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Increasing supply chain sustainability through partnerships with 3PL suppliers

A case study within the pulp and paper industry

Master's thesis in Supply chain management

RASMUS LINDBERG
HUGO LINDGREN

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS
DIVISION OF SERVICE MANAGEMENT AND LOGISTICS

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Report no. E2021:010
Department of Technology Management and Economics
Chalmers University of Technology
SE-412 96 Göteborg
Sweden
Telephone + 46 (0)31-772 1000

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SUMMARY

Stora Enso, is one of the major actors within the pulp and paper industry, an industry in which large volumes of goods are being shipped from production facilities to customers. Stora Enso's transports contribute to a large part of both their costs and their emissions, which makes it a strategic area. Stora Enso have an ambition to be in the frontline in the industry regarding sustainability, and therefore transportation is one of the areas where the highest potential for improvements exists.

The purpose of the report is consequently to evaluate how Stora Enso can achieve more sustainable transports by developing partnerships with 3PL suppliers, looking mainly at road and rail transports. The task was approached in two parts, where one part aimed to find what prerequisites are needed to successfully establish partnerships with 3PL suppliers, while the other part looked at how these partnerships could be formed to create a more sustainable supply chain for Stora Enso. The method used was to conduct external interviews with some of the most important 3PL suppliers to Stora Enso that were determined by analysis of internal supplier spend and volume data, along with internal interviews with people at Stora Enso.

It was found that the prerequisites required for partnership are high levels of trust, communication and integration, mutual benefits and goals, common values, mutual dependencies and enabling of innovation. Although none of the suppliers fulfill all the prerequisites, most of the relationships provide a good foundation that can be developed into deeper partnerships, if Stora Enso and their suppliers work on establishing the prerequisites that are not yet fulfilled. The final recommendation for achieving higher sustainability is in the short term to establish partnerships with the rail suppliers, who although not offering much opportunity for innovation, can contribute to large sustainability improvements by moving more transport to conventional rail. Also, partnerships could be developed with road suppliers, where there are existing sustainability solutions that could be implemented, along with more use of intermodal transport, decreasing the transport emissions. Furthermore, there is the possibility to develop long-term strategic partnerships with some of the road suppliers that hold potential for creating competitive advantage through new sustainable innovations.

Keywords: Third-party logistics (3PL), Partnerships, Sustainability, Supply chain, Transportation, Pulp and paper industry

PREFACE

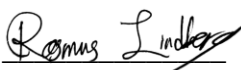
This Master's thesis has been conducted during the spring of 2021 at Chalmers University of Technology. The thesis has been written at the department of Technology Management and Economics, at the division of Service Management and Logistics, as the final part of the authors' studies at the Supply Chain Management master's program. The study has been designed and executed in collaboration with the company Stora Enso, within their team Network and Routing that operates within Stora Enso's department Sourcing and Logistics.

We want to thank our supervisors at Stora Enso, Dani Söderling and Mathilda Gärdesmed, for their continuous support and help in providing us with insights of the company. We would also like to thank all the other employees at Stora Enso which we have gotten in contact with during these past months, who have participated in interviews and helped us get in contact with Stora Enso's 3PL suppliers.

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Rasmus Lindberg


Hugo Lindgren

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1. INTRODUCTION

The context of the report is the pulp and paper industry, which consist of different production units that are used in the process of turning woods into various consumer products. When the products are finished, they are distributed to merchants or retailers along with final customers, which together make up the sales network (Carlsson et al., 2009). Although the global growth of graphic paper has stagnated since 2007 due to increasing digitalization, and is expected to continue declining, the industry as a whole is still growing (Berg & Lingqvist, 2019). This can to a large degree be contributed to growth of the packaging sector, together with more tissue paper and pulp for hygiene products being sold. According to Berg and Lingqvist (2019), the industry is going through a major transformation, and innovation has become more central in order to find new applications for the material sourced by woods. The industry as a whole has also changed, and few of the major actors have seen growth in size, but instead more focus has been on specialization in fewer segments (Berg & Lingqvist, 2019).

Due to the large volumes in the industry, being around 420 million tons in 2018 (Berg & Lingqvist, 2019), efficient logistic flows are a vital part of the industry's profitability and environmental sustainability. The various transportation between production units, and thereafter to the end customer contribute to a large part of the total raw material costs (Lehoux et al., 2010). Furthermore, Carlsson et al. (2009) mention that the volumes and quality of the supply of raw material is unpredictable, while at the same time, there are hundreds of more end products than the raw material it came from. This variation in supply, along with the complex transportation network creates a huge logistic challenge to optimize transports and minimize emissions. Since a large share of the costs are related to transportation, there should be great potential to see major cost savings, along with decreased emissions by making these transports more efficient.

The case company used in this paper is Stora Enso, which is the sixth largest company in the world within the pulp and paper industry, and the largest in Europe in regard to total revenue (McCabe, 2020). They are situated in 30 countries over the globe, but the main market is Europe, contributing to 73% of their total sales. Stora Enso has a strong focus on renewable products, and in 2019 their products were grouped in five different divisions, being *consumer board*, *packaging solutions*, *biomaterials*, *wood products*, and *paper*, where consumer board, biomaterials and paper has the largest shares of sales, with around 25% each of the total sales (Stora Enso, 2019). Sustainability is central in the company's strategy according to Dani Söderling (personal communication, December 15, 2020), and by growing more trees than they are harvesting, CO₂ is being absorbed and creating a positive CO₂ impact of three million tonnes CO₂ per year. The products can later be recycled or used as biofuel, and compared with using fossil-based products, Stora Enso claims 20 million tonnes less CO₂ is emitted. Emissions are however inevitable in the value chain, caused by

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production and transportation, and contribute to eleven million tonnes CO₂ being emitted per year. The sustainability of their products is considered by Stora Enso as their most important competitive advantage, and they have an ambition to be in the frontline of sustainability within the industry. (Dani Söderling, personal communication, December 15, 2020).

Relating back to the logistic challenges in the industry in general, the same challenges are present for Stora Enso. At the sourcing department, logistics stand for the largest share of sourcing costs, making it a strategic area. Stora Enso has the aim to design their logistic network so it optimizes cost, sustainability and the level of service that they provide. (Dani Söderling, personal communication, December 15, 2020).

As Mills et al. (2004) explain, this means that companies, like Stora Enso, need to work inter-organizationally with firms that are part of their logistics network. This network can contain several different types of actors e.g., suppliers, transport providers, retailers et cetera and it can be a challenge to handle all of them in an optimal way. However, if a company manages to establish a network in which the different actors can complement each other, then Vokurka et al. (2002) emphasize that competitive advantages can be reached. Lambert et al. (1996) bring up that these competitive advantages can be gained by setting up partnerships with actors within the logistics network.

Partnerships between actors can be everything from a sole activity being coordinated together, to an elaborate long-term partnership in which entire organizations are integrated together, but what is common for all these forms is that they revolve around close integration, sharing of assets and trust between the actors (Lambert et al. 1996). A lot of research has previously been made regarding buyer-supplier partnerships, and Lehoux et al. (2010) for example show how manufacturers within the pulp and paper industry can collaborate with their customers regarding the order process to achieve lower costs. However, less research has been conducted on the possible partnerships between a manufacturer and a third-party logistics (3PL) supplier, an independent actor that companies outsource their logistic activities to. According to Mason et al. (2007) this is because 3PL activities traditionally are treated as non-strategic, so focus lies on cost minimization rather than partnership creation. Furthermore, this can be confirmed from the study by Lieb and Miller (2002) that show how a majority of US based companies used 3PL suppliers, but the general characteristics of these relationships was to have no inter-organizational integration and firms had contracts with multiple suppliers rather than a few.

The lack of research in this subject is fascinating since the prospective for beneficial partnerships with 3PL suppliers seem apparent in today's business. Berg and Lingqvist (2019) for example did research on the pulp and paper industry and suggest that partnerships with distributors and other non-traditional actors provides a large potential

1. INTRODUCTION

for value creation. Additionally, Sinkovics and Roath (2004) explain how a well-established relationship with a 3PL supplier can help to improve the logistics performance towards the customer. This improvement can stem from increased service levels or an improved organizational flexibility, which according to Sinkovics and Roath (2004) is a result of closely collaborating with a 3PL supplier. Rao (2004) also explains that these types of partnerships can be structured to help improve the sustainability in the supply chain. Furthermore, relationships with a 3PL supplier can create the opportunity for a triadic relationship where the 3PL supplier gets involved in a partnership with two other companies (Huang et al., 2016). As an illustration, Cole and Aitken (2020) discovered that a triadic relationship with an intermediary can provide large benefits when it comes to creating a more sustainable supply chain. Thus, multiple benefits can be obtained by establishing a partnership with a 3PL supplier. However, it should also be mentioned that some concerns may arise in these partnerships. Van Damme and Ploos van Amstel (1996) acknowledge that a company gives up control when outsourcing an activity and there could be a risk of confidential information spreading to another actor in the 3PL suppliers network. These aspects have to be taken into consideration, but van Damme and Ploos van Amstel (1996) also mentions that these risks get alleviated by keeping a closer partnership rather than a transactional relationship.

1.1 Purpose

The purpose of this report is to examine how a large manufacturer within the paper and pulp industry, namely Stora Enso, can make use of their current network of 3PL suppliers to establish partnerships that increase the sustainability of the supply chain. The thesis aims to end up with strategic recommendations that indicate which of Stora Enso's 3PL suppliers that hold potential to establish partnerships with and guidelines for what type of partnership Stora Enso should establish to optimize the sustainability benefits.

1.2 Research questions

Based on the purpose, two research questions have been formulated that this thesis aims to answer:

1. What are the prerequisites needed to establish partnerships between Stora Enso and its 3PL suppliers?
2. How can partnerships between Stora Enso and their 3PL suppliers be developed to create more sustainable supply chains?

1.3 Delimitations

Due to the large amounts of possibilities that are present when conducting a thesis similar to this, combined with the fact that the work is limited in regard to time and resources, some delimitations had to be set up beforehand to prevent this project from becoming insurmountable.

Firstly, the focus was limited to Stora Enso's downstream supplier network, meaning that their upstream supplier network was not evaluated in this thesis. The reason for this was that the downstream network of Stora Enso is where they have control over their choice of 3PL suppliers, while upstream that choice rather falls on Stora Enso's suppliers.

Furthermore, a geographical boundary was also determined, where the report mainly looked at transports originating from Sweden. This boundary was set up because Stora Enso has an incredibly large network, and a full evaluation of their logistics network would not have been feasible in the time given. The choice of Sweden was in turn based on the geographical closeness and the familiarity of the country, which is believed to alleviate the data collection.

The large size of Stora Enso's network has also led to a choice of only interviewing a selection of Stora Enso's 20 largest suppliers based on spend and volume. Due to the limited time and resources, a thorough investigation of all of Stora Enso's suppliers would not have been possible, so a choice was made to prioritize the largest ones.

Lastly, among the suppliers of logistic services in Stora Enso's network, the focus is mainly put on the land-based suppliers, i.e., road and rail suppliers, since the potential for improvements through partnerships was deemed higher here. Furthermore, no focus was put on the actors in the container shipping industry, since this market is dominated by a few large and powerful actors that already have optimized their supply chain according to Stora Enso (Dani Söderling, personal communication, December 15, 2020). The market was therefore deemed unfavorable when it comes to establishing partnerships with these actors.

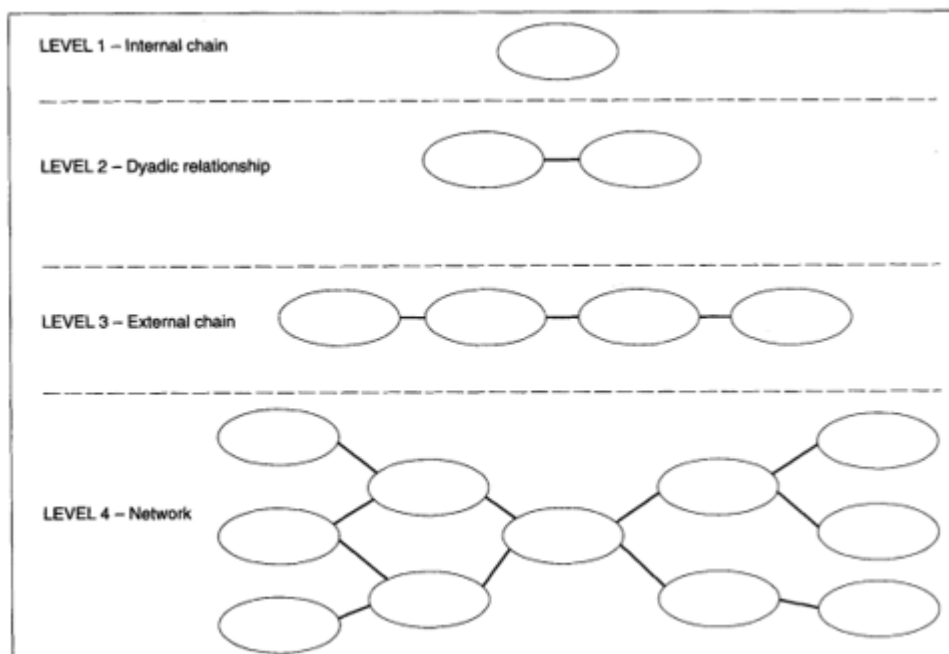
2. THEORETICAL FRAMEWORK

The theoretical framework consists of three main parts that were chosen to give a theoretical foundation to this study. Firstly, one part will bring up theory regarding supply chain networks and the dynamics that influence them. Then there will be a section about partnerships and how they can be set up to enhance the performance of a supply chain. Lastly, the framework consists of one part that brings up what different methods 3PL suppliers can implement to increase sustainability in a supply chain, seen from both an environmental and from a social perspective.

2.1 Supply chain networks

In Harland (1996), supply chain research is divided on four levels, *internal chain*, *dyadic relationships*, *external chain* and *network*, as seen in Figure 1. The smallest network that can exist is in the form of a triad, where three nodes in the network form a triangular relationship, in which the relationship link between two nodes affect other links in the triad (Choi & Wu, 2009). Yan et al. (2015) explains that the network of firms are important factors for the firm's economic actions and results, beyond the more obvious performance factors within the firm itself or its direct relationship ties. When discussing the power of a firm, Kähkönen and Virolainen (2011) also brings up how its power is dependent on the network of the firm which it is embedded in.

