cost,

beyond the cost of the actual lost cargo. This, according to TAC, is the main reason why railway has been deselected. However, if these security issues are solvable, railway could once again be a viable transportation mode.

Another influencing factor is the procurement process. The manager of logistics procurement explained that they do not explicitly state any demands. Rather, the question whether a sustainable alternative exists is asked, which signals 3PL organizations that TAC are looking for alternatives. For instance, the respondents explained that when requesting HVO fuel without deforestation related activities, it became optional. Furthermore, it was argued that this stimulates 3PL organizations' innovation and that this might results in the 3PL company offering a sustainable alternative during the next procurement occasion.

Further, TAC also presented the actions that they take today in order to progress towards their goal regarding carbon neutrality. Among these actions are efficiently filling their outgoing cargo in order to prevent half-full trucks and so called *empty miles*[20]. Since the marginal cost is reduced depending on the weight carried, this kind of efficiency action reduce the cost per bottle delivered. It also reduces the number of trucks on the road which prevents unnecessary pollution.

External barriers

TAC has an ambition to be climate neutral by 2030. However, similar to the rest of its sustainability efforts, this is not communicated to any greater extent. It was also argued by our respondents that the use of goals can be double sided. While a goal can drive change in some situations, in other situations, goals might constrain innovative solutions and even hold back organizations that strive beyond the formulated goals. For instance, Pernod Ricard have no individual goals for each subsidiary, but rather set larger goals for the entire group, which TAC already outperforms.

The respondents also received the question whether cooperation and joint ventures between peers and rivals in the spirits industry can be a means to use their combined influence to pressure 3PL organization in a sustainable manner. While the respondents were doubtful whether the

[20] Transportation without any loaded goods

impact of a joint venture would actually provide a significant amount of pressure, they state that cooperation is and will be key in many aspects. For instance, there are currently joint ventures between rivals in the industry in order to promote glass recycling.

4.3 Nordic Bulkers

Internal barriers

Both respondents state that the reason why sustainable alternatives are not prioritized is because no one wants to pay for it. Customers expect them to have a sustainable approach but do not want to negotiate with price. The project manager stated "*The mindset must be normalized and comprehended in the world*".

The respondents argue that there is no significant difference depending on what country of origin the request is coming from. Rather the price sensitivity is general. They also state that it is easier to communicate offers or negotiate with existing customers compared to new, potential customers. The project manager, also a former truck driver, states that from experience in the 1990s, the larger procurement processes that exist today differ significantly from those of the past. Earlier, one had a continuous contact with the customers and could establish long lasting partnerships and deals. Nowadays, it was argued, that customers replace key individuals at decision making positions regarding procurement in order to ensure objectivity in their assessment, which complicates the conditions and possibilities to communicate sustainable offers that are not competing on the same price level. In addition to this, the increasingly fluctuating market demand results in planning difficulties. Thereby, the usage of modes that require more planning and are environmentally favorable, such as intermodality, becomes under prioritized compared to more flexible modes, such as road freight.

Additionally, the respondents believe that there is a lack of knowledge regarding what transportation mode or alternative is most effective in certain situations and in what ways it will affect the environment from a triple bottom line perspective. According to the respondents, in order to achieve an effective and sustainable oversea freight transportation chain, one must broaden the view and consider all possible alternatives.

External barriers

In terms of what the respondents believe currently hinders the oversea freight transportation industry from moving towards sustainability, several things where mentioned. However, the foremost barrier seems to be technological innovation. The respondents believe that electrification of the freight fleet will not be possible because of the amount of finite resources required for battery production and the extensive amount of energy that needs to be produced in a sustainable manner to charge all the vehicles. Additionally, they argued that making charging stations available for the current amount of vehicles on the market would require an immense amount of financial resources and commitment. Similar views are shared on HVO. Biodiesel is interesting as a short-term solution and for national transportation modes. However, similar problems emerge for biodiesel as for electric propulsion: there is no way that the supply of biodiesel could account for the current number of vehicles on the roads.

However, there are not only technological barriers for transportation to become more sustainable. According to the respondents, the total amount of legally allowed freight weight differs significantly between neighboring nations. For instance, in Sweden it is allowed to carry a total amount of 64 ton per load, which is significantly more than the maximum load allowed in Germany, amounting to 40 ton, with special exception to 44 tons if within 100 km range from a combi terminal[21]. Additional national weight restrictions can be found in appendix 8. According to the respondents, these weight restrictions are mostly due to political reasons and while one can argue that lower carrying weight results in safer roads, it also results in more vehicles per road, causing greater pollution and contributing to congestion.

Additional barriers regarding communication emerged when the respondents were informed of the security problems that TAC experienced with rail transport. The respondents argue that if the issues had been communicated with the distributor, a solution would most likely be available. It was further explained that this problem is most likely product specific and could be solved by redesigning safer customized containers and exclude the huge Absolut logotype on the side of the container. Further they argued that these conditions are used to transport medical supplies and medications to ensure safety of the cargo.

[21] A terminal where modular load carriers change modes without affecting the goods itself. Such transport is called intermodal

The respondents believe that intermodality is the most sustainable alternative existing at the moment, and that organizations like TAC could benefit from investments making intermodal transport systems viable for their export. However, they also state that this is merely an assumption and that a more extensive assessment is needed.

4.4 Associated professor X – University of Gothenburg

With regard to the uncovered barriers which TAC faces, Associate professor X argues that these barriers are significant to the industry to a certain extent. In his opinion sustainable development of the subject in question was undeniably hampered by the lack of innovation. However, an intermodal approach, is as of now, one of the most sustainable solutions, and according to the respondent, the benefits of intermodal transportation modes increase the further the cargo is traveling. This, as the marginal cost is relatively small for additional cargo, the capital cost is however quite expensive. Therefore, if intermodality is to be financially viable, the cargo must, advantageously, travel at least 500 km. The respondent argues that the security issues encountered by TAC are not surprising, however, the financial cost of stolen goods were. Since the timetables of train freight are public information, anyone can identify a specific train, cart and location where the cargo will be standing still to plan a heist. The respondent also confirms Nordic Bulkers argument that the differentiation of weight restrictions between nations in Europe are due to politics.

4.5 Pernod Ricard

Internal barriers

"The mindset" is a concept coined by the respondent and highlighted as the greatest internal challenge for organizations to implement sustainable development of oversea freight transportation. The mindset is the commitment, willingness and belief that change is possible and would be beneficial in multiple ways. It was described that this *mindset* is existing in TAC and that the CEO's commitment is significantly impacting TAC's work with sustainability in a positive way, making the organization one of the most successful in terms of sustainability within the Pernod Ricard Group. Further, the respondent stated that the mindset can differ between departments within an organization, and that even though environmentally related issues are explained and communicated, there can be a lack of knowledge to fully comprehend the issues.

The freight transportation has been given little priority in Pernod Ricard's work with sustainability due to it only accounting for a relatively small part of the group's total carbon footprint. According to the respondent, the sustainability work today mainly focuses on measurements in terms of how something can be measured or if the measurement provides any usefulness. Further the respondent stated that finding relevant measurements, measuring and reporting are all important aspects in their sustainable development. However, measurements take time and are often prioritized ahead of action, thus leaving little time to act. The group's environmental manager (personal communication, 25 April 18). states that "*One must find a balance between measuring the impact, reporting and acting in order to strive for change in a sustainable manner*".

Further, because of the decentralized strategy Pernod Ricard group use, the understanding of sustainability and commitment to it can differ significantly from brand to brand. Therefore, the respondent argued that there is a need for companies to be properly trained in sustainability and the many aspects and necessities of it if measuring, reporting and policy implementation are to be effective and successful.

External barriers

According to the respondent, the greatest challenge in developing sustainable freight transportation currently lies with the access to infrastructure. The infrastructure for sustainable alternatives for oversea freight transportation cannot simply meet the demand for freight transport. Additionally, the cost of sustainable alternatives is, at the moment, not viable for businesses. However, our respondent argued that sustainable transportation is not too expensive, rather, the unsustainable alternatives are too cheap. The price for transportation currently does not make up for the actual cost of transportation and its negative externalities. Thus, if today's unsustainable freight transportation was to add the cost for all negative externalities in terms of GHG, congestion etc., the sustainable alternatives would be considered cheap in comparison.

The respondent also described the lack of technological advancements and innovations as a key challenge. It was pointed out that, while some alternative fuels, such as HVO, are an excellent more sustainable alternative to fossil fuels, the accessibility outside of Sweden is extremely limited.

4.6 Girteka Logistics AB

Internal barriers

The respondent argues that the sheer size of Girteka and the fact that they are fully asset owned gives them an advantage in their sustainability work for several reasons. They have the ability to invest in newer, cleaner trucks compared with smaller companies. Additionally, Girteka works actively to educate their drivers in eco-efficient driving and measures every individual's fuel consumption in order to follow up on progress and setbacks. This, in order to minimize the CO_2 emitted by their freight transportation. Further, the respondent states that the size of the company also results in an advantage in terms of minimizing the occurrence of *empty miles*. This by using computer models and planning programs that enable them to optimize their routes and make use of less fuel demanding trucks to drive the empty kilometers. Additionally, transparency is of high importance according to the respondent, "*Girteka cannot afford a scandal*" (Chief communications officer, personal communication, 25 April 18).

External barriers

In terms of what was argued to be hindering Girteka from taking even larger responsibility regarding sustainability, a couple of barriers were highlighted. First of all, when asked who needs to take action, the freight supplying transport industry or the organization demanding the freight services, the respondent initially clarified the following:

> *You are from a good country, in general, Swedish companies care about this, but almost no other companies care about it. Swedish companies, they ask about it, they care about it and they mean it. But other countries, some may talk about it but it is more like symbolic.*

Rather, the respondent states that their customers prioritize according to whether a company is reliable, can actually do the job and at what price.

Girteka is also the first organization in Europe to order the new Tesla electric semi, which from a technological and innovative point of view is significant. However, according to the respondent there is still some scepticism on how this will be able to have an impact on the industry. It was argued that there are several problems that needs to be tackled before an electric truck like the Tesla Semi can be used effectively. This, due to the extensive amount of energy

required, and, that despite that it will take a few years until such electric truck is a reality. The problem of accessibility of recharging stations will most likely remain at that time due to the extensive long term financial investments required to establish such charging stations.

In addition, the existing tension and the lack of truck drivers in Europe was clarified. Our respondent emphasizes the importance of being socially conscious in terms of responsibilities towards their employees and points out that Girteka has the lowest turnover of truck drivers in the industry.

4.7 Summary

The empirical outcome of these interviews has resulted in multiple barriers being highlighted to why companies yet have not managed to develop sustainable freight transportation, as well as plausible ways of how a company could cope with these barriers.

Internal barriers

One of the central internal barriers hindering the sustainable development is what can be classified as corporate culture, including the environmentally distorted mindset of the organization and its members. This could, according to our respondents from Pernod Ricard and TAC, be the result of uncertainty or lacking knowledge amongst different departments, which could result in contradictory goals being set within the organization.

Furthermore, as CO_2 emissions are not included in the price of freight transportation, the cost of sustainable options most often exceeds companies willingness to pay, as there are less expensive alternatives, which is a barrier that all respondents agreed upon. As transportation most often represents just a small portion of a company's carbon footprint, the motivation for sustainable development of the subject in question may be inadequate. In addition, to actually develop in a sustainable manner, it is important to measure and report the impact. However, this takes time, money and knowledge, which must be balanced. The respondent at Girteka also argued that if the company is not fully asset owned, possibilities to invest in sustainable development decrease significantly, which is the case for the majority of businesses within the industry. Lastly, using a freight mode as a marketing tool when carrying the company's logo creates security issues, as in TAC's case, if the goods were to be placed on less supervised means of transport such as railway carts.

External barriers

First and foremost, all respondents agree that the most obvious barrier that the industry faces is the lack of technical innovations, even though efforts are being made in terms of electric trucks and R&D of alternative fuels. Moreover, the current infrastructure, including roads, railway network, availability of alternative fuels and their supply have hindered and still hinders the realization of sustainable development.

As for today, according to the respondents, the most sustainable way of oversea freight transportation is intermodality. However, due to it being relatively inflexible compared to road freight, and the additional security problems encountered, are factors that have, according to all respondents, been a contributing factor to why companies choose road freight over intermodality. Furthermore, the structure of the procurement process, where the turnover of key individuals is high and environmental aspects are of low priority, represents a significant barrier towards implementation.

Lastly, our respondents at Nordic Bulkers and University of Gothenburg argue that because of the differing weight restrictions between nations in Europe, it is more difficult to minimize the emissions per transported unit. This since the weight must be adjusted to the country with the lowest restriction which the freight transport will cross.