Figure 1. Levels of research in supply chain management (Harland, 1996)



Through this knowledge of networks, strategic networks can be built, which are described by Ricciardi (2014) as relationships between two or more firms, where the exchange or lack of exchange in one of the firms has a direct impact on the other firm.

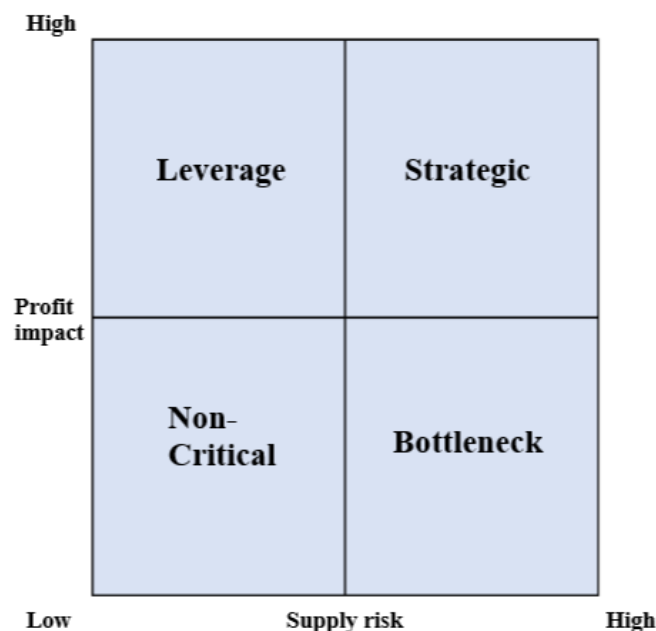
2. THEORETICAL FRAMEWORK

Strategic networks are considered a valuable resource that can be used for exchange of knowledge, skills or financial resources (Sandberg, 2007). In this section, the dynamics of supply chain networks will be further explained with one subsection focusing on how supplier relationships can be formed in many different ways, while the second subsection will present theory on how power and trust influences a relationship.

2.1.1 Suppliers can be differentiated

Within purchasing and supply management literature there are different strategies or tools of how to handle relationships with suppliers. One of the most frequently mentioned tools is purchasing portfolio models, of which several different variations exist (Caniels & Gelderman, 2005). However, most of them have their inspiration from Kraljic's (1983) portfolio model, which is considered the first comprehensive model for purchasing and supply management (Gelderman & van Weele, 2003). In Kraljic's (1983) paper, a 2x2 matrix is introduced, with profit impact going from low to high on one axis and supply risk going from low to high on the other axis. The profit impact is based on the volumes purchased, share of total purchasing cost, and how it impacts the growth of the business or the quality of the products, while supply risk depends on the number of suppliers providing the product, make-or-buy opportunities, storage risks and substitution possibilities. A simplified version can be seen in Figure 2, containing four different categories, being *strategic*-, *bottleneck*-, *leverage*- and *noncritical* items, where different strategies should be utilized for each category (Kraljic, 1983).

Figure 2. *The Kraljic matrix based on Kraljic (1983)*



For strategic items, supply decisions need to be very carefully done using different analytical tools such as market analysis, risk analysis and price forecasting. For

2. THEORETICAL FRAMEWORK

bottleneck items it is important to guarantee volume, even though this might mean a higher price, and it is important with control of vendors, along with security of inventories and backup plans. Leverage items have low supply risk but high profit impact, and therefore the buyer should exploit its power when purchasing, choose its vendors and if necessary, look at product substitution, along with the use of pricing strategies, contract purchasing mix and order volume optimization. Finally, noncritical items should aim to be standardized, with efficient processing, and use order volume and inventory optimization (Kraljic, 1983).

Other authors, such as Dubois and Pedersen (2002), have criticized the portfolio of Kraljic (1983) and similar models for only taking two dimensions, supply risk and profit impact into account. Furthermore, Dubois and Pedersen (2002) point out that these models also have flaws in the assumption that companies in a power position will always exploit this power at the expense of the other party, and instead of focusing on products and companies, an approach is proposed in which the relationships and network context is more central. It is discussed how different adjustments between actors create unavoidable interdependence, but also contribute to productivity and innovation for firms in the relationship along with the whole network (Dubois & Pedersen, 2002).

Another of the limitations of the Kraljic matrix brought up by Gelderman and van Weele (2003) is that the model is not so helpful when considering how and when to change strategy from one quadrant to another. In their paper, their aim was therefore to look closer into this and as a result they came up with a revised Kraljic matrix as seen in Figure 3, containing guidelines on what strategic directions to take depending on where on the matrix one is positioned (Gelderman & van Weele, 2003). The profit impact of logistic services within Stora Enso can be considered large, and hence focus is on the two upper quadrants, leverage and strategic items, where in total five different actions can be considered according to Gelderman and van Weele (2003).

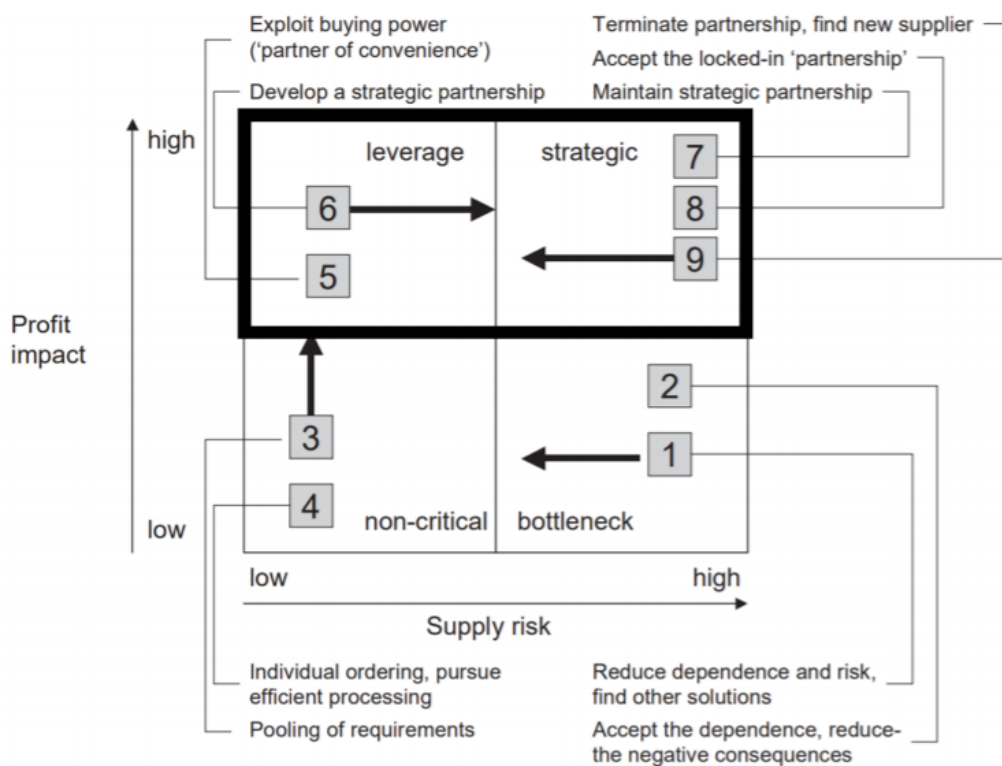
For leverage items, one alternative action is to hold the position and *exploit buying power*, using methods such as competitive bidding and more short-term contracts. Another less common option, for leverage items where the profit impact is even higher, is to move into the strategic quadrant and *develop a strategic partnership* with a supplier of a certain item. The purpose would be to gain competitive advantage, but this puts higher requirements on the supplier and should only be considered feasible with suppliers of more advanced technology according to Gelderman and van Weele (2003).

For items placed in the strategic quadrant of the matrix, there are two actions that do not involve changing quadrants, where the first one is to *maintain strategic partnership*. This means to have a long-term commitment with these more important suppliers, with the purpose to create competitive advantages, and in these types of relationships mutuality, trust and openness is central. The second holding position is to *accept the*

2. THEORETICAL FRAMEWORK

locked-in 'partnership' and this is when the position in the matrix is forced by unfavorable circumstances, such as patent positions, supplier monopoly, high switching costs, or demand from customers of a certain item. The final action is called *terminate partnership, find new supplier*, and involves moving from the strategic to the leverage quadrant in an attempt to find new suppliers to develop relationships with, in order to decrease the dependence of a supplier where the current partnership is not desirable. This can be a difficult process, both in regard to terminating the partnership and in finding new suitable suppliers (Gelderman & van Weele, 2003).

Figure 3. Revised Kraljic matrix, displaying possible actions in the matrix, with emphasis put on the upper two quadrants (Gelderman & van Weele, 2003)



2.1.2 Power and trust in a relationship

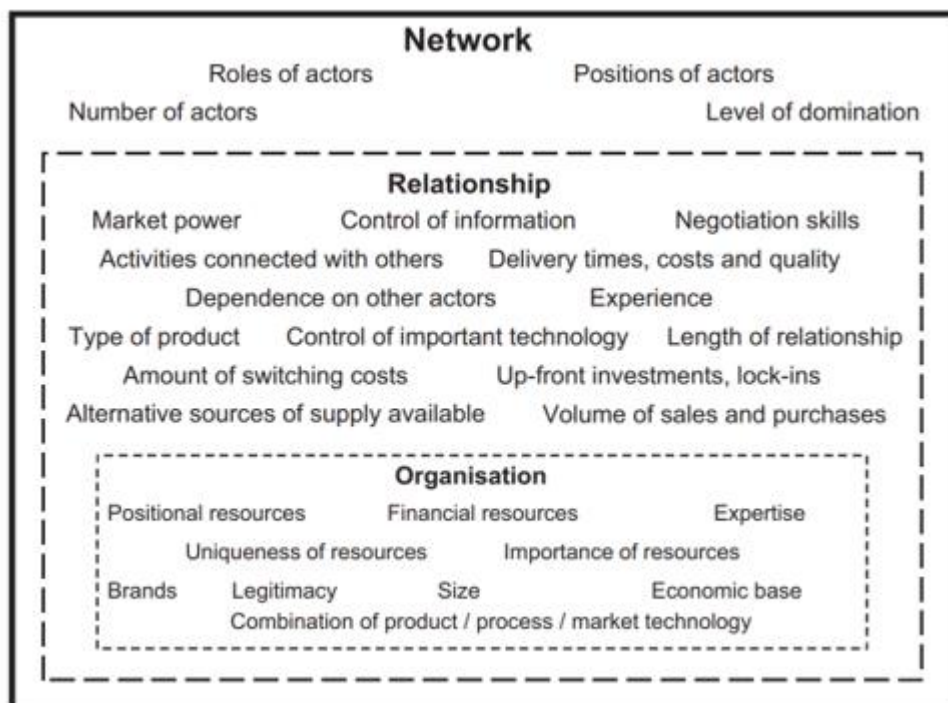
In supply chain literature, two different strategies exist that buyers try to use in order to influence their suppliers, being to either use some type of power or focus on creating trust (Terpend & Ashenbaum, 2012). The first strategy revolves around power, which is an important concept when discussing Business-to-Business (B2B) relationships according to Hingley (2005), which is also confirmed by Cox (2001) who suggests that every study of buyer-seller relationships should have power as a central part. Many authors around the 1990s have criticized literature in the area of business relationships of focusing too much on partnering and trust, while ignoring power (Chicksand, 2015). Hingley (2005) argues that focusing on trust and mutuality in B2B relationships does

2. THEORETICAL FRAMEWORK

not remove the aspect of power, instead the author argues that even organizations that are in partnership will still actively strive for a stronger position in relation to the other party. However, this does not mean that power should be exploited, because even though it may give short term benefits it can hurt the company long term, especially if the power balance changes (Kumar, 1996).

Power arises from the fact that one company has key resources needed by another company, which creates a dependence on the more powerful company. This can in its turn make the weaker company to act in a way that it would usually not want to, for example by paying a higher price due to the necessity to have a certain resource (Finne et al., 2015). Kähkönen and Virolainen (2011) extends the concept of power from dyadic buyer-supplier relationships to a network perspective. The authors evaluate different sources of power in a theoretical study and propose a framework of structural power sources as seen in Figure 4. The first level is the organization level which includes resources, capabilities and competences et cetera. The second level is the relationship level, where power is impacted by market power, number of buyers versus sellers, switching costs, volumes along with several other factors. The final level is the network, and considers the roles and positions of the actors within the network which also make up a company's structural power (Kähkönen and Virolainen, 2011)

Figure 4. Framework of structural power sources (Kähkönen and Virolainen, 2011)



When there is a power imbalance between the organizations, this is called an asymmetric business relationship (Rindt & Mouzas, 2015). Although symmetrical

2. THEORETICAL FRAMEWORK

power is considered to create a more stable and long-term relationship, relationships where asymmetrical power exists are very common. This implies that the weaker organization often is willing to accept an unbalanced relationship even if it favors the stronger organization, as long as the benefits of the relation are deemed to make the relation worthwhile (Hingley, 2005).

There are different views whether power symmetry is necessary or not for fostering long-term relationships, where one issue with asymmetrical relationships that is brought up by some authors is that they are perceived to have lower levels of trust (Cuevas et al., 2015). According to Kumar (1996), close cooperation between retailers and manufacturers with higher levels of trust, enables them to maximize the value for customers. When there is trust between the companies, this allows for information sharing, making investments in the relationship or customized solutions between the partners (Kumar, 1996). However, one of the findings from Cuevas et al. (2015) is that the development of trust requires the goals of the parties to be highly aligned, and the authors claim that this is a more crucial factor for developing trust than having a relationship with power symmetry. Therefore, in partnerships with asymmetrical power, Cuevas et al. (2015) suggests that the more powerful party keeps the power asymmetry, but also makes sure that there is a common vision and aligned goals. Other ways of handling asymmetrical relationships are to not exploit the power advantage, but instead take responsibility for the other party's profitability by treating it fairly, and not accept prices that are not sustainable to that party (Kumar, 1996). When the partners have symmetrical power, Cuevas et al. (2015) still emphasizes the need to not take trustworthy relationships for granted, but to continuously make sure that there is goal congruence among the partners, and work to further strengthen and align these goals.

2.2 Partnerships in a supply chain

In a company's network, there will often be some actors with capabilities that have potential to improve the supply chain for the focal company. In these cases, the focal company can consider creating partnerships with these actors to enhance the results within the supply chain (Christopher & Jüttner, 2000). Although partnerships can vary in intricacy, Lambert et al. (1996) explain that a partnership generally entails close integration, sharing of assets and trust between the actors. Important for a strategic partnership to succeed, according to Lambert et al. (1996), is that both parties need to mutually benefit from the agreement and that they have to agree on the level of integration, which is in line with Buono (1997), who argues for the importance of having mutually beneficial goals in a strategic partnership. Furthermore, Buono (1997) also brings up trust, interdependence and norms of reciprocity as some requirements for a successful partnership. In this section, the element of partnerships will be further explored. One part will focus on partnerships with 3PL suppliers while the second part will focus on partnerships made to increase sustainability in the supply chain.

2.2.1 3PL partnerships

3PL suppliers are actors that take responsibility for logistic services within the supply chain, such as transportation and warehousing, for companies that choose to outsource these activities (Zacharia et al., 2011). Traditionally, focus in partnerships with 3PL suppliers has been on cost-minimization, meaning that the partnerships rarely are of a very strategic nature. The reason for this is, according to Mason et al. (2007), that companies outsourced those activities that were deemed less important for their core business. However, this has begun to change since the importance of having a competitive supply chain has become more prevalent. This means that 3PL suppliers today can play a much larger part in a partnership, where they are responsible for providing effective logistics services that enhance the focal company's performance (Zacharia et al., 2011).

Zacharia et al. (2011) explain how 3PL suppliers in some partnerships can take on more responsibility, operating as orchestrators for a company's logistic activities. This results in a more strategic partnership in which a 3PL supplier gets a chance to use their competence to design the supply chain, either in collaboration with the focal company or by getting total responsibility on their own. Zacharia et al. (2011) also emphasize that fully outsourcing responsibility often is done with activities that hold a high strategic importance for the company, meaning that it is important with high trust between the actors, and a large degree of interaction and commitment is needed since it is important that everything goes without any costly misses. The trust and interaction between the two actors become even more important in these strategic partnerships when assessing the risks that come with these types of partnerships. Van Damme and Ploos van Amstel (1996) bring up how this approach hands the control of the supply chain to the 3PL supplier, which can be a risk since it can be activities of strategic importance. Furthermore, since information is shared with an actor outside of the firm, van Damme and Ploos van Amstel (1996) acknowledge the risk of information leakage which can hurt the company if competitors gain firm-specific knowledge. Additionally, Huo et al. (2018) mention the risk of opportunism that are present in these types of partnerships. Generally, the insight into a 3PL supplier's work is limited which creates a risk of them not fulfilling their part of an agreement (Huo et al., 2018). However, van Damme and Ploos van Amstel (1996) ensure that creating an even closer relationship helps to alleviate the risks since it builds trust and mutual dependence.

The structure of the contracts is also an important factor when it comes to establishing successful partnerships. Frydlinger et al. (2019) explain how traditional supplier contracts generally are large documents filled with obligations and rules that are set up to prevent opportunistic behavior. The authors further mention how these contracts inhibit innovation and prevent trust from being created between the parties. So, for a more strategic partnership, Frydlinger et al. (2019) propose that the contracts should be of a less detailed level, instead setting up mutual goals and contractual structures for the relationship without going into details on performance.

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These types of contracts have proven to limit costs and improve performance in multiple business relationships examined by Frydinger et al. (2019), however, the authors also point out that it is not the preferred contract in every situation. This is supported by Martínez-Jerez (2014) stating that a strategic contract only should be set up if three conditions apply, these three being that the product or service in question should be of high importance, the service provider should hold a higher competence than the buyer and the future outcomes must be deemed as uncertain. If any of these conditions do not apply, then a more traditional contract can be set up according to Martínez-Jerez (2014). Frydinger et al. (2019) also mention additional factors that can be evaluated when deciding on type of contract, for example if there are any substitutes available on the market and what risks there are if the partner would not be able to perform.

If the decision then is made to enter a strategic partnership with an actor, Frydinger et al. (2019) advise that the contract helps to align the actors' future goals and interests while setting up guiding principles for the partnership to follow. Furthermore, Martínez-Jerez (2014) states that these contracts should have incentives that encourage innovation by sharing risks and gains and that the information exchange should be focused on creating value rather than delivering detailed measurements of performance indicators created to control the relationship.

2.2.2 Partnerships for increased sustainability

Sustainability is becoming more important than ever within business and there is no difference within the field of logistics. Companies have to create supply chains that are taking sustainability into consideration while at the same time still providing value for the customers. Dey et al. (2011) bring up several factors that a company can focus on when it comes to logistics, for example that high load factors and route optimization will be very beneficial for the climate since a reduction of unnecessary transport will limit emissions. Dey et al. (2011) also explain that these improvements are made possible by close integration and communication with the transport providers. Furthermore, Dey et al. (2011) also mention that road transport is responsible for a large share of transport emissions so alternative fuels or electrical vehicles can be a possible solution to limit these emissions.

These improvements are all possible to implement, although a company might not be able to do it all in-house. Instead, creating a partnership with a 3PL supplier is a method that Cole and Aitken (2020) propose. The authors show how an intermediary can help to implement these types of sustainability improvements and since these 3PL suppliers tend to have capabilities that the focal company lacks, then the improvements tend to become more successful due to the partnership with the intermediary. The benefits of outsourcing logistic activities to a 3PL supplier are also supported by Facanha and

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Horvath (2005) that show how companies, by outsourcing their logistic activities, can decrease energy consumption, emissions and human injuries in the supply chain. This shows that an approach like this is beneficial both from an environmental sustainability standpoint as well as from a social sustainability standpoint.

Furthermore, Cichosz et al. (2020) have found that partnerships with 3PL suppliers can be set up to change road transports into intermodal transports instead. This would limit the amount of road transport, replacing some of it with rail transport, and thus decreasing the emissions. Flodén and Williamsson (2016) also mention the possible benefits of intermodal transportation in their research and suggest that a supply chain would become more sustainable if the amount of road transport could be reduced. Furthermore, Flodén and Williamsson (2016) explain that a major challenge with intermodal transport is that larger volumes have to be sent with each transport. To achieve this, partnerships might have to be initiated and the authors propose that vertical partnerships with actors within a supply chain are more likely to thrive compared to horizontal partnerships with companies within the same business area, since competition and company secrets might complicate these partnerships. Another challenge with intermodal transports according to Flodén and Williamsson (2016) is that the return flows generally are conducted empty. Finding a partnership in which the actors can share the intermodal transport in a complementary way so that both routes contain goods would be very beneficial for the environment. So, a partnership that enables intermodal transport would play a big part in creating more sustainable supply chains and to succeed with this Cichosz et al. (2020) emphasize that it requires a lot of collaborative work and information exchanges to successfully set up this type of partnership.

Partnerships for sustainable solutions can also be in the form of cooperative research and development (R&D) work. De Stefano and Montes-Sancho (2018) have conducted research that shows how R&D cooperation between two partners can lead to more environmentally sustainable supply chains. The authors acknowledge how innovation towards more sustainable supply chains generally requires a lot of investments and it contains many uncertainties. Therefore, a partnership where investments and risks are shared can be a foundation that promotes more innovation on the subject which thus creates beneficial conditions for a more sustainable supply chain. Furthermore, De Stefano and Montes-Sancho (2018) emphasize that these types of partnerships are recommended to be started with actors centrally embedded in the business network, since the possible benefits become larger in those instances, for example since diffusion of a successful innovation becomes easier when it originates from a central position in the network.

As buyers of 3PL services, companies generally have to be active in their quest for sustainable supply chains. Evangelista et al. (2013) emphasize how 3PL suppliers often limit their sustainability work to the demands of their customers. The reason for this,

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according to Evangelista et al. (2017), is that 3PL suppliers see barriers in the shape of high investment costs and uncertainties regarding if the benefits will cover the investments. Toelke and McKinnon (2021) also mention that many 3PL suppliers, especially smaller ones, lack the knowledge of what sustainability strategies exist and more so how to implement them. This lack of knowledge is an important factor as a barrier since Toelke and McKinnon (2021) have found out that 3PL suppliers having awareness of sustainability actions often correlate with them also implementing those actions. Therefore, Evangelista et al. (2017) explain that 3PL suppliers generally implement environmental initiatives as a result of external drivers which could be assured customer satisfaction if environmental actions were to be implemented, thus removing risk, or by having a partner that drives the implementation forward, meaning that it can be up to the buyer to set requirements for their partnership.

Because of this, the power perspective plays a role in partnerships when it comes to sustainability. Touboulic et al. (2014) explain how partnerships with a buyer more powerful than the 3PL supplier generally promotes sustainable supply chains more than partnerships with a powerful 3PL supplier does. However, there is also a balance between how much power a company can exploit towards a 3PL supplier. Because even though Evangelista et al. (2013) acknowledge that a company can use its power on a smaller 3PL supplier to set sustainable requirements, Xu and Beamon (2006) bring up that the smaller actor might seek to get out of a partnership in which they would feel marginalized. Here, Toelke and McKinnon (2021) bring up an alternative to the method of exploiting power as a buyer. This method revolves around reducing the risk and uncertainties that 3PL suppliers get from investing in new sustainable implementations for example through signing longer contracts or providing financial support towards the investment.

2.3 Sustainable solutions for supply chains

Sustainability is an element that is gaining increased importance in supply chains today, and as a result, businesses have to come up with ideas to create sustainable supply chains. Rodrigue (2020) brings up aspects that transport affects negatively today, some of these being, emissions, land usage, noise and accidents. Furthermore, Rodrigue (2020) mentions that actions can be taken to make the supply chains more sustainable, both from an environmental sustainability standpoint as well as from a social sustainability point of view.

2.3.1 Initiatives for environmental sustainability

As mentioned earlier, Rodrigue (2020) shows that emissions are a large issue when evaluating the sustainability of supply chains. Flodén (2016) explains how road transportation is responsible for a large share of transport emissions at present, and the author further acknowledges that a reason why road transportation still is widely used is because of the speed, flexibility and reliability that it offers. An alternative to road

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transport is transport by rail. This mode is more sustainable when compared to road transport, according to Rodrigue (2020), especially when the trains are electrical, which is the case in the majority of Europe (Lumsden, 2007). Additionally, Ji-Hyland and Allen (2020) mention that there is a shortage of truck drivers in Europe, which risks creating delayed transports. And, since one train with ten wagons can carry the same amount of goods as 600 trucks (Rodrigue, 2020), increased use of rail transportation would help alleviate the issue of driver shortages. However, Rodrigue (2020) also acknowledges that when using rail transportation, the companies lose flexibility and speed compared to road transportation, and for it to be economically viable, it has to be large volumes and long distances. Therefore, road transport will not be able to be completely replaced and methods to improve sustainability in road transport are also brought forward in theory. One method is to make sure that the trucks used hold the highest Euro-standard. Papadopoulos et al. (2020) have conducted research that shows significant differences in the amount of emissions when comparing Euro IV, Euro V and Euro VI trucks. Therefore, using trucks of Euro VI standard would help reduce emissions from road transport.

There is also constantly being conducted research that is aiming to come up with new methods to improve sustainability in road transport. One of these methods that are focused on is platooning. Platooning is when a number of trucks drive in a formation with minimal distance between each other to limit the aerodynamic drag on the vehicles. To successfully have trucks drive in a platoon an automated driving system needs to be active on the trucks following the leader so that all trucks drive in the same speed so the distances between the trucks continuously are held to a minimum and so that the trucks react in time if there would arise a need for emergency braking (Alam et al., 2015). Sivanandham and Gajanand (2020) bring up that use of platooning successfully reduces the fuel consumption in the vehicles, due to the aerodynamic drag being limited.

There are however some challenges with implementing platooning in everyday transport. Mainly, since the vehicles are to be controlled automatically, the technology must work (Sivanandham & Gajanand, 2020), and the trucks has to be approved by the legal entities, which might not be a guarantee, especially when traveling through multiple countries that have different laws and regulations (Tsugawa et al., 2016). Furthermore, Sivanandham and Gajanand (2020) also emphasize that if the platooning is to be successful, then a large challenge lies in route optimization since transports to similar locations have to be scheduled to travel at the same time.

These mentioned methods are all possible ways to improve sustainability of road transports through new and improved technology. However, Toelke and McKinnon (2021) also mention that there are operational methods to improve road sustainability, such as route optimization, fuel consumption monitoring and eco-driver training. These methods are according to Toelke and McKinnon (2021) more likely to be implemented

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by carriers since they do not require any investments and thus the carriers face less cost and less risk if they choose to implement these methods.

Another alternative for increased sustainability is intermodal transport. Intermodal transport is when more than one mode of transport is used without having to unload and reload the goods between the different modes (Lumsden, 2007). In this case, the focus lies on intermodal transportation using a combination of road and rail transport, and the benefits with this type of transportation is that it can take advantage of the strengths of each of the transportation modes (Rodrigue, 2020). Rodrigue (2020) explains how intermodal transportation can use rail transportation for long distances, resulting in low costs and low levels of emission, while switching to road transportation for the final distance to the customer to still have the flexibility and speed in the local delivery. Even though intermodal transport is a good choice from a sustainability perspective, there are still challenges that have to be taken into account for it to be a feasible method to use. Flodén (2016) has discovered some challenges, one being that large volumes are required at all times since the benefits get diminished if the train cannot be loaded to its entirety. Meaning that if a company has a lot of fluctuating demand, then it can be difficult to regularly use intermodal transport. Furthermore, Flodén (2016) mentions that additional costs occur from shifting the goods onto the new transport mode and additionally more storage may be needed due to the fact that a train can carry larger volumes than trucks. Although this is something that has to be taken into account when calculating the transports.