5. Analysis and discussion

In the following section, the empirical data and its relation to our research question, previous research and theoretical framework will be analyzed. This will be divided in terms of external and internal barriers that have been distinguished and analyzed individually.

5.1 Facing and overcoming External barriers

The empirical result showed that all the respondents agreed upon that the underlying source to the issue in question were the *technical difficulties* and *lack of innovation*. This is also highlighted in several of the previous studies and reports presented in this study, amongst them by the Institute for Transport Studies (2010). Thus, this strengthens the importance and need of R&D regarding oversea freight transportation. This goes in accordance with one of McKinnon's (2010) general solutions described in section 2.2, advocating vehicle utilization, reducing the ratio of vehicle-kms to tonne-kms by increasing energy efficiency, and decreasing emissions per unit of energy.

5.1.1 Infrastructural barriers

The interviews shed light on several infrastructural barriers, which reinforces the argument (in section 1.2.1) that today's decisions are critically important for tomorrow. This, since infrastructure has a long lifespan, is costly to develop and can work as barriers and/or solutions for the sustainable development of freight service.

5.1.1.1 Sustainable development of freight transportation

Our research on and definition of sustainable transportation tell us that it is not likely that there will be any revolutionizing alternative fossil free fuel in the nearest future, making everything else obsolete, which is agreed upon when asking the respondents at Nordic Bulkers and Girteka. Rather, the use of the right transportation mode and the right fuel for the right distance and goods will gradually reduce the negative externalities of oversea freight transportation. This is in accordance with what McKinnon (2010) and the High-Level Advisory Group to UN (2016) describe as the ASI strategy - Avoid, Shift, Improve, which they also advocate as the most applicable solution at this time. For instance, by *Avoiding* empty miles and *Shifting* towards

more sustainable fuel and modes, TAC could *Improve* their oversea freight transportation. To successfully do this, adequate knowledge of what is most effective in terms of the triple bottom line is needed. Santén and Arvidsson (2011) state (in section 1.2.2) that seemingly, there is a general lack of knowledge amongst the decisions makers. In this respect, there is collective agreement amongst our respondents, arguing that there is a general lack of knowledge existing regarding this, and that decision-making individuals might fail to have a holistic view of freight transportation, leaving important factors outside of the calculated price and estimated environmental impact. This results in a poor choice of transportation that is ineffective both in financial terms and in terms of negative externalities.

Nordic Bulkers states that freight transport has and continuously will encounter difficulties when altering towards electrification of the current fleet. This is due to the needs of technological innovation and extensive investments in infrastructure to simplify and increase the accessibility of battery charging. Girteka further states that the energy consumption of these electric trucks is highly problematic. Thus, Girteka argues that such trucks would be most efficient for shorter routes, where the truck needs no additional charging along the transportation distance. Additionally, Nordic Bulkers also highlighted that as of today, the batteries are made of nonrenewable resources, which from an environmental point of view is not favorable and therefore hinders a replacement of the current fleet. Resources acting as barriers is highlighted by Banister (2005), which further explains that authorities are less likely to subsidize the implementation if it is not in line with their policy making. Thus, incentives and policies are most likely required if organizations are to successfully implement a shift towards electric road freight.

Instead of shifting mode, one could shift fuel. For instance, TAC have internally shifted towards HVO usage instead of fossil fuel, thus reducing their CO_2 emissions to some extent. However, the increased demand for HVO has led to a *side effect* of businesses capitalizing on its production, highlighted as a barrier by Banister (2005). This has resulted in a *perverse effect* causing illegal deforestation to make space for palm oil cultivation. As TAC became aware of this, they requested that the HVO used would under no circumstances be based on palm oil, thus, eliminating the *perverse effect*. Seemingly they have been successful with this, which shows the importance of knowledge. This is in line with what Nordic Bulkers states: many of the issues organization face could be solvable if they are explicitly expressed. However,

implementing HVO in all of Europe would at this time not be plausible as the supply does not cover the initial demand, as stated by both TAC and Nordic Bulkers.

5.1.1.2 Intermodality and rail network, a holistic view

The case study of TAC identified that intermodal freight transportation in terms of promoting railway freight has previously been used and that there are rails existing, connecting TAC's warehouse to the railway-grid. TAC mention several reasons why this transportation mode is not used anymore. The main reason being security issues of the cargo and the extensive tax-related costs upon stolen goods. This is in line with (1) *characteristics of the product* and (2) *sums of money involved* which Lammgård and Andersson (2014) stated would affect a buyer's choice in the procurement process of freight and evidently acts as a barrier. However, Nordic Bulkers argued that the security of the cargo could be accounted for, and that it comes down to what and how the organization choose to *prioritize* and how *committed* the organizations are to change. Nordic Bulkers produces customized containers that, they argue, could be fitted with additional security measures to ensure the safety of the cargo. Thus, if these issues were to be well communicated, possible solutions could be developed in a near future. Notably, the importance of the security related issue acting as a barrier may primarily be applicable for companies with highly valuable goods and/or extensive related costs, if the goods were to be stolen, as in TAC's case.

With shifting modes, trade-offs might occur. For instance, if TAC were to change back towards rail freight, it would most likely be necessary to exclude their logo from their containers, to address the security issue. This would be a trade-off towards marketing. Additional reasons for deselection of rail freight are that the warehouse is currently not compatible with the standardized railway carts that TAC wants to use, as well as the tracks between Åhus and Kristianstad requiring significant renovation if they are to be used for freight transportation. Furthermore, residents close to the tracks will be exposed to significant negative externalities in terms of recurring noise. These reasons or barriers can be categorized, accordingly by Banister (2005), as *other physical barriers* (in section 2.3.1). Once again, Nordic Bulkers argues that these are merely minor complications and that the long-term benefits of railway should exceed the financial cost of making the warehouse and tracks compatible. The noise could be reduced significantly by constructing sound barriers (by the exposed residents). However, Nordic Bulkers acknowledge that these are merely assumptions and that a more

extensive investigation is needed to accurately determine whether rail freight could be a viable solution.

According to our respondent at University of Gothenburg (section 5.3), intermodality requires the cargo to travel at least 300-500 km if it is to be effective in terms of reducing environmental impact and financial viability. Thus, shorter distances should shift fuel type rather than freight mode. We would conclude that the presented reasons why TAC is not using the railway are experienced as significant by the firm, but the main reasons (not explicitly communicated by TAC) we interpret as being the lack of flexibility and the extensive need of planning that comes with the use of railway freight. The barriers stated above are all substantial reasons that hinder TAC from using a more sustainable transport mode. However, we would argue in assent with Nordic Bulkers and previous research (highlighted in section 2) that from a long term point of view, the positive aspects of railway would outweigh the financial costs, lack of flexibility and the negative externalities in terms of CO_2 emissions that come from road freight. Additionally, even though the fluctuating market demand, stated by Nordic Bulkers, results in planning difficulties, and thereby reduced usages of rail and intermodal as oversea freight transportation modes. The fluctuation might not to be as volatile for the spirits market and thereby should not affect TAC's choice of mode as much.

5.1.2 The general industry structure

The theoretical framework, Isomorphism, established by DiMaggio and Powell (1983), provides to some extent an explanation why the sustainable development of transportation has been lagging in comparison with other parts of business. As our respondent at Girteka stated (in section 5.5), companies from Sweden, generally advocating sustainable development higher than other European companies, genuinely ask for sustainable alternatives, while the others merely ask for it due to symbolic value.

We would argue that the situation Girteka experiences regarding the demand of sustainable road freight transportation, is the industry norm. Thus, the isomorphic phenomenon acts as a barrier. Specifically mimetic isomorphism, as this is the result of uncertainty and therefore leans towards those who are perceived as successful, which we would argue generally characterizes the sustainable development of freight transportation. This general uncertainty seems to be recurrent and all the respondents highlight this as problematic, either in terms of lacking

knowledge, or in terms of a missing mindset or commitment. At Pernod Ricard, the industry and its commitment to sustainable development are described as a *Business as usual* kind of approach. This is not only according to with what Girteka seems to be describing, but also strengthens our conclusion regarding an existing *mimetic isomorphism* phenomenon acting as a barrier.

However, along with the increased public acceptability of sustainability and the awareness of businesses' environmental impact, organizations who in early stages adopts sustainable ways of freight transportation could trigger a *coercive isomorphism pressure* on peer rivals, as described by DiMaggio and Powell (1983). Organizations who do not commit to these pressures and keep the *Business as usual* approach could lose legitimacy and competitiveness. In Pernod Ricard's case, their decentralized strategy could stimulate change in the development of sustainable freight transportation to a greater extent than what they are currently doing. By formulating and implementing individual goals for each subsidiary, they could, as our respondents at TAC argues, signal suppliers that there is an interest in sustainable alternatives, triggering innovative solutions. As DiMaggio and Powell (1983) describe, these individual goals could through business politics influence and trigger a coercive isomorphic phenomenon.

5.1.3 The procurement process

The procurement process was identified as a barrier for sustainable development, both by freight-buying TAC and freight-providing Nordic Bulkers and Girteka. TAC state that there was an overall negative and unprioritized attitude within the industry outside of Sweden, seemingly controlling the accessibility of more sustainable freight services offered by the providing companies. Nordic Bulkers mentioned in consent with Girteka, that due to the general price pressure in the procurement process, there was little room to even propose sustainable alternatives. This goes in line with what Lammgård and Andersson (2014) conclude from their research regarding the effect of priorities when purchasing freight. Thus, we argue that the significant problems within the procurement process seems to be within the *specification* and the *selection of supplier* stages (see figure 1).

This could be related to the *normative effect* within the isomorphism theory by DiMaggio and Powell (1983), and companies that apply a *Business as usual* approach, as described by Pernod Ricard. Even though a freight-buying company wants to increase the level of sustainability in

their oversea freight transportation, and a freight-providing company has more sustainable solutions to offer, neither is properly communicated in the *specification stage*, due to the *Business as usual* approach and norm within the industry.

However, if organizations in early stages were to prioritize environmental efficiency in the procurement process, this could pressurize rivals to do the same, due to public acceptability, as described by Banister (2005). Thus, *coercive isomorphic pressure*, described by DiMaggio and Powell (1983), could be favorable for the environmental aspect of the industry and lead to a shift of the norm toward a more sustainability driven procurement process of the freight service. Thus, normative isomorphism could work in favor of sustainable oversea freight services instead of being a hinder. However, in order for any development, communication is key, and as Nordic Bulker stated, the issues could be solvable if they are expressed.

5.1.4 Legislation and regulation

Pernod Ricard explains that there must be a significant reformation regarding prices of existing means of unsustainable transportation. All the respondents argued that sustainable alternatives are not able to compete with non-sustainable substitutes in terms of price. Not because of the sustainable alternatives being too expensive, but rather, the unsustainable modes are too cheap. The explanation lies in the negative externalities not being accounted for in the price, thus leaving the cost of these negative externalities on the public. If these cost where to be included in the price, the sustainable alternatives would be much more viable and competitive. This is in line with *Reducing the transport intensity of the economy,* stated by McKinnon (2010). The question is how these costs could be accounted for. In agreement with what Tsamboulas (2005) states, we consider that the EU is the institution that possesses the most power to influence the transport sector in the member states and could use this power to introduce legislation and regulation, promoting this change.

As Vierth (2013) mentioned, CO_2 emissions could be taxed through excise duty and thereby attach the cost of these negative externalities to the price of transportation. This would result in freight transportation modes with less CO_2 emissions being more financially viable, compared to those with greater CO_2 emissions. So far, the EU's work in trying to promote sustainable oversea freight transportation has focused on promoting intermodality on the so called TEN-T corridors (Institute for Transport Studies, 2010) (as explained in section 2.3.2). However, this

has not been adequate in meeting the increasing complexity of logistics and the globalized trade. Rather, the European market has been fragmented, leaving nations and cities not connected to the TEN-T corridors behind in the development of intermodal sustainable oversea freight transportation. Rather than a strict focus on these TEN-T corridors, a more spatial development as a wider concept highlighted by Tsamboulas' (2005) five framework conditions (*A national policy framework*) is needed to prevent further fragmentation.

However, even though Tsamboulas (2005) highlights the power of the EU, he also describes in his five framework conditions that a *decentralization of powers & responsibilities* is key to overcoming barriers to implementation, which is somewhat contradictory. The argument to decentralize lies with the *public and private acceptability*. This is critical if behavioral changes are to be made. It is generally known that forced regulations implemented by governmental institutions are at greater risk to be rejected by the public and private sector, depending on the characterization of the implemented regulation being pull or push. If the regulation is not accepted by the public and private sector, it could result in more harmful *perverse effects* emerging. Furthermore, regulations and legislation can also act as a *legal barrier*, which was also highlighted by Nordic Bulkers, TAC, and the associate professor at University of Gothenburg. They argue in agreement that the weight restrictions differing significantly internationally (appendix 8) results in that the distributor must adapt to the lowest weight restriction set by the nations which the cargo must pass through. Thus, resulting in additional numbers of transports.