2.3.2 Initiatives for social sustainability

For a company to have socially sustainable supply chains, it means that not only the workers need to have good working conditions, but the business has to be sustainable for the people that get affected regionally by the company's actions (Rodrigue, 2020). One illustration of this is that transportation has to be conducted in a manner that is safe both for the drivers as well as for private persons driving on the same road (De Nadai et al., 2016). May and Crass (2007) have examined factors that can help create social sustainability regarding road transports and one action can for example be to design vehicles with the help of new technology to make them both ergonomically sustainable to drive in for the drivers but also safe if an accident were to occur. De Nadai et al. (2016), also show that technology in the form of digital monitoring can be used to notice fatigue in drivers by analyzing their behavior while driving. This technology can then help alert if the driver starts to lose focus which limits the risk of accidents. Furthermore, May and Crass (2007) explain that policies can be created that put requirements on transport companies to ensure that they work sustainably. These requirements can for example be that driving under the influence of alcohol is strictly prohibited, or that all drivers need to have partaken in courses about road safety.

However, May and Crass (2007) also acknowledge that there are barriers present when it comes to implementing social sustainability measures in a supply chain. One large

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issue is the financial aspect of implementing new technology. New technology requires investments and since many firms strive to be cost-efficient, a significant investment may make it so that companies refrain from changing technology. Furthermore, May and Crass (2007) mention barriers in the form of insufficient information. Companies might have a lack of insight into how the transportations are performed, which means that they cannot confirm that the policies are being followed, and on the other way round, drivers might not have received the training they were supposed to get. Here, May and Crass (2007) emphasize that necessary data needs to be shared between the actors to prevent these information gaps from limiting social sustainability.

Regarding safety in transports, a big factor is the mode of transportation. Rodrigue (2020) explains that road transportation is responsible for a large majority of the accidents that occur, and the risk for more accidents just increases with an increased amount of road transport since each truck contributes to more congestion on the roads. It could therefore be beneficial from a social sustainability viewpoint to use alternative modes of transport. This is also supported by Facanha and Horvath (2005), who state that road transports by far are the most accident-prone transportation method, and that replacing road transport with rail would help create a much safer transportation environment.

Since road transport cannot be completely replaced by alternative modes, other methods can be implemented to increase the safety of road transport. According to Sivanandham and Gajanand (2020), platooning helps to increase safety by limiting the congestion on the roads since the trucks drive closer together. This creates more space on the roads which reduces the risk of accidents. However, Sivanandham and Gajanand (2020) also explain that the automated driving technology has to work since any malfunctions could lead to terrible accidents. Additionally, Sivanandham and Gajanand (2020) mention that some drivers express discomfort over driving so close to the truck in front, so this has to be acknowledged since it affects the drivers' working conditions. Although there are some risks present due to the advanced technology, Tsugawa et al. (2016) emphasize that an automated driving system is beneficial from a safety standpoint since it removes the human factor and the risks that normally arise when drivers are starting to lose concentration. When using platooning, Tsugawa et al. (2016) illustrate that drivers can rest when following the leading truck and thereby regenerating their energy before taking the wheel again. A summary of all the methods brought up in theory for improved sustainability, both environmental and social, can be studied in Table 1.

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Table 1. *Possible methods for increased sustainability brought up in the theoretical framework*

Environmental sustainability
Switch transport from road
Upgrade Euro class on truck fleet
Electrical vehicles
Alternative fuels
Intermodal transport
Platooning
Operational methods, e.g., route optimization or eco-driver training
Social sustainability
Design new vehicles
Digital monitoring
Establish policies and training
Switch transport from road
Platooning

3. METHODOLOGY

This chapter will cover how the thesis has been conducted. The research strategy will be presented, followed by an explanation of how the method was designed before a description will be given of the research process.

3.1 Research strategy

In research, the research method is usually of either qualitative or a quantitative character. When using a quantitative method, the basis is collection and analysis of some kind of data that is possible to quantify in numbers, and the purpose is usually to test a certain theory or hypothesis, therefore also labeled as a deductive method (Bryman & Bell, 2011). Using a qualitative method, which instead is inductive with a focus on generating theory, the data collected instead consist of words that need to be interpreted, for example when doing interviews (Bryman & Bell, 2011). However, more and more papers are starting to take advantage of combining both methods, also called *mixed methods research* (Bryman & Bell, 2011). Using mixed methods, the traditional qualitative and quantitative methods are integrated in the study, with the purpose of answering one or several research questions (Davis & Golicic, 2012; Hesse-Biber, 2010).

There are multiple reasons why using a mixed method can be beneficial. One of the most common uses according to Hesse-Biber (2010) is to answer the same research question using mixed methods, which give opportunity for the methods to strengthen the result of each other. Mixed methods can also be used in a way that the result of one method guides the development of the other method as mentioned by Hesse-Biber (2010), in which examples are given, where statistical data (quantitative method) is used to create interview questions (qualitative method). However, there are also challenges with using mixed methods, where one major factor is the increased work in collecting and analyzing more material (Davis & Golicic, 2012). Hesse-Biber (2010) also mentions that it might be redundant to use multiple methods if one method alone is able to provide a good answer, while they also bring up the risk that a researcher who is not as skilled in using and analyzing one of the methods can limit the study.

For studies within supply chain management, mixed methods research is not so common according to Davis and Golicic (2012), which according to the authors is a mistake, as it limits the number of research questions that can be answered. Furthermore, they bring up literature that argues that the complex nature of supply chains requires several types of research approaches to provide better understanding of the subject (Davis & Golicic, 2012).

To answer the research questions, using a mixed method was considered to be the best option. The purpose of the quantitative part was to identify appropriate 3PL suppliers

to interview within Stora Enso's supplier network, and thereby it did not provide any empirical findings on its own. The qualitative method on the other hand was the core of the report and was used to gain deeper insight into existing and potential partnerships within the network.

3.2 Research design

To answer the first research question, quantitative data of Stora Enso's 3PL supplier spend and volume was analyzed in order to identify which external 3PL suppliers that were most important for Stora Enso, thus being potential interview objects for the qualitative part. The qualitative study was conducted using semi-structured interviews with various people both internally within Stora Enso, as well as externally with 3PL suppliers identified from the quantitative method. The questions used to provide material for this research question revolved around the characteristics of the relationship between Stora Enso and its 3PL suppliers, and also what factors the interviewees considered important for a partnership to function well. These findings were then compared to the theory found on the subject and analyzed in order to find out which of the 3PL suppliers that could be appropriate partners for Stora Enso.

For the second research question, qualitative data was collected in the same interviews used for the first research question. Here, the purpose was more to investigate what types of partnerships Stora Enso have and what sustainability benefits they bring. Questions also revolved around the potential areas of further collaboration, and how higher sustainability could be reached by closer cooperation with Stora Enso. An analysis was then made based on this data to find what potential enhancements regarding Stora Enso's supply chain sustainability further partnerships can bring.

3.2.1 Case study

This thesis has been conducted as a case study of Stora Enso. A case study is, according to Bryman and Bell (2011), a very detailed study of something specific, in this case an organization. Bryman and Bell (2011) explain that this method commonly is used to gain a deep and intensive insight of a certain subject and the findings are then generally compared with theory through an inductive approach. Furthermore, the case study used for this thesis is what Bryman and Bell (2011) would call an intrinsic case study, meaning that this thesis focuses on gaining insights about the particular case rather than providing general insights about the industry as a whole.

In this case study, interviews have been conducted both internally with employees within Stora Enso's organization, as well as externally with Stora Enso's suppliers. Conducting a case study in this way is beneficial according to Simons (2009), since that results in empirical findings based on different perspectives, which helps to create a full and nuanced understanding of the situation. This way of collecting data from multiple

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sources is also something that Simons (2009) calls data triangulation, meaning that the findings get verified from different sources to avoid the risk of subjectivity.

The case study has also been focusing on different facets of Stora Enso's supplier network, mainly focusing on their road transport supplier network and their rail transport supplier network, with some interviews performed in the sea transport network as well. This is what Gondo et al. (2010) call a case study with sub-cases. The benefits with sub-cases, according to Gondo et al. (2010), is that they can help provide a deeper understanding of the studied organization on a more specific level, and they can present findings that might hold true for one sub-case, but otherwise would not have been conclusive enough as findings for the case study as a whole.

3.2.2 Interview process

The qualitative part of the study was partly conducted through semi-structured interviews with employees at Stora Enso who are working with their current partnerships or other activities relevant to this research. Furthermore, interviews were undertaken with representatives from some of Stora Enso's logistics suppliers that were singled out from the quantitative part of the study. The benefits with interviews, as stated by Sreejesh et al. (2014), is that it captures the perspective of an individual more thoroughly than quantitative data does and information can also be gathered by unspoken actions, such as body language. The choice of conducting semi-structured interviews was because they allow for flexibility from the person being interviewed, thus making sure that their viewpoint gets clearly expressed. Furthermore, a benefit with semi-structured interviews is that even though the method allows for flexibility, it still makes sure that the interview does not go off topic, which is a more prominent risk if unstructured interviews were to be used (Sreejesh et al., 2014).

However, even with semi-structured interviews, it can be a challenge to acquire the knowledge depth that is desired. To succeed with this, Taylor et al. (2016) advise that descriptive questions are to be asked first to get the interview subject to talk about a broad amount of subjects, before following up with more specific questions on the topics that seem to be of most relevance for the study. Before the interviews took place, a short explanation of what themes the interview would be about was sent to the participant. The reason for this is because it will give the participant time to prepare for the interview and to avoid any misunderstandings about the topics that are to be discussed (Opdenakker, 2006). However, unless specifically asked for, no complete questionnaires were sent out, since Opdenakker (2006) explains how this might lead to the interview subject only giving previously rehearsed answers that takes away the spontaneous answers that semi-structured interviews otherwise lead to. The interviews were also recorded, with permission from the interviewees, and transcribed. This was done because it, as stated by Taylor et al. (2016), helps capture information that otherwise could go lost if the interviewer is to rely on memory and taken notes.

Due to the current circumstances with the COVID-19 pandemic, all the interviews were conducted online through a videoconferencing tool and may have affected the quality of the interviews. One issue that can arise is technical difficulties, and Sullivan (2012) highlights how technical issues such as poor internet connection can disrupt an interview and additionally, people unfamiliar with the concept might struggle with some technical aspects. Furthermore, Janghorban et al. (2014) emphasize how it becomes more difficult to study a person's body language and behavior through a non-physical meeting. However, the use of online interviews also brings some benefits. Some individuals might feel more comfortable being interviewed by someone that is not physically present, leading to more elaborate and genuine answers (Bryman & Bell, 2011). Another benefit is that online interviews become less time consuming, since no travel is necessary, and the geographical limitations become almost non-existent since people from all over the world can be reached without any travel, with the only requirement being a stable internet connection (Janghorban et al., 2014).

3.3 Research process

In order to find appropriate 3PL suppliers to interview and evaluate as potential partners, a selection had to be made of which companies to get in contact with, as Stora Enso is a large company with a large number of suppliers. From Stora Enso, raw excel-data regarding all their shipments made in 2020 was provided, containing data such as destination, volumes, shipper and shipping costs. By analyzing this data, it was possible to make a list of the most important suppliers in regard to volume and spend, in order to be able to find the companies where there might be higher potential for improvements. Due to the focus on rail and road transport, the analyzed data was filtered to suppliers within these areas, resulting in 20 suppliers that were considered interesting to interview. With the help of Stora Enso, some of these suppliers that they deemed more relevant to interview were then chosen from the list, and meetings were then set up with the suppliers through Stora Enso. Due to ongoing negotiations between Stora Enso and many of these companies, all interviews were not given at once, as negotiations needed to be finished before it was considered appropriate to have these interviews with the suppliers. In the end, four road suppliers and three rail suppliers were interviewed, and even though there was a wish to interview more suppliers that were of high importance according to the excel data, the lack of time did not enable this, since these suppliers were still in ongoing negotiations. However, from Stora Enso's perspective, the suppliers interviewed were considered to be representative of the market as a whole, and therefore the seven interviews were deemed enough.

On the suggestion of Stora Enso, the interviews from the rail and road sectors were also complemented with interviews from some other transport sectors, namely liner service and break bulk shipping, where there was one interview made with a supplier within each sector. The purpose of this was not to identify potential partnerships, but rather to

look at their collaborations with these actors, in order to get insights that might have possible applications to the relationships with the land-based suppliers. For each of the interviews made within all different sectors, the corresponding contact with the suppliers at Stora Enso were also made, in total four interviews for the four sectors. In addition to this, an interview was held with the sustainability manager at Stora Enso early in the project with the purpose of getting a more complete picture of how Stora Enso works with sustainability. One interview was also conducted with the manager of network and routing to gain insight into how Stora Enso currently handles their relationships within their network of 3PL suppliers.

3.4 Ethics

When people are being interviewed for the sake of a study, consideration must be taken to ensure that these interview subjects are being ethically treated. Bryman and Bell (2011) bring up some factors that this thesis will take into account to ensure that it will be performed in an ethical way.

The first factor Bryman and Bell (2011) mention is that the method cannot be harmful for the participants in any physical or psychological way. For this thesis, it means that in the interviews that will be conducted, every participant will get the chance to remain anonymous and if any participant wishes to do so, their wishes will be respected. Vetenskapsrådet (2017) also emphasizes that all participation in research should be voluntary, so every participant will be informed that it is acceptable to discontinue an interview if they would feel like doing so.

Another factor that Bryman and Bell (2011) bring up is that the participants have to be accurately informed about what the study is about and how they will be observed. Furthermore, the participants also have to consent to these methods being used. In our study, it is planned that every interview is to be recorded, but this requires that the interview subjects agree to being recorded, otherwise this method will not be used. These ideas are also supported by Vetenskapsrådet (2017) that states that participants have to knowingly give consent about the methods used if the study is to hold up ethically.

Bryman and Bell (2011) also explain that every participant has the right to keep certain knowledge private, if they wish to do so. For this thesis, it means that interview subjects can choose to decline to answer certain questions without having to give a reason to why that choice is made. It can also mean that if the participant would regret their participation in this study, then any information recorded with that person will have to be deleted and not be used in this study.

Lastly, Bryman and Bell (2011) mention how deception is regarded as unethical when conducting a study. This means that one cannot perform research and give the

participants a false explanation of why they are being interviewed or observed. In this thesis, this has been accounted for by making sure that all interview subjects will be aware of the fact that this study is being performed in cooperation with Stora Enso, no matter what organization the interview subject represents.

3.5 Trustworthiness

When conducting this thesis, a lot of emphasis was made on making it trustworthy. This entails that the thesis must be both reliable and valid.

Regarding reliability for qualitative studies, it becomes very important to avoid that the data collection becomes subjective. Taylor et al. (2016) acknowledge that people being interviewed are likely to be subjective since they often are tied to an organization or something similar. However, by using triangulation in the study, Taylor et al. (2016) show how reliability can be achieved since triangulation is the concept of examining multiple sources that hold different viewpoints, thus balancing out the risk for subjectivity. Furthermore, Taylor et al. (2016) also bring up a problem that some interviewers do, that being to try and objectively interpret what the interview subject says. The authors are clear with noting that this only makes the data subjective from the interviewer's point of view and it is detrimental for maintaining reliability in a report. This issue was avoided by recording and performing transcriptions of all the interviews. Bryman and Bell (2011) explain how the method of transcription removes the risk of subjective data collection since the exact formulations from the interview persons are documented and it allows for the authors to re-examine the interview to make sure that no misinterpretations have been made. Additionally, Ejvegård (2003) emphasizes that primary data should be used to the largest extent possible to maintain reliability since secondary data has been interpreted by someone other than the original source. This has been taken into account for this report by only collecting primary data, from interviews, and sales data from Stora Enso.

Regarding validity for qualitative studies, the challenge is to make sure that the data collected actually belongs to the scope of the thesis (Ejvegård, 2003). To make sure that questions posed during interviews will be valid, a thorough study of present literature on the subject will be undertaken beforehand. The idea is that a high understanding of the subject will help ensure that the interviews are held to topics relevant to the subject.

4. EMPIRICAL FINDINGS

Within this chapter, the empirical findings from the interviews will be presented. The chapter has been divided into one section presenting the internal findings from the interviews conducted with workers within Stora Enso and a second section that presents the external findings gathered from the interviews with Stora Enso's different 3PL suppliers. Each subsection will then conclude with a table showing the key takeaways from that specific section.

4.1 Internal findings

In this chapter, the findings from the interviews conducted with employees within Stora Enso will be presented. In total, seven interviews have been conducted with people working in various divisions within the company, as can be seen in Table 2. The presented findings will be structured to match the research questions by being divided into two sections. The first one focuses on Stora Enso's current 3PL supplier network and how the relationships with their suppliers are structured today. The second part goes more into detail on the sustainability theme by presenting how sustainability is viewed within the organization as well as how they work with sustainability together with their suppliers.

Table 2. *The role in the organization of the persons interviewed within Stora Enso*

Role of persons interviewed	Date of interview
Sustainability manager, Sourcing and Logistics	8/2-2021
Director, Landtransport Services Scandinavia	8/2-2021, 15/4-2021
Director, European Liner System	17/2-2021
Purchasing Manager, Break bulk services	9/3-2021
Procurement manager, Rail services	19/3-2021
Manager, Network and Routing	21/4-2021

4.1.1 Stora Enso's current supplier network

The network of Stora Enso contains multiple 3PL suppliers and for the most part, these are transactional relationships, where new contract negotiations take place every year. The different suppliers also vary in perceived importance, resulting in communication being much closer with the suppliers deemed more important for the company. Furthermore, it is also notable that even though the majority of the relationships use

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short term contracts, there are still multiple long-standing relationships where the actors have been working together for many years now, and the relationships between them are therefore considered very strong with a lot of inherent trust.

The interviews also bring up how Stora Enso's products generally have a very fluctuating transport need, since their customer's orders can come in short notice and therefore their production is difficult to forecast in advance. This plays a part in why Stora Enso generally wants to sign short-term contracts with their 3PL suppliers, since they want to remain flexible and always be ready to get the most advantageous contract based on their current volumes. An understanding from within the company is also that suppliers would prefer longer contracts, especially if they are to make a larger commitment by investing in new technology or anything similar to heighten their performance towards Stora Enso.

The internal findings also show that the characteristics of the transport market play a role in how the relationships are being constructed. For example, in the liner services division where Stora Enso buy sea freights up to the northern part of the Baltic sea, the market is characterized by few actors, and therefore their need for closer collaborations is stronger. In this market, Stora Enso has established a more strategic partnership with Liner services supplier A, which will be further presented in Section 4.2.3.2.1. Similarly, when observing the rail market, which also is characterized by few actors, the findings show that Stora Enso's relationships with their rail suppliers are very close with a lot of communication considered as an important aspect.

There is also an understanding present within the organization that if Stora Enso are to develop a more effective supply chain, then the mindset has to change, and they have to start viewing their suppliers as enablers towards a more innovative supply chain. Today, the relations with their 3PL suppliers are rather treated as transactional relationships focused on buying freight at low costs. Furthermore, when asked about what prerequisites Stora Enso believes need to be in place to develop a partnership, the main aspects brought up was that there has to be trust and information sharing between the companies. In regard to information sharing, Stora Enso talked about potential to be more open about for example volume forecasts in a deeper relationship, while the suppliers could contribute with more detailed data relating to the transports regarding for example payloads and emissions. Also, another prerequisite that was considered very important was for the partnership to contribute to innovative solutions for Stora Enso.

Furthermore, there are instances where Stora Enso have previously created partnerships with their suppliers. For example, in the late 1990s when Rail supplier C developed specially designed train wagons that were made solely to carry Stora Enso's own containers, that are larger than a standard container. In cases like these, the findings show that Stora Enso enables the suppliers to stand for the investment by signing longer

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contracts with them, thus sharing the risks of the investment. However, the fluctuating volumes complicates the signing of longer contracts, since Stora Enso do not want to lock themselves into a promised volume that may be altered in the near future. The findings also bring up that some longer contracts are signed where no volume commitment is being made, in order to ensure future flexibility, while still ensuring continued collaboration. Additionally, a longer contract is in place on the road market with one supplier, where the supplier transports goods on a set route with vehicles solely used by Stora Enso. In this particular case, it was also mentioned that talks have been held regarding a performance-based contract, where the supplier would get incentives to try and save fuel. But these ideas have yet to materialize as of now. Furthermore, regarding Stora Enso's contracts in general, it was also brought up during the interviews that it can be difficult to write longer contracts that cover all possible outcomes. However, the belief from within the company is that outcomes that have not been covered can be solved together.

The interviews also point towards Stora Enso being a powerful actor within their supplier network since they are a large company with considerable volumes. This is shown through explanations of how Stora Enso sometimes put demands on their suppliers in negotiations to fulfill certain requirements. However, there are no signs of exploitation as the interviewed people are conscious of the importance of keeping in good relations with their suppliers in their network. Also, the perception within the company is that larger 3PL suppliers are more capable of providing flexible solutions quickly for large, fluctuating volumes, which makes those suppliers more interesting in regard to deeper partnerships, knowingly prioritizing the capabilities of the supplier over the power balance between the actors. Key takeaways from this section can be seen in Table 3.

Table 3. *Key takeaways from the internal findings on Stora Enso's current network*

Key takeaways
Mainly short-term contracts, due to cost minimization and need for flexibility due to fluctuating volumes
Long standing relationships containing a lot of trust with their suppliers
Strategic partnerships present in the organization, exemplified by collaboration with Liner services supplier A
Trust and innovation important for a partnership
Stora Enso holds a lot of power, but uses it responsibly
Prefers to collaborate with flexible actors in the 3PL market

4.1.2 Stora Enso's view on sustainability and future partnerships

When talking about sustainability, it is clear from the interviews that the personnel in the organization think sustainability is important and they want to become better at it. Here, the findings show that the interviewed subjects see a possibility in becoming better at sustainability through more developed partnerships with 3PL suppliers and they also understand that with the increased importance of sustainability in business, changes in their current setup needs to be made.

Today, Stora Enso measures environmental sustainability through CO₂-equivalents and social sustainability through safety indicators. These are measurements that Stora Enso ask from their suppliers if they are to conduct business with them, and all suppliers also have to sign a supplier code of conduct. Here, Stora Enso acknowledges that not every supplier gets audited due to the sheer size of their supplier network, and focus lies on auditing those suppliers that are viewed as possible risks and those that have previously had issues connected to the code of conduct. Sustainability is also one of the three key performance indicators (KPIs) used at Stora Enso regarding transportation, where the other two are cost and service, which for example is measured on lead times, delivery frequency and service stock levels. The interviewed workers further mention that the requirements put on suppliers have become tougher nowadays when compared to previous years. However, it was also mentioned that the main focus currently lies on optimizing the cost and service KPIs, with the sustainability KPI holding less importance of the three. Furthermore, an issue that comes up is that the company has no real insight into how the transportation is made by the suppliers, since the suppliers sometimes are reluctant in providing the full details, meaning that the suppliers' reported emission numbers can be hard to verify. Instead, Stora Enso are calculating their own estimations on these transport emissions based on the information at hand. They also cooperate with multiple other various actors within the industry by being part of forums where actors work together to come up with standardized ways of measuring emissions. Based on this issue, some interviewees mentioned the idea of having a common digital platform in which 3PL suppliers can put in their exact data to ensure that everything is being transported in the reported manner.

When looking at Stora Enso's land transports, a large share of their volumes is being transported by road with a smaller amount being transported by rail. The possibility of using more rail transport in the future is something that was communicated very clearly as being an attractive improvement due to the increased sustainability performance that would lead to. An example of how Stora Enso can use more rail transport in the future was showcased in one interview that explained how Stora Enso changed their transport mode from road to rail. It was done by transporting goods from four different mills together down to a centralized warehouse in Europe using rail transport and then delivering it by truck for the final destination to the different customers. The findings also bring up challenges with an increased amount of rail transport, mainly because the

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infrastructure in the railway market is limited. The interviewed personnel mention how not all destinations have railway tracks covering the routes and also that there is a limited amount of train wagons available, which hinders the potential for establishing more rail transport in the future.

The findings also show how the organization is considering intermodal transport to be a more sustainable replacement for road transport. Multiple people mention how Stora Enso has started to transport more goods through this method and they believe that even more transport can be allocated towards intermodal transport going forward. The challenges that are mentioned in regard to using more intermodal transport is mainly to handle the loss of speed and flexibility that road transport offers, and to ensure that enough volumes are being transported since intermodal transport requires larger volumes than road transport. However, it is brought up that Stora Enso's products in many cases are more dependent on a dependable lead time and not necessarily needing a quick lead time. Furthermore, it is important to note that Stora Enso in some cases are replacing conventional rail transport routes into intermodal routes, rather than only replacing pure road transport routes. This is noticeable and the choice of doing so correlates with the fact that the sustainability factor is not the primary factor when choosing transport mode, according to the interviews, but rather the focus lies on cost minimization. On this subject, the findings show that the most cost-efficient transport mode generally gets chosen and it is rather considered a bonus if that would happen to be the most sustainable transport mode as well. However, the beliefs from the interviewees are also that the way these choices are made will be altered in the future if Stora Enso's customers start to demand more sustainability from them.

In one of the interviews, it was also discussed how Stora Enso wanted to improve their sustainability through partnerships with their suppliers. Stora Enso would like to see a collaboration in which the actors discuss what improvements that can be made through innovation in a long-term partnership, and then it is up to the supplier to provide this innovation while Stora Enso offers their commitment towards the supplier. Here, it was also stated that this did not necessarily imply that a long-term contract has to be signed, but the commitment towards each other should still be long-term. However, Stora Enso also acknowledges that short contracts can limit innovation since there is not a lot of time present where they can work on innovation projects together between the yearly negotiation periods. The key takeaways from this section can be further displayed in Table 4.

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Table 4. *Key takeaways from the internal findings on Stora Enso's view of sustainability and future partnerships*

Key takeaways
Lack of insight into how the transportation is being performed, makes it hard to verify emission data
Sustainability is one the KPIs for transport, but cost and service are prioritized
Rail infrastructure is lacking, not all transports can be performed by rail
The general belief is that the company would benefit from more intermodal transport
Generally, the most cost-efficient transport method gets chosen, the sustainability factor is not a deciding factor
Stora Enso focus on auditing their high-risk suppliers
The organization want more innovative solutions towards increased sustainability
Currently a lack of long-term commitment with the short-term contracts, that limits innovation

4.2 External findings

In this section, the findings from the external interviews conducted with Stora Enso's 3PL suppliers will be presented. In total, nine interviews have been conducted and they have been with suppliers active in either rail transportation, road transportation or sea transportation, further details can be seen in Table 5. The findings will be presented separately for each transport mode in a structure meant to match the research questions and thus each transport mode will be divided into two sections. The first one focuses on the relationship the suppliers currently have with Stora Enso, and what is needed for deeper partnerships. The second section then goes into detail on how the suppliers work with sustainability and what role Stora Enso can play together with the suppliers to increase the sustainability of the supply chain.

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Table 5. *The external interviews and what transport market they are from*

Company	Date of interview
Road supplier A	24/2-2021
Liner services supplier A	8/3-2021
Rail supplier A	8/3-2021
Rail supplier B	11/3-2021
Road supplier B	11/3-2021
Rail supplier C	17/3-2021
Road supplier C	31/3-2021
Break bulk supplier A	13/4-2021
Road supplier D	15/4-2021

4.2.1 Rail suppliers

Three different suppliers working with rail were interviewed, all offering different types of services. Rail supplier C is a major supplier for rail transports within Sweden, while Rail supplier A is one of the larger suppliers operating for European rail transports. Rail supplier B on the other hand are mainly building and renting out train wagons to companies such as Rail supplier C and Rail supplier A, but also directly to Stora Enso. This is done either by renting out wagons between two destinations, or by having a long-term agreement in which wagons are rented out for one or several years.

The railway sector in Sweden is characterized by a few actors that own the entire rail market, and also in Europe, the interviews reveal that there does not exist many actors compared to the road market. At the same time, none of the actors interviewed felt like this gave them any type of monopoly on the market, since they experience competition from the transport sector as a whole, where they also compete with road and sea transports. There is also intermodal transport, which is gaining increasing shares of the transport market.

4.2.1.1 Rail suppliers' current relationship with Stora Enso

All of the suppliers have a long history of over 20 years working with Stora Enso during which some mutual dependency has been built up, and Stora Enso is considered an important customer due to the volumes they can offer. However, it is only at Rail supplier A that the word partnership is used to describe the relationship with Stora Enso.