TAC and Pernod Ricard described the double-sidedness of organizational goals. They argued that goals being implemented could either stimulate change, but also paralyze organizations who strive to go beyond formulated goals. It is therefore essential that the European Commission and decision-makers responsible of formulating regulations and goals *communicate* with involved actors to get the full holistic view emphasized by the High-Level Advisory Group to UN (2016). Further, it likely requires a top-down approach in terms of commitment and leadership if such goals are to be implemented successfully. A recurrent criteria highlighted by Banister (2005), is *Balancing the fuel consumption* and *developing intermodality,* which Nordic Bulkers, Pernod Ricard and TAC also highlight. They all describe the *mindset* that is needed both internally but also externally in terms of normalization of sustainability to ensure the acceptability of implemented measures.

5.2 Facing and overcoming Internal barriers

Detected barriers to developing sustainable oversea freight transportation have also shown to derive internally from a company, where hinders within an organization slow down or prevent sustainable development from being successfully implemented.

Pernod Ricard highlighted the different *mindsets* within an organization's different departments. And even though the importance of addressing environmental issues were properly communicated, little or no change in mindset were made. According to Banister (2005), one step in the five framework conditions to overcome barriers are to establish a *well communicated sustainable transport strategy*. However, even though communication is highlighted as key, it is merely not enough if change is to be made. Further, Pernod Ricard states that presumably, a deeper knowledge is required in order to fully understand the importance of sustainability and how it can be integrated in business.

In addition, Pernod Ricard highlights the importance of balancing time spent on measurement and reporting, which is all needed in order to detect a company's extent of environmental impact, and what can be developed in a sustainable manner. Pernod Ricard further states that measuring requires knowledge, but also builds knowledge, and the issue is rather that they are measuring too much, leaving little time or resources to actually focus on change. Girteka (section 5.5) argues that it is difficult to sustain a sustainable development throughout the entire business and to their advantage, being fully asset owned is preferable and facilitates sustainable development. Arguably, if one controls and owns all assets of transportation, one can change the development of this to a greater extent compared to trying to change someone else's assets. However, this requires financial means and prioritization of these, making it a sort of *internal resource barrier*.

We argue that it is critically important to communicate and disperse knowledge within and between organizations. If sustainable development of oversea freight transportation is being traded-off for other preferences, and the freight sector develops as estimated, the relating issues will no longer be *just a small part* of the carbon footprint, but instead most likely grow to be far more severe.

6. Conclusion

In the following section the conclusions drawn from this study will be presented in the light of the research question, the collected data and related discussions. Finally, we will present a proposal for further research based on the shortcomings of this study.

6.1 Barriers towards sustainable freight transportation

6.1.1 External barriers

Technical difficulties are most likely the reason for the extent of financial means, time and commitment required for change. The increase in global population, accessibility through internet and globalization have all put pressure on the oversea freight industry which has, and still is, rapidly expanding (United Nations, 2016). In addition, since infrastructure comes with long lifespan (ibid) and requires planning, this study has shown that there have been little possibilities to make any quick and vast changes in favor of sustainability. Therefore, accessibility of alternative fuels and renewable energy, along with the supply of these, is restricted and even more so in southern parts of Europe. Since time persistence demand from customers has increased (Institute for Transport Studies, 2010), combined with planning difficulties due to fluctuating global markets, there has been a notable switch from rail to road freight, which has resulted in an increase of CO_2 emissions. Alternative modes, such as intermodality, with lower CO_2 emission levels, are in many cases rejected because of issues related to extensive planning, less flexibility and security.

In line with Lammgård & Andersson's (2014) research, this study has shown that the procurement process is governed by the general prioritized demands, such as price, time and, depending on the goods value (as highlighted in this study), security. This results in freight services with less environmental impact, such as intermodal, remaining in the shadow of cheaper alternatives, such as road freight. In addition, even though more sustainable solutions sometimes are chosen, it is observed that perverse effects can occur due to lacking knowledge and comprehension. This uncertainty may result, through the shape of mimetic isomorphism, in the *business as usual* mindset, which evidently seems to be the dominating norm of the whole industry.

6.1.2 Internal barriers

A general mindset has also been detected within companies and organizations, which in some cases have a favorable, but mostly, an unfavorable effect on sustainable development. With differing mindsets amongst departments comes different prioritization, and thus, contradictory goals occur which often results in delaying sustainable development. It is concluded that the outcome is inadequate comprehension and knowledge regarding the importance of sustainable development, even if well communicated. In addition, it was observed that sustainable development is often restricted by internal resource barriers, such as financial means, the prioritization of these, and whether a company is fully asset owned or not.

6.2 How a company can cope with these barriers

To overcome these barriers, it is essential to fully comprehend the entirety of the oversea freight industry, its multilateral presence and the concept of sustainable development. Understanding the barriers highlighted in this research can provide a foundation based on which organizations can further develop their sustainable oversea freight transportation. To successfully do this, communication and knowledge are key, along with the related measurements and reports. This applies to both the industry itself and the companies within.

Within an organization, decentralized methods in terms of setting individual goals and sub-goals could, along with increasing knowledge and communication, stimulate change. This could shift the mindset, orientating it towards sustainability. If larger players within the industry shift their mindset, this could through coercive isomorphism result in the mindset shifting within the whole industry. However, this needs to be supplemented by institutional regulation and legislation in terms of standardizing weight regulations and other cross-border restrictions. Further, the costs of negative externalities must be attached to the price of the service in order for sustainable alternatives to become financially viable and competitive. Finally, infrastructural decisions and investments must be facilitated in favor of sustainable oversea freight development in order for companies to successfully use the ASI approach described by McKinnon (2010).

The conclusions made in this report are consistent with previous research, which indicates reliability, not just of this research but rather the importance of the whole subject in matter. Furthermore, during this research, we have continually referred to "*sustainable solutions*",

which might not reflect the reality and urgency adequately. Rather, one might argue that up to now, policies, actions, regulations and legislation are all different kinds of "*damage contro*l", since the CO_2 emissions already have had an irreversible effect on our climate. We would argue that sustainable development of oversea freight transportation and business until now are to be seen as efforts to minimize the damage induced by the lack of responsibility regarding negative externalities caused so far. The freight sector requires long-time planning and extensive investments and seemingly, there are no quick-fixes.

6.3 Further research

Since there is a general upcoming trend towards sustainable development, and due to the urgency of the issues highlighted in this thesis, further research regarding the sustainable development of oversea freight transportation would not only be highly interesting but also crucial to ensure that the development will be ongoing.

Due to limitations of this research, it is important to acknowledge that some of the result may be misrepresented by reality. In order to achieve a more precise assessment of the total environmental impact of oversea transportation, all negative externalities should be presented and a full life cycle analysis should be included.

It is our belief that legislation and regulations are required for the industry to change since the current demand for sustainable oversea freight transportation is being set off by cheaper, unsustainable alternatives, inflicting a higher cost on society in terms of non-accountable negative externalities. Thus, further research highlighting what the most effective characteristics of such regulations would be, and how one can successfully gain public acceptability to reach behavioral change when implementing such regulations, should be of great importance.

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Appendix

Appendix 1 – Preferences amongst freight-buying companies in the purchasing process

	Price	Punctuality	Transport time	Environmental efficency
2003	51%	23%	18%	8%
2012	54%	22%	16%	8%

Appendix 2 – TACs sustainability work throughout their businesses

TAC works towards sustainable development throughout the entire process: from having one of the most energy-efficient distillation methods, using wheat from fields that yields more than twice as high as the global average and using water pumped from local underground aquifers which requires less processing. Also, recycling by-products from production as food to various local cattle and using glass bottles that have more than 40% recycled clear glass. (The Absolut Company, 2018c). Further, the distance between factories does not exceed 20 km, therefore, TAC has required all transportation between these short distances to make use of HVO.

Appendix 3 – Interview guide, TAC

Inledning av intervju

Vårt syfte med den här uppsatsen är att se vilka de största barriärerna som existerar för att införa ett hållbart transportsystem samt vilka potentiella möjligheter ett sådant system skapar. Vi kommer att använda er, Absolut Vodka, som ett exempel på företag som vill införa och arbeta mot hållbara lösningar men målet är att komma till generella slutsatser som kan appliceras på verksamheter vars huvudsakliga affärer bygger på export. Det är viktigt att vi har en generell approach eftersom vi ska skriva en vetenskaplig studie.

I vanliga fall när man talar om hållbarhet eller *sustainability* så brukar man inkludera hela triple bottom line, dvs ekonomisk, miljömässig och social hållbarhet. Vi fokuserar nu endast på den miljömässiga hållbarheten men även hur den är kopplade till ekonomiska incitament.

Frågor till Absolut Vodka

- Vilka är ni och vad arbetar ni med?

För att fastställa vad som räknas som ”mer hållbara transporter” måste det första steget vara att ta reda på vad dagens påverkan av transporterna är. Vi har ju fått ta del av information där det står att ca 15% av Absolut Vodkas avtryck är från just transporter.

- Finns det mer specifik data på vilka delar av transporten som står för vad?
- Skulle vi kunna få ta del av den här datan?

Hållbara transporter

Mål och syn på hållbara transporter

- Vad anser ni vara hållbara transporter?
- Vad är ert mål med hållbarhetsarbetet gällande transporterna?
- Har ni olika mål eller fokus med transporterna beroende vart i världen produktens destination är?
- Varför vill ni införa ett hållbart transportsystem? (moral, konkurrensfördelar eller legitimitet)
- Vad har Absolut Vodka att vinna på ett införande av hållbara transportsystem?

Dagens arbete med hållbara transporter

- Hur ser ert hållbarhetsarbete ut idag gällande transporter och logistik i Europa, främst i norra Europa.
- Vilken typ av transportmedel är det som huvudsakligen används runt norra Europa?
- Varför just denna typ av transportmedel?

First and last mile

Inom just logistik så brukar man tala om the first & last mile. Det vill säga de första milen när produkten lämnar Åhus och de sista milen när produkten landar hos återförsäljaren.

- Hur ser er första och sista milen ut i norra Europa.

Utmaningar och attribut vid köp av transportservice

- Vad upplever ni vara de största utmaningarna i utvecklingen och implementeringen av hållbarhetsarbetet på logistik sidan.
- Vad upplever ni vara dagens interna ”barriärer” för att uppnå era ambitioner.
    - (Ett exempel på intern barriär kan vara bristande information, kunskap och utbildning om miljö eller till exempel ekonomiska barriärer)
- Alltså både barriärer inom The Absolut Company men även inom Pernod Riccard koncernen.
- Vad upplever ni vara dagens externa barriärer för att uppnå era ambitioner?
    - (Ett exempel på extern barriär kan vara dåliga leverantörsförhållanden/ Risk att förlora viktiga leverantörer eller till exempel regleringar)
- Ställer ni några krav på era distributörer?
- Skulle ni kunna rangordna era preferenser när det kommer till beställningen av leverantörer, (pris, tid, hållbarhet m.m) vad är det som väger tyngst?

Isomorphism - möjlig inverkan inom branschen

- Finns det liknande ambitioner bland andra företag både inom och utanför Pernod Ricard koncernen?
- Ser ni er själva som ledare inom branschen?
    - Om ja, varför?
    - Om nej, varför?
- Tror ni att andra rivaler eller konkurrenter ser på Absolut Vodka på samma sätt?

- Tror ni att ert arbete med utveckling av mer hållbara transporter kan komma att ha en inverkan på Pernod Ricard koncernen som stort och övriga transporter inom koncernen?
- Är det ett hinder eller en möjlighet att vara del av Pernord Ricard koncernen?
- Anser ni att ni hade kunnat åstadkomma mer eller mindre ifall Absolut Vodka fortfarande var ägt av staten?

Alternativt avslutande fråga

- Vad anser ni saknas idag för att införa ett hållbart transportsystem? Är det tekniska innovationer, statliga regleringar, eller företagets fokus angående ekonomiska incitament i förhållande till ett hållbart ansvarstagande?
-

Alternativa extra frågor

- Finns det någon eller några typ av statliga eller EU regleringar som ni ser som hinder för att åstadkomma era ambitioner gällande hållbara transporter?
- Finns det någon eller några typer av regleringar som ni önskar att staten eller EU införde för att stimulera en utveckling av hållbara transportsystem?