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The factors that contribute to this view of a partnership with Stora Enso is the good relationship that has been built up over a long time, in which it is considered important to continuously show loyalty in order to keep the good relationship with each other. This is exemplified by the fact that Stora Enso is not just abandoning Rail supplier A at a specific transport route just because another supplier happens to have a cheaper transport, but if this is the case, they have a dialog with Rail supplier A, in contrast to some other customers that will just change supplier without any notice. Other examples where instead Rail supplier A are showing loyalty towards Stora Enso is the current flow of empty wagons from Germany up to Stora Enso in Sweden, which before the Covid-19 pandemic started were full truckloads from Volkswagen. Although driving empty wagons is not financially profitable, this has been done as a long-term investment in the relationship with Stora Enso.

Furthermore, some closer collaboration has also taken place with Rail supplier C. Customized wagons were developed in the 1990s, for the purpose of carrying Stora Enso's own containers, that are larger than a standard container. Although these wagons are still in traffic there has not been any further similar collaborations with any of the rail suppliers. In general, the relationships with the rail suppliers are mainly of a transactional nature, and most contracts are short-term.

When talking in general about prerequisites for closer collaboration or partnerships with another actor, some different factors are brought up in the interviews. The importance of a good relationship, and to be able to trust one another are mentioned in all interviews, along with the necessity to have an open communication, in which both parties are able to have a dialog even when it gets more uncomfortable. Furthermore, it is deemed important to have common interests or goals, so that solutions can be made that benefit both parties. Having shared values is also brought up as a requirement for a closer relationship, for example Rail supplier A bring up the importance that the other party values social sustainability high. The relationship with Stora Enso is considered good by the interviewed suppliers. The interviews also reveal that the suppliers feel that their values are in line with Stora Enso's, however, in what ways goals are aligned among the suppliers and Stora Enso are not as clear. Key takeaways from this section can be seen in Table 6.

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Table 6. *Key takeaways from the rail suppliers' thoughts on their current relationship with Stora Enso*

Key takeaways
Long standing relationships with a lot of trust, some mutual dependency
Stora Enso an important customer due to their volumes
Continuously demonstration of loyalty is important, where both actors give and take
Transactional relationships with annual contracts, but with history of some closer collaborations
Prerequisites for a partnership are a good relationship, trust, open communication, mutual goals and mutual benefits
The relationship is considered good and they believe that their values are in line with Stora Enso's

4.2.1.2 Rail suppliers' view on sustainability and future partnerships

The suppliers see both opportunities and challenges in increasing the collaboration with Stora Enso. It is pointed out in the interviews that the products Stora Enso have are very well suited for conventional rail transport, and the large volumes give them the ability to fill wagons themselves. There is also emphasis on the possibility to load the wagons any time at the production sites. This is due to the fact that the wagons are dropped off and picked up the day after, in comparison with a truck where there is a driver waiting for the truck to get loaded, which gives less flexibility of when to load the trucks.

At the same time there are also limitations and challenges in regard to infrastructure. There is a limited amount of wagons available on the market and sometimes there can be shortages of these. However, Rail supplier B explain how they strive to continuously expand their inventory of wagons, and also the interviewed worker stated that they are open to designing wagons together with a customer, as a joint investment. Furthermore, to really be able to utilize the conventional railway there need to be railway tracks built by the production facility, and also extra sidetracks to fit more wagons. However, according to the railway suppliers, many times tracks are taken down in order to give space for other buildings, but without replacing them elsewhere. In another case relating to Stora Enso's production facility in Skoghall, there used to be three different sidetracks of two km, which enabled them to store wagons and thereby be able to handle sudden increases in demand. But these tracks were removed by Trafikverket who replaced it with two tracks of 250 m, which greatly limits the capacity. Another example in the interviews is given in regard to a recently built warehouse in Lübeck, where no rail track was built in connection to the facility, despite the fact that it would have allowed driving the whole way there from Sweden on rail.

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One challenge with the infrastructure is also that the customers and rail suppliers are not in control over this, but the state-owned company Trafikverket takes care of the infrastructure. At the same time there is also a possibility to influence changes in infrastructure, both for an actor like Stora Enso or for the rail suppliers, and companies can apply to Trafikverket for them to for example build passing loops to increase the capacity of a railway route, or to widen a tunnel to cope with special transports. An option that Rail supplier C bring up is for several companies, customers or competitors to go together if they see potential improvements in infrastructure, and thereby have more power to influence Trafikverket to make it go through.

There are also limitations concerning the IT-systems in the railway market. Compared to road transport, where there is live GPS-data of where the trucks are located and when they are expected to arrive at each stop, conventional rail lacks this transparency. Within Sweden it is possible only to see which stations that the train passed, and when it goes outside the borders of Sweden to Europe there is no visibility, since the countries use different systems. This means that it is needed to guess what time a train in Europe will arrive at its destination, which is a clear disadvantage. However, Rail supplier C mentions that this problem is on the way to being solved, as several European rail operators are cooperating to create a common interface among the countries. This will make it possible to enter the other countries' IT-systems and find details such as current location and arrival times.

One of the main advantages with using rail is the low emissions from using electrical trains, and this is clearly promoted by all the rail suppliers, even though they point out that the degree to which this is an advantage depends on where the electricity stems from. In Sweden at least, the electricity is not created from fossil fuels, and is far more environmentally sustainable than road or sea transport, and it is pointed out in one of the interviews that rail is the only transport mode at the moment which can be driven by electricity on a larger scale. It is however mentioned that electrical trucks are being developed, and furthermore, tests are being made by Stora Enso themselves between the cities of Gävle and Falun using overhead lines over the highway, though it is expected to take a long time before such a network would be developed across Europe. Regardless of the fuel, the fact that rail has much lower friction than other transport modes is also mentioned and compared to intermodal transport where containers are transported on wagons, conventional wagons are also stated to have a clear advantage in lower total weight and higher capacity. Furthermore, the interviewed rail suppliers also believed that their transportation mode was better from a social sustainability standpoint as well since rail transport is responsible for fewer accidents when compared to other transport modes and there are less issues regarding working conditions if compared to road transport, according to the interviewees.

Despite these clear sustainability advantages, there is a common view among the interviewees that neither Stora Enso nor other companies are particularly willing to pay

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more to have a more sustainable solution, for example by choosing rail instead of road. Instead, the price is seen as the deciding factor, and the feeling from one of the rail operators is that if rail is chosen, it is either because of the price or other factors not related to sustainability. The experience from the interviewed actors is that the paper and pulp industry only want sustainable solutions if it is free, or if it comes as requirements from Stora Enso's customers. Rail supplier A has tried offering their customers 2% higher price for climate neutral transports, but so far, no customers have been willing to take this offer. However, the interviews also show optimism that the willingness to pay more for sustainable solutions will increase in the near future, and Sweden's goal to become fossil free is believed to be one driving factor for this. In Table 7, key takeaways from this section are summarized.

Table 7. *Key takeaways from the rail suppliers' thoughts on sustainability and future partnerships with Stora Enso*

Key takeaways
Stora Enso's goods is well suited for rail due to weight and volumes
Limited amount of wagons, but there are opportunity to build new ones together with suppliers
Infrastructure is lacking, but some possibilities to improve infrastructure exists
Rail transport is superior to other transport modes in regard to emissions
Low willingness to pay for sustainability, both from Stora Enso and other actors
Common belief that the willingness to pay for sustainability will increase in the near future

4.2.2 Road suppliers

From the road suppliers, four suppliers were interviewed. Road supplier D is solely involved in road transport. Road supplier C are mainly involved in road transport, but they also provide intermodal solutions, although Stora Enso are not buyers of this service. However, Road supplier B and Road supplier A are suppliers of both normal road transports and intermodal transports to Stora Enso.

Compared to the rail market, the road market is characterized by high competition, where even larger actors such as Road supplier C and Road supplier A only have market shares consisting of a few percentages of the total road market according to the interviews. There are multiple actors originating from all of Europe competing in the market, which generally leads to actors having to drop their profit margins to stand out as an attractive alternative.

4.2.2.1 Road suppliers' current relationship with Stora Enso

The interviews conducted with the road suppliers showed that these relationships, similar to the rail suppliers, mainly consist of long-standing relationships, where trust has been built up over the years. With the road suppliers, the findings show that it is almost entirely transactional relationships with annual contract negotiations, and no deeper collaborations between the parties. Road supplier B mention that one of the main reasons for this is that the transport business is very volatile, and since the market condition can change frequently, agreements are usually limited to one year. However, the communication is brought up as something that is working well between the suppliers and Stora Enso, with some companies acknowledging that Stora Enso is a prioritized customer to give newly gained information to, based on their importance as a key account customer.

When looking further into Stora Enso's relationships with their road suppliers, the findings show that through their long-standing relationships, some mutual dependency has been built up on some of their routes. However, the interviewees also mention that on other routes, they are easily interchangeable for Stora Enso, which in some cases have led to them having to accept terms that are unfavorable for themselves.

Furthermore, the interviewed actors were asked what was important for them if a deeper partnership was to be established in the future, the answers were quite similar. The prerequisites included that the actors have to feel that they trust each other and a good relationship where both parties come along with each other is needed, along with the importance that the companies share similar values regarding future goals, sustainability and their way of conducting business. Additionally, the need for mutual benefits was highlighted, and a sense of long-term commitment together with a common vision for the future was deemed important.

Stora Enso also uses intermodal transport on some routes, in order to achieve more sustainable transport. However, the choice of intermodal transport over road transport is mainly made in cases where the cost of the transport will not be negatively affected by it, according to the interviews. Stora Enso's main supplier when it comes to intermodal transport is Road supplier B, and in the interview with them it was stated that approximately 40% of all their transports for Stora Enso is being conducted through intermodal traffic. Road supplier A is also performing intermodal transports for Stora Enso, for example on some transport routes down to Italy, although the amount of intermodal transport with Road supplier A is smaller when compared to Road supplier B. A collection of the key takeaways from this section can be seen in Table 8.

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Table 8. *Key takeaways from the road suppliers' thoughts on their current relationship with Stora Enso*

Key takeaways
Long standing relationships with a lot of trust, some mutual dependency
Transactional relationships with annual contracts, no deeper collaborations
Well working communication, Stora Enso are a prioritized customer
Prerequisites for a partnership are trust, a good relationship, mutual benefits, shared values and visions and long-term commitment

4.2.2.2 Road suppliers' view on sustainability and future partnerships

All interviewed firms hold a high focus on improving their sustainability performance. Regarding social sustainability, all companies make sure that they follow the rules and regulations in place and that the working conditions for their workers hold a high standard. Furthermore, the findings show how the road suppliers work with many aspects regarding environmental sustainability. As mentioned, the suppliers are increasingly using intermodal transport as an alternative to pure road transport and route optimization tools are used on the current routes. The suppliers also put focus on improving their vehicle fleets, with the majority of the trucks today being classified as Euro V or higher. Research is also put into alternative fuels such as hydrogenated vegetable oil (HVO) and aerodynamic improvements for the trailers, with the aim of decreasing air resistance on trucks to limit fuel consumption. In this area, Road supplier A also mention that they are looking into the method of platooning, with trucks that drive autonomously behind each other. Furthermore, an interesting finding from the interview with Road supplier D was that even though they have trucks that can be driven on HVO, they currently still use fossil fuels. This is being done since HVO is a more expensive fuel and the companies contracting them are currently not willing to pay more for having their transports performed with alternative fuels.

The findings from the interviews also presented the fact that truck driver is an occupation where the average age of the workers is increasing and thus there are risks of driver shortages in the future. It was also brought up that new regulations are coming in the truck industry in 2022, limiting the time drivers can stay away from their home country which would decrease the amount of low-cost transports with foreign drivers. These are factors that the interviewed actors believe will open the door for more intermodal transports in the near future. Additionally, an increase in intermodal transport would also create different working conditions for the truck drivers, since their transport routes would become shorter with rail transport covering the major distances across borders, and this could potentially make the profession more attractive according to one of the interviews. Furthermore, it is stated in the interviews that there is potential for an increased use of intermodal transport within Stora Enso moving

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forward. However, the potential is somewhat limited due to the lack of railway infrastructure and the need for speed and flexibility on some routes that only road transport can provide, meaning that regular road transport will still be the main source of transportation on these routes.

The topic of electrical vehicles was also raised under the interviews and that is also something the road suppliers are working to implement in the future. On last-mile deliveries, companies such as Road supplier C have already managed to implement electrical deliveries, but work still remains regarding electrical heavy trucks. It was mentioned that a pilot project is ongoing that involves a completely electrical heavy truck, although it was acknowledged that a commercial implementation probably is years away still. Furthermore, the interview subjects also brought up emphasis on the high speed with which innovation develops within the field of logistics.

Furthermore, it was also stated in the interviews that the emissions from all transports are measured in all the interviewed companies and they also mentioned that some of this data is currently shared with Stora Enso. Road supplier D have also taken the data sharing one step further by creating their own IT-platform where their customers can go in and see each transport in detail. In addition to measuring the emissions, Road supplier D also monitors all of their privately owned trucks, which is the majority of their truck fleet, to make sure that the social sustainability is maintained, for example by making sure that drivers keep within the speed limit and take the breaks that they are obliged to take. Furthermore, Road supplier C mentioned that they have an option to pay an extra amount for each transport conducted with them in order to have a climate-compensated transport. This is an alternative for customers to make sure that their transports become more sustainable. However, it was stated that Stora Enso is not currently paying for this option. Similar findings were made during the interview with Road supplier B, in which the interviewed person expressed that even if Stora Enso prefers using the intermodal option due to the greater sustainability, the experience is that this only happens if the price is the same or lower than it would be using road transport.

When questioned about the possibility of deeper partnerships in the future together with Stora Enso, the companies generally responded positively to the idea and even though no concrete ideas of what such a partnership would look like was mentioned, the prevalent answer was that it should be long-term, mutually beneficial and with focus on development. Road supplier D also brought up that a long-term contract would remove a lot of uncertainties that come from the highly competitive transport market, meaning that such a contract would allow them to make more investments for improved performance. Furthermore, it was expressed that less focus on cost-optimization would be appreciated in a long-term commitment, and for Stora Enso to show more willingness to invest towards sustainability. It was however also mentioned that a lot of factors have to match for it to be possible with a partnership and the interviewees

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stated that some routes are better suited for partnerships than others. This is because some routes are more uncertain and require flexibility, while other routes, for example within Sweden, are more stable which would allow for a longer planning perspective.