Appendix 4 – Interview guide, Nordic Bulkers

Vårt syfte med den här uppsatsen är att se vilka de största barriärerna som existerar för att införa ett hållbart transportsystem samt vilka potentiella möjligheter ett sådant system skapar. Vi kommer använda Absolut Vodka som ett exempel på företag som vill införa och arbeta mot hållbara lösningar men målet är att komma till generella slutsatser som kan appliceras på liknande verksamheter vars huvudsakliga affärer bygger på export.

Upplägg av intervju:

- Frågor om er
- Frågor om övergripande problem relaterat till utveckling av hållbara transporter
- Er syn på de största utmaningarna relaterat till utveckling av hållbara transporter
- Frågor kring den problematik som Absolut Vodka står inför

Frågor riktade till Nordic Bulkers

- Vem är du och vad arbetar du med?
- Vilka är Nordic Bulkers och vad är det ni arbetar med?
- Vad skiljer er från andra transportföretag?
- Hur ser ert hållbarhetsarbete ut gällande transporter idag?
- Vad har ni för framtida mål gällande hållbara transporter?
- Vad har ni upplevt vara de största utmaningarna som ni stött på angående er utveckling av mer hållbara transporter?
- Hur överkom ni dessa?
- Ställer ni några krav på era kunder i hållbarhetsarbetet?
- Skulle du kunna rangordna era kunders preferenser när de kommer till er? (pris, tid, hållbarhet, säkerhet etc.)

Frågor riktade till övergripande problem - hållbara transporter

- Vad är ett hållbart transportsystem enligt Nordic Bulkers?
- Vilka utmaningar finns det idag i införandet av ett sådant system?
- vilka är morgondagens lösningar gällande hållbara transportsystem?
- Hur långt borta är dessa lösningarna?

- Vilka faktorer eller variabler ingår i beräkningarna gällande miljöpåverkan av era transporter och hur ser dessa ut gentemot branschen?
- Vad skulle du säga är de största barriärerna för verksamheter vars huvudsakliga affärer bygger på export gällande införandet av hållbara transportsystem?
    - Är de främst tekniska innovationer?
    - Är det handelshinder i form av statliga regleringar
    - Handlar det om motivationen eller viljan av införandet?
    - Hur ser ni på problematiken av att olika länder har olika tillgångar till diverse bränslen?
- Var är det enklast att göra förändringar mot en mer hållbara transportsystem idag?
- Snabba växlingar av efterfrågan av olika produkter på grund av de möjligheter som kommer med e-handel. Hur kan detta påverka hållbarhetsarbetet?
- Vi har varit i kontakt med ett företag som har testat på tågtransport, men dessvärre upplevt vissa säkerhetsproblem, i form av stöld. Upplever ni också säkerhetsproblem? Om ja, hur arbetar ni för att överkomma dessa?
    - Finns det saker som ni inte har direkt kontroll över, men som skulle kunna åtgärda dessa säkerhetsproblem? - direkt tåg - special containers?
    - intermodalt - ingen akutplanering

Europeiska unionen har listat bland annat 5 stora utmaningar gällande transport inom EU: *Trafikstockningar, oljeberoende, växthusgasutsläpp, varierande infrastrukturskvalité* och *konkurrens*:

- Hur ser ni på dessa utmaningar?
- Hur har ni handskats med dessa utmaningar?
- Finns det några specifika regleringar eller lagar, exempelvis som skatter eller subventioner, som främjar eller motverkar införande av hållbara transportsystem idag?
- På vilka sätt tycker ni att beslutsfattande organ såsom till exempel EU arbetar med att främja hållbara transportsystem idag?
- Om man ska generalisera och göra det så konkret som möjligt, hur mycket dyrare skulle ni uppskatta att införandet av ett hållbart transportsystem är gentemot ett icke hållbart alternativ / dagens transportsystem.

Frågor riktade till problemet med Absolut Vodka i åtanke

Kort om Absolut Vodka och deras distribuering:
Råvaror och produkten produceras i Åhus och transporteras därefter till diverse uppsamlingsplatser runt om Europa, utifrån där de distribueras vidare runt om i världen.

- Vad ser ni för möjligheter med ett sådant upplägg?
- Vilka nackdelar finns det med ett sådant upplägg?
- Har ni något annat typ av distributionssystem?
- Vilket transportmedel ser ni är mest optimalt för en sådan typ av transport som sker mellan Åhus och Hamburg?

- **Slutligen**, som vi har förstått det så är det oftast det billigaste alternativet, ekonomiskt sätt minst hållbart ur en miljösynpunkt. Vad är kostnaden i förhållande till vinsten för en verksamhet att införa ett hållbart transportsystem.
- Har ni vid något tillfälle haft samarbete av något slag med annat logistik/bulk företag?
- Om ja, hur upplever ni att deras förhållningssätt till hållbara transporter var/är?

Appendix 5 – Interview guide, Associate professor X at University of Gothenburg

Övergripande syfte med uppsatsen samt case studie

Tanken med vår uppsats är att vi ska undersöka vilka barriärer som finns i införandet av hållbara transportsystem. Vi har avgränsat oss till att

- endast kolla på transport inom 1500km från Åhus i Europa,
- endast kolla på transport via väg och räls.
- Endast kolla på miljömässiga påverkan av triple bottom line konceptet - CO2 emissioner

Barriärer som vi har hittat än så länge:

- Olika tillåtna maxvikter på vägarna - standardiseringar - eu politik
- Regleringar som gör att lastbilsförare inte får sova i sina bilar Brist på lastbilschaufförer - positivt utifrån ett miljöperspektiv
- Köp och upphandling processerna - långsiktiga relationer motverkas medvetet?
- Köp och upphandling processerna - preferenser hos köparna av transport
- Tillgängligheten på alternativa bränslen
- Tillgängligheten på tekniska lösningar och innovationer
- Infrastrukturen på väg och tåg spår inklusive tågterminaler
- EU stora fokus på TEN-T korridorerna - glömmer bort att ansluta till mindre vägar
- Otillräckliga incitament för verksamheter att göra hållbara val - CO2 skatt
- Organisationer preferenser och rangordning av dessa - säkerhet, pris, tid, hållbarhet
- ekonomiska anledningar

- Finns det någon barriär som vi har missat?
- Vilka svårigheter har du stött på inom industrin överlag?
- Tips på ytterligare teorier vi kan använda som sekundär data?