Lastly, the road suppliers were also asked about their view on any possible triadic collaborations, for example by Stora Enso using cargo groupage together with another company to limit empty transports for the 3PL supplier. The response was that all road suppliers already work with maximizing trailer usage, either by cargo groupage or by ensuring that they have cargo transport in the return flow as well. However, this is something that the road suppliers take their own responsibility for since, according to one supplier, it is their best way of maximizing their transports. If more actors were to be involved, the risk would be that miscommunication or other factors would impair the effectiveness of their transport, according to the findings. In Table 9, the key takeaways from this section have been put together.

Table 9. *Key takeaways from the road suppliers' thoughts on sustainability and future partnerships with Stora Enso*

Key takeaways
The suppliers make sure to follow all the rules and regulations to maintain a high social sustainability
Solutions with alternative fuels are possible today, but no customer is willing to pay extra a more sustainable solution
Driver shortages and new regulations might create more opportunity for intermodal transport in the near future
Emission data is being measured by all suppliers, currently shares some of it with Stora Enso
Difficult to create triadic collaborations, 3PL suppliers maximize trailer usage on their own

4.2.3 Sea suppliers

From the sea transport market, two different types of suppliers were interviewed. Liner services supplier A, portraying the liner services, and Break bulk supplier A, portraying the break bulk shipping. The characteristics for these two markets are different, for example with more competition within the break bulk market and the two different markets will thus be further explained separately in the coming sections.

4.2.3.1 Break bulk shipping supplier

Within the market of break bulk shipping, the supplier Break bulk supplier A has been interviewed. Break bulk supplier A are responsible for shipping Stora Enso's break bulk products, mainly from their mills in Finland, down to continental Europe by sea transport. The break bulk transport market can be compared more to the land transport

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market rather than to the liner services market, because there is more competition amongst the suppliers and the relationships between the actors are of a less strategic nature.

4.2.3.1.1 Break bulk shipping supplier's current relationship with Stora Enso

It was presented that the actors have a contract agreement in place that is a bit longer compared to their previous short-term contracts. This agreement was made since both parties saw it as beneficial to gain stability for the upcoming years. Furthermore, the belief from the interviewed person is that the two firms in many aspects are dependent on each other. It was acknowledged that Stora Enso have a lot of power, but the perception from the interviewee is that this never is misused and still, while Stora Enso are a large customer for Break bulk supplier A, the belief is that they are dependent on Break bulk supplier A as well since they offer capacity needed by Stora Enso.

In the past, a more strategic collaboration was also put in place between the two actors. In the 1990s, Break bulk supplier A built vessels that were specifically designed to carry Stora Enso's own containers on a certain route. This project is internally deemed as a huge success but at the moment, no similar projects are being undertaken, with the volume negotiations being more towards the transactional nature.

The interview subject was also asked what is needed for a partnership to be set up and successful between two companies. Here, the findings show that it is important with trust between the actors, that the partner has financial credibility, and that the social sustainability of the company is in order, for example by making sure that their own code of conduct is being followed. Furthermore, the personal relationship was brought up as an important aspect when it comes to partnerships. The interviewed person explained the importance of actually knowing the people your company collaborates with both sides being open towards each other and willing to work together. If these personal aspects are in place, then the belief from the interviewee is that the financial business aspects will work out much easier in a partnership. Key takeaways from this section have been encapsulated in Table 10.

Table 10. *Key takeaways from the break bulk supplier's thoughts on their current relationship with Stora Enso*

Key takeaways
Slightly longer contracts than road and rail, but this change is very recent
Mutual dependence even if Stora Enso sits on the power
There are hopes that the demand of sustainability will increase
The personal relationship and trust between the actors is vital for partnerships

4.2.3.1.2 Break bulk shipping supplier's view on sustainability and future partnerships

From a sustainability point of view, Break bulk supplier A are using different methods to reduce their energy consumption and CO₂-emissions. It was mentioned that they implement route optimization, slow steaming and try to limit electricity usage on board the vessels. Furthermore, discussions are also actively being made about a possible switch to alternative fuels in the future, especially since their vessels will have to be replaced due to age in the future. However, the findings tell that the infrastructure for alternative fuels still has some ways to go when it comes to availability for refueling and also regarding the economic aspect. Alternative fuels are currently more expensive than fossil fuels so a more sustainable vessel will cost more to operate, and it was also explained that the manufacturing cost, which already is a significant investment for a new vessel, will cost approximately twice as much if the vessel were to run on alternative fuels. The issue that arises here according to the empirical findings is that the customers have to be willing to pay extra if these alternative fuels solutions are to be implemented due to the extra costs. And so far, Break bulk supplier A have yet to receive a definitive commitment from any of their customers that they are willing to do that, thus hindering them from making this investment. It was brought up that since the financial crisis in 2008, the market has been characterized by focus on minimizing costs. However, the interviewee also thought that this perception was starting to change now after many years of no change in the matter.

When asked about future partnerships with Stora Enso, the answer received was that Break bulk supplier A hopes to maintain their relationship with Stora Enso into the future and the hope is to get an even closer collaboration. The main aspiration being that they commit to each other over a longer time period in the future. The current contract is according to Break bulk supplier a good step in the right direction, but the desire would be to have a commitment over an even longer time period in the future. It was also stated that longer commitment like that would include volume flexibility through reoccurring negotiations depending on the market so the volume uncertainty would not be an issue according to the interviewed person. However, such a commitment would still be very important for Break bulk supplier A since it could allow them to make larger investments into new, more sustainable vessels, since such a commitment would remove the uncertainties that otherwise come with such an investment. For a condensed view of the key takeaways from this section, see Table 11.

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Table 11. *Key takeaways from the break bulk supplier's thoughts on sustainability and future partnerships with Stora Enso*

Key takeaways
Strong focus on minimizing cost
No interest from the industry to pay more for improved sustainability
Wishes for more commitment and longer contracts with Stora Enso in the future
Longer contracts would allow for investments in new and more sustainable vessels

4.2.3.2 Liner services supplier

Within the liner services division, Liner services supplier A has been interviewed. Liner services supplier A is a company that offers liner services through RoRo-shipping covering Stora Enso's routes up into the northern part of the Baltic sea. This transport branch differs from the land transport market since it can be more likened to a monopolistic market with very few actors and high entry barriers. As a result of this, the relationship between Stora Enso and Liner services supplier A differs a lot from Stora Enso's relationships with their land transport suppliers. This partnership will be presented in the coming section, however no section about future partnerships will be included since their current partnership is constructed long-term.

4.2.3.2.1 Liner services supplier's current partnership with Stora Enso

The relationship with Liner services supplier A differs from the relationships Stora Enso have with their land transport suppliers. Here, Stora Enso have previously for many years contracted Liner services supplier A to handle the liner transports on ships that are owned by Stora Enso, with them having the responsibility to sell remaining capacity to other actors in the area. However, with their new agreement, a partnership is in place where Liner services supplier A is building two brand new ships that are much better from a sustainability standpoint as well as from an overall performance standpoint. These ships will provide capacity for a number of actors offering volumes on these routes, one of them being Stora Enso. This agreement is made through long-term contracts which made it possible for Liner services supplier A to make the large investment required to build the new ships and it requires close collaboration between all actors involved. Also, during the building phase, the collaboration is ongoing with Stora Enso and the other companies are for example taking part by giving input into how the new ships will be developed, so that the characteristics of the ship will fit the industry. It is also notable that since Stora Enso previously used their own ships, they had more flexibility regarding their volumes. Now they have to keep within the frames of their negotiated volumes, but that was deemed worthwhile due to the benefits that come from this partnership and the brand-new ships.

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During the interview, it was also stated that the long-standing relationship and the inherent trust between the two companies was a big contributing factor for the strategic partnership to take place. Furthermore, it was stated that it was very important that the companies share the same values and put emphasis on the environment if this type of agreement is to be maintained for a longer period of time. However, it was also mentioned that a challenge of working with large companies like Stora Enso is that they sometimes are slow to make decisions, due to the hierarchy within the organization. The key takeaways from this section are found in Table 12.

Table 12. *Key takeaways from the liner services supplier's thoughts on their current partnership with Stora Enso*

Key takeaways
Long contract written which has enabled the supplier to investment in new sustainable ships
Close communication with the actors involved
Less flexibility compared to using own ships, but many benefits received instead
The long history of the relationship and trust built up was a large factor for the partnership taking place.

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The analysis will combine the theoretical framework and the empirical findings with the aim of answering the report's research questions. This chapter involves six sections, where the first two are focused on the first research question and explains how Stora Enso's current partnerships are built and what prerequisites for partnerships that have been found through theory and interviews. The final four sections revolve around the second research question and are divided as such that one section explain what possibilities are present for improved environmental sustainability, one bring up the possibilities for improved social sustainability, one covers how sustainability can be reached through partnerships and the final section looks at how contracts can be structured to allow for strategic partnerships.

5.1 Stora Enso's current relationships

From theory, several traits of a partnership can be distinguished and compared to the relationships between Stora Enso and its 3PL suppliers. Lambert et al. (1996) talks about how sharing of assets and close integration is significant for partnerships, but when looking at the empirical findings, there is little evidence of these types of relationships, with the exception of the partnership with Liner services supplier A. With Liner services supplier A there is more integration in the relationship compared to the relationships within road or rail transport, and Stora Enso are working closely with them to make sure that the new ships that are being developed will be used in an optimal way, in order to ensure long-term success for both companies. This shows signs of strong commitment to each other, which is one important part of partnerships according Zacharia et al. (2011). The relationships between Stora Enso and Liner services supplier A also distinguish itself from other supplier relationships in their long-term contracts, and except for Break bulk supplier A who has slightly longer contracts than the other suppliers, Liner services supplier A is the interviewed supplier with the longest written contract. This has enabled Liner services supplier A to make investments towards newer and more sustainable ships. Furthermore, when studying the empirical findings, it is notable that the future aspirations from Break bulk supplier A within the break bulk transport market is very similar to the actual partnership Stora Enso has established within their liner services market. The market characteristics are certainly different between the two markets which might affect the possibility of implementing such a partnership. However, it definitely seems as though a long-term commitment is what is needed within sea transport to allow for more sustainability in the future due to the significant investments that distinguish the sea transport market. This way of working with longer commitment also has support in literature, where it is suggested that less detailed contracts should be set up for strategic partnerships if the service is of high importance, the provider holds higher competence than the buyer, and if the future outcome is unclear (Martínez-Jerez, 2014). In the referred relationship all these three requirements are fulfilled, which confirms the choice of contract and further enforces

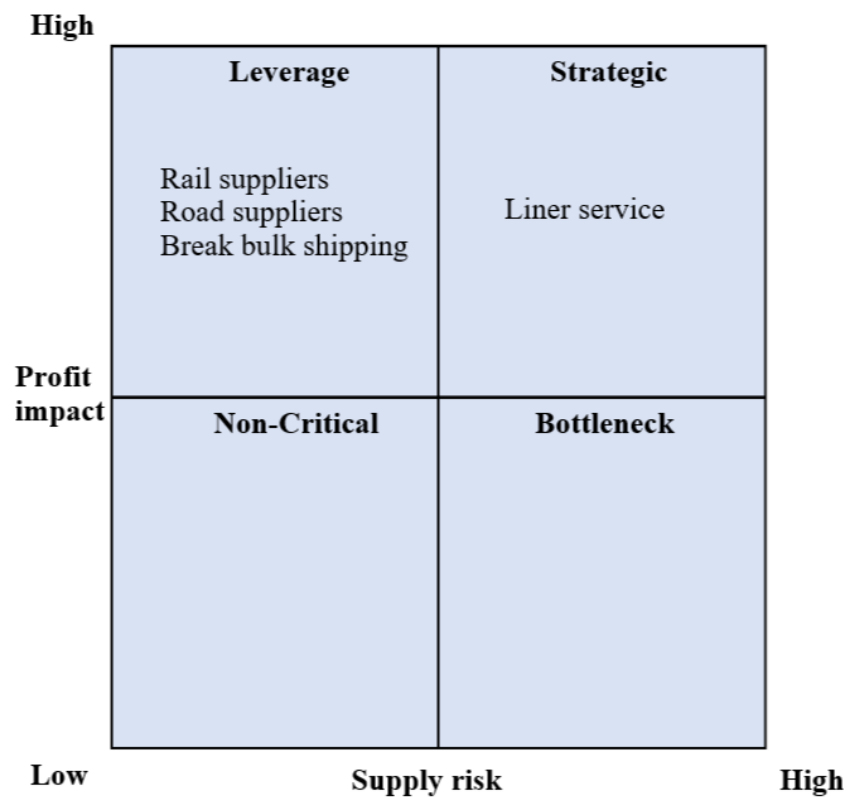
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the view of the relationship being a good example of partnership. There is also a strong interdependence between the companies, where both parties are dependent on the wellbeing of the other, which is also a necessity for a successful partnership according to Buono (1997).

If comparing the relationship with Liner services supplier A to the Kraljic matrix (Kraljic, 1983), which is seen in Figure 2 in Section 2.1.1, the few actors on the market make the supply risk high, which is further confirmed by the fact that Stora Enso earlier used their own ships in order to ensure supply of transports. There are also large volumes being sent on these lines, so the profit impact can be considered high, which together with the high supply risk would place the relationship in the strategic quadrant of the matrix as seen in Figure 5. Taking the analysis deeper by looking at the extended Kraljic matrix by Gelderman and van Weele (2003), the relationship can in one way be seen as a locked-in 'partnership', due to the few suppliers available, almost creating a monopoly situation. On the other hand, the partnership is not forced, but has been initiated as a way of outsourcing the service to focus on the core business, which is often done for activities that are of strategic importance to the company according to Zacharia et al. (2011). The purpose with the relationship for Stora Enso is to ensure their volumes and achieve better sustainability, and this would contribute to creating competitive advantage, which is seen as the main reason to maintain strategic partnership (Gelderman & van Weele, 2003).