Frågor relaterade till case studie av The Absolut Company

I våran case studie så tror vi att vi kommer komma fram till att intermodala transportsystem är den optimala vägen för Absolut Vodka att minimera deras CO2 avtryck.

- Vad är de största svårigheterna med intermodala transporter?

The Absolut Company har testat på tågtransport tidigare men nämner att de har varit problem med säkerheten, de vill inte lasta om vid någon terminal på vägen utan deras sigill ska hållas hela transportkedjan samt att portarna vid lastningen inte är anpassade för ”traditionella” tågcontainers. Spåret mellan Åhus och Kristianstad kan dessutom behöva renoveras eftersom det inte är godkänt för godståg.

- Tycker du att alla dessa “men” är överkomliga och kortsiktiga kostnaderna kommer understiga de långsiktiga vinsterna?
- Hur tror du att den framtida utvecklingen kommer se ut härnäst?
- Vad tror du det finns för troliga framtida möjligheter?
- Vad ser du för lösningar utöver intermodala transporter?

Vad tycker du om dessa frågorna som vi har förberett att ställa till

a) Pernod Ricard, Group Environmental Manager – (Appendix 4)
b) Griteka Logistics, Chief Communications Officer / Key Account Director – (Appendix 5)

Appendix 6 – Interview guide, Pernod Ricard

My name is Eric Lind and me and my associate Jacqueline Rudeké are currently writing our bachelor thesis in corporate sustainability at Gothenburg university, school of business, economics and law. We are researching what barriers there are for organizations to sustainably develop their freight transportation and to some extent, how one could overcome these barriers. To do this, we are using *The Absolut Company* as a case study and believe that *The Absolut Companies* favorable circumstances such as financial structure and management commitment ensures that similar organizations can expect to face at least the same or similar barriers. Our goal is to come to general conclusions that could be applicable to similar, export intensive organizations.

The following questions will we be asking you about during our interview opportunity. If you have anything you consider to be relevant or would like to add please do.

1. What is your assignment as Group Environmental Manager?

2. What is Pernod Ricard doing in terms of sustainable developing freight transportation within the organizations?

3. What would you consider is the greatest challenges regarding developing sustainable freight transportation?

4. What would be most helpful in order to overcome these challenges?

5. How does The Absolut Companies sustainability work differ from other brands within the Pernod Ricard Group? How does it differ from rivals?

6. Could a sustainable solution for The Absolut Companies freight transportation also be successfully applicable on other brands logistics within the group?

7. Does Pernod Ricard promote any type of sustainable development of transportation to its subsidiaries?

8. Does Pernod Ricard want to promote sustainability as something centralized throughout the group or rather as something decentralized that every brand must commit themselves.

9. Does Pernod Ricard promote intermodality?
   - If so, how?
   - If not, why?

10. How is the sustainability work with freight transportation prioritized within Pernod Ricard Group compared with other aspects of sustainability and business?

11. What is considered to be a plausible "sacrifice" to reduce the environmental impact of business and freight transportation? For instance, in a procurement process, how much more expensive could a sustainable solution be to still compete with less sustainable alternatives. Or what other factors are there that needs to be accounted for?

12. Do you consider it to be the transport industry or the organizations using the transportation industry to be the one that is in charge and needs to change their actions in order to promote sustainable development of the sector?

Appendix 7 – Interview guide, Girteka Logistics AB

My name is Eric Lind and me and my partner Jacqueline Rudeké are currently writing our bachelor thesis in corporate sustainability at Gothenburg university, school of business, economics and law. We are researching what barriers there are for organizations to sustainably develop their freight transportation and to some extent, how one could overcome these barriers. To do this, we are using *The Absolut Company* as a case study and believe that *The Absolut Companies* favorable circumstances such as financial structure and management commitment ensures that similar organizations can expect to face at least the same or similar barriers. Our goal is to come to general conclusions that could be applicable to similar, export intensive organizations.

1. What differs Griteka from other freight transporting organizations?
2. In what ways are Griteka working with sustainability issues regarding environmental impact and what can you offer your customers that wants to reduce their environmental impact?
3. What is Gritekas view on intermodality?
4. Are you working on ways to promote intermodality?
    a) If yes, how?
    b) If no, why?
    c) In 2017 you mentioned in your report that ”2017 was also the year where we strengthened our usage of intermodal solutions” - how did you do it? What are these “intermodal solutions”?
5. According to you, what are the greatest challenges you are facing regarding sustainability within the freight transportation industry?
6. How could you overcome these challenges?
7. What would you say is the main priority for your customers in their preferences? For instance, is it price, time consistency, safety or sustainability?
8. Would you consider these preferences as a barrier to further develop sustainability?
9. How can Griteka promote and encourage changes in this prioritization?
10. Do you consider it to be the transport industry or the organizations using the transportation industry to be the one that is in charge and needs to change their actions in order to promote sustainable development of the sector?

11. In your CSR report for 2016 you mention that a strong focus on the procurement operations is needed and that you need to balance your negotiations and ensure transparent procurement procedures. Why is this highlighted as one of your future ambitions?
12. In what ways have the procurement operations been a challenge for sustainable development?
13. Regarding your CSR report, there seems to be a focus on the social responsibility aspect of sustainability. Why is this?
    a) Would you say that the social aspect is easier to deal with than the environmental aspect?
14. What are the measurable efforts that is mentioned in the CSR report? (under the headline, *environmental focus*)
    a) Is it possible for us to obtain these measurements?
15. Do you have any calculations regarding your trucks and their efficiency? (such as fuel, cooling units, fuel usage etc.)
16. How do you see the measurement of environmental impact in your asset based investment sheet?
17. You have ordered a TESLA truck, where and in what type of transportation will you use it?
    a) How much do you expect to reduce your environmental impact by using the TESLA truck?
    b) How do you visualize the future of electric trucks?
18. What would you consider is "the missing piece" for the transportation industry to take the next step towards sustainability?
19. Does Griteka have any tangible ambitions or goals regarding minimizing environmental impact in the nearest 5-10 years?

Appendix 8 – weight restrictions

	Weight restriction, (total load in tonnes)	Special exceptions from weight restriction
Sweden	64 tons	
Finland	74 tons	
Norway	50 tons	
Denmark	50 tons	
Germany	40 tons	44 tons, if within 100km from a combiterminal
Netherlands	50 tons	
Belgium	40 tons	
France	40 tons	44 tons, if the driver is French
England	44 tons	