When comparing the road and rail suppliers to liner services, along with the break bulk shipping, there is much more competition in general, which decreases the supply risk. Since the interviews are made with those 3PL suppliers that contribute to the largest part of Stora Enso's volumes and spend, the profit impact can similarly as for Liner services supplier A be considered high. This would imply that these suppliers would naturally fall into the leverage quadrant in the Kraljic matrix. But at the same time, there are also routes where few alternatives exist, and sometimes customers have demands of doing the transports with a particular transport mode. In these cases, the relationships have some similarities to the locked-in 'partnership' in the strategic quadrant from Gelderman and van Weele (2003), in which supplier monopoly, high switching costs or customer demand of a certain service forces the relationship into this position of dependence. However, Stora Enso are to a large degree avoiding this by trying to find multiple options for each route, also with the purpose of handling their large volume fluctuations. Because of this, the leverage quadrant would likely be a more accurate description of the current position of these suppliers, and as seen in Figure 5 the majority of suppliers are placed here. In this position, theory suggests that buyer power should be exploited, using competitive bidding and short-term contracts (Gelderman & van Weele, 2003). This is also what Stora Enso are doing to some degree according to the empirical findings, where the tendency is to sign short-term contracts where price is one of the most important factors, although the service and sustainability of the transport is also considered.

Figure 5. *Kraljic matrix based on Kraljic (1983), displaying what type of relationship Stora Enso has with their suppliers sorted by transport mode*



At the same time, the relationships with these larger actors that were interviewed all have a long history working with Stora Enso, and good relationships have been built up. This has created some levels of interdependence, where the high volumes, which are connected to specific routes, in some cases make it difficult to suddenly change suppliers. To some degree, these built-up interdependencies, along with high levels of trust could imply that these relationships should be considered as partnerships. But in general, the majority of the relationships with the suppliers seem to lack the commitment to each other that Zacharia et al. (2011) talks about and that exists in the relationship between Stora Enso and Liner services supplier A. Furthermore, no common investments have been made with these other suppliers in recent times, and for example, there are no clear mutual goals in the relationships, which is needed for successful partnerships (Frydinger et al., 2019; Buono, 1997).

However, one element of partnerships that is brought up by Buono (1997) is norms of reciprocity, of which examples can be found in the relationship with Rail supplier A, where representatives of Rail supplier A specifically talk about the importance of continuously showing loyalty and returning favors towards each other. This is exemplified with Stora Enso showing loyalty by not changing suppliers suddenly on a specific transport route without discussing with Rail supplier A first, which is different to what some other companies may do when they get offered a better price. Also, Rail

supplier A are showing loyalty during the COVID-19 pandemic by temporarily sending empty wagons up to Sweden, even though it is not profitable for them.

5.2 Prerequisites for partnerships

When comparing what the suppliers consider as prerequisites for partnerships with theory in this subject, many similarities can be seen. In all the interviews, the most common theme regarding this was the importance of a good relationship where trust is central, which is also strongly confirmed in literature (Gelderman & van Weele., 2003; Lambert et al., 1996; Zacharia et al., 2011). The advantages of having high levels of trust between companies are many, and some examples mentioned by Kumar (1996) are that it allows for information sharing, making investments in the relationship or customized solutions between the partners. This also relates to the need for open communication and ability to discuss issues that are not as comfortable, which is being expressed by one of the rail suppliers, and the importance of communication and large degrees of interaction is also emphasized in Zacharia et al. (2011). Consistently throughout the interviews, the suppliers were expressing that the relationship with Stora Enso is good and that there is a mutual trust among the companies, which has been built up during many years. Furthermore, the communication between the suppliers and Stora Enso was also brought up as something that was working well between the companies. At the same time, Stora Enso also sees potential for more information sharing and openness in the relationships, where suppliers for example could provide more detailed data about the transports, while Stora Enso for example could be more transparent with their forecasts of volumes. By having a closer relationship, more trust is built, and it also creates mutual dependencies according to van Damme and Ploos van Amstel (1996), who explains that this additionally limits the risks that one of the parties would not fulfill their obligations in the partnership. The importance of mutual dependencies for successful partnerships is also brought up by Buono (1997), but is on the contrary not mentioned as a prerequisite according to any of the empirical findings. However, Dubois and Pedersen (2002) are on the same track as Buono (1997), and discuss how adjustments between actors create unavoidable interdependence, but this should not be considered a problem as it contributes to more productivity and innovation.

Another prerequisite for partnership that was deemed important for many of the suppliers was to have common goals that are mutually beneficial, which is also supported by Buono (1997) and Lambert et al. (1996). The need for goals that are aligned is also considered a central part for long-term relationships according to Cuevas et al. (2015), who states that this is especially the case for relationships where there is a power asymmetry. According to Cuevas et al. (2015), literature shows that relationships with a power asymmetry tend to contain lower levels of trust. That Stora Enso is the more powerful party is confirmed in the empirical findings, which means that all of their 3PL supplier relationships have some level of power asymmetry. Some

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of the factors that make a company more powerful are brought up in Kähkönen and Virolainen (2011), where relevant examples in regard to Stora Enso are the fact that there are many alternative suppliers, and high competition on the market and that Stora Enso try to not lock themselves into one supplier. Furthermore, the size of the company and the volumes they can offer to suppliers are also factors that are mentioned by Kähkönen and Virolainen (2011). However, even if there is a power asymmetry in the relationships, the empirical findings show that there are high levels of trust despite this. Indeed, Cuevas et al. (2015) conclude that power asymmetry does not need to be a limiting factor for a long-term relationship, instead it is stated that the most important factor for creating trust in a relationship is by making sure that the partners have a common vision and aligned goals.

However, even though high levels of trust exist between Stora Enso and its suppliers, it is not mentioned that Stora Enso has any mutual goals that they are working towards together with their suppliers. Stora Enso have their own goals in regard to transport, which is to perform well in regard to the three KPIs, cost, service and sustainability, and they also have a supplier code of conduct which the suppliers have to follow, but no common goals that the parties agree on together can be found in the interviews. Furthermore, it is mentioned in the interviews that Stora Enso, due to their size, often are able to negotiate beneficial contracts for themselves. However, in a partnership, Kumar (1996) says that the more powerful actor in a partnership should be careful to exploit its power, and instead make sure that the weaker party feels fairly treated. It is also important that the stronger party make sure that the profitability is sustainable for the weaker party according to Kumar (1996), since exploiting power can be disadvantageous in the long term (Kumar, 1996). Xu and Beamon (2006) also bring up how the smaller company can come to leave the partnership if they feel marginalized.

Although this could be an issue, no signs from the empirical findings show that any supplier is being exploited, even if Stora Enso holds more power. Several suppliers acknowledge that Stora Enso has a lot of power, but they do not feel like it is being misused. Furthermore, it was brought up in the internal findings that Stora Enso are very conscious about not misusing any power since they want to keep their established relationships intact. This behavior is in line with Dubois and Pedersen's (2002) theories, stating that powerful companies do not always want to exploit their power and instead focus on maintaining the relationships and dependencies built up between the actors. It was also stated that Stora Enso sees bigger possibilities for partnerships with larger 3PL suppliers, since they believe that these larger actors have better capabilities that can accommodate for improved processes, and they are generally more willing to develop flexible solutions together with Stora Enso. This perception is supported by the findings from Toelke and McKinnon (2021) that shows how larger 3PL suppliers are more likely to hold knowledge regarding new sustainability solutions and that this knowledge generally results in them implementing the solutions as well.

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Even if a majority of the suppliers of Stora Enso are placed in the leverage quadrant in the Kraljic matrix, this is not necessarily a hindrance for developing partnerships, and Gelderman and van Weele (2003) mentions that moving from the leverage to the strategic quadrant is a possibility that can yield competitive advantage. However, it is pointed out that this only should be considered if the profit impact is high and the supplier has more advanced technology to offer (Gelderman & van Weele, 2003). This is something that is touched upon in one of the interviews from Stora Enso, where one of the prerequisites for partnership being brought up was that the suppliers should be able to contribute to innovation.

A summary of all prerequisites that was brought up, and in which contexts they were mentioned can be seen in Table 13. To have a good relationship characterized by trust was the only prerequisite brought up by all sources and can be considered of particular importance. Open communication with high levels of interaction was also central, where there were only a few cases where it was not brought up. The only prerequisite that was found among the suppliers, but not in literature was the need of common values, which referred to having shared values of the way business is conducted and how the partners work with social and environmental sustainability. In particular, the rail suppliers express this, stating that they feel how they share common values with Stora Enso, and have confidence that Stora Enso cares for social and environmental sustainability, which are important values for them and thus make them more willing to set up common goals for the future.

Table 13. *Displaying the prerequisites needed for a partnership that was brought up in the findings*

Prerequisites for partnerships	In literature	Stora Enso	Rail suppliers	Road suppliers	Break bulk service	Liner service
Good relationship characterised by trust	Yes	Yes	Yes	Yes	Yes	Yes
Open communication with high levels of interaction	Yes	Yes	Yes	Not mentioned	Yes	Yes
Mutual goals and benefits	Yes	Not mentioned	Yes	Yes	Not mentioned	Not mentioned
Common values	Not mentioned	Not mentioned	Yes	Yes	Yes	Yes
Mutual dependencies	Yes	Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned
Enabling of innovation	Yes	Yes	Not mentioned	Not mentioned	Yes	Not mentioned

5.3 Opportunities for improved environmental sustainability

In theory, Rodrigue (2020) mentions how limiting emissions is of high importance when it comes to improving the sustainability of a supply chain. This is something that all interviewed actors seem to agree with, and it is apparent that both Stora Enso and their suppliers want to improve their processes to decrease the emissions that originate from their transports. However, at the moment, the empirical findings show that Stora Enso have yet to take significant action towards these improvements. It is mentioned that the sustainability KPI does not hold the same importance as cost and service when it comes to optimizing the company performance and also that most changes leading to improved sustainability is a result of customer demands or solutions that simultaneously reduces cost. But it is also mentioned that the perception from the empirical findings is that further regulations put in place and the escalated sustainability interest in the industry as a whole, will lead to more sustainability improvements moving forward.

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Theory mentions multiple different methods that 3PL suppliers can implement to improve the sustainability performance, and the empirical findings show that many of these methods are being used in practice already, which is summarized in Table 14. All road transport companies interviewed do for example work with upgrading their truck fleets with the aim of achieving the highest Euro class possible on all their vehicles, which is an effective method to limit emissions according to Papadopoulos et al. (2020). The empirical findings also show that the road suppliers work on adding trucks to their fleet that run on alternative fuels. Also, in some cases the suppliers are working on implementing electrical vehicles, both of these actions being something that Dey et al. (2011) confirm are solutions that can help limit emissions. Furthermore, Toelke and McKinnon (2021) discussed operational methods that road transport companies could implement easily to limit emissions and the interview findings confirmed that such methods are being used. Road supplier C for example, stated that they apply a route optimization tool on their transports to get the trucks to drive the most efficient route possible.

Additionally, the concept of platooning was brought up in theory by Alam et al. (2015), however, no interviewed company was currently close to implementing such a solution. With that said, there were still some signs of this being a possible innovative implementation for the companies in the future. Road supplier A mentioned that the concept was being discussed and both them and Road supplier C also worked on the concept of more aerodynamic trailers, which can be seen as a pre-stage of platooning, since platooning also focuses on improving the aerodynamic performance of the trucks according to Sivanandham and Gajanand (2020). Aerodynamic trailers are something that Stora Enso could implement easier than platooning, since Sivanandham and Gajanand (2020) report how platooning requires thorough scheduling of transports beforehand in order for trucks going to similar routes get deployed simultaneously. This could become a challenge for Stora Enso if they are to use platooning in the future, as the empirical findings show how their volumes generally are hard to forecast due to fluctuating demand.

Regarding emissions, it is also notable that all interviewed companies mention that they measure emissions and share this data with Stora Enso. However, it was expressed in the internal findings that Stora Enso lacks transparency regarding how transports are being performed. This makes it hard for Stora Enso to verify the data, leading to them calculating their own estimations as well. The reason that the transparency is limited could possibly be because the 3PL suppliers do not want to share this information for privacy reasons. Huo et al. (2018) do for example bring up that there always is a risk of opportunism when sharing data between companies and van Damme and Ploos van Amstel (1996) that there can be knowledge leakage as a consequence of transparency. To solve this issue, it would seem like a closer partnership could be very appropriate since, as mentioned previously, van Damme and Ploos van Amstel (1996) explain that this would build more trust between the actors, which could allow for the suppliers to

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increase their transparency. When looking at ways of how to increase this transparency, it was brought up in the internal interviews that a common IT-platform where all 3PL suppliers submit their data would be a preferred scenario since it would give Stora Enso the insight they seek. The interview with Road supplier D also showed that they have developed such a platform which shows that a common platform like this is possible to develop.

Table 14. *Summarizing which road suppliers currently work with what sustainability initiatives*

Initiatives/Road suppliers	Road supplier A	Road supplier B	Road supplier C	Road supplier D
Upgrade Euro class	Yes	Yes	Yes	Yes
Alternative fuels	Yes	Being discussed	Yes	Yes
Electrical vehicles	No	No	Prototype in place	No
Intermodal transport	Yes	Yes	Yes	No
Operational methods	Yes	Yes	Yes	Yes
Platooning	Being discussed	No	No	No
Aerodynamic trailers	Being discussed	No	Being discussed	No
Measuring emissions	Yes	Yes	Yes	Yes
Common IT-platform	No	No	No	Yes

Regarding ways to improve environmental sustainability, a lot of theory talks about ways to reduce road transportation. Rodrigue (2020) brings up how rail is a more environmentally friendly alternative, something that the interviewed rail suppliers were very eager to mention as well, since they see that as their competitive advantage compared to road transport. During the interviews with the rail suppliers, it was also clear that Stora Enso's product is considered to be very well suited for rail transport due to the fact that it generally consists of large volumes and the deliveries are generally not dependent on quick lead times, rather just that the deliveries are dependable. These opinions from the interviews also make sense from a theoretical perspective, since the challenges identified when switching from road to rail are just that larger volumes are needed and that the transport will lose speed and flexibility (Flodén, 2016; Rodrigue, 2020). Also, the empirical findings presented another dilemma when it comes to road

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transport, which is that there is a lack of truck drivers currently. This is also mentioned as a problem by Ji-Hyland and Allen (2020), and as it is pointed out in the empirical findings, the average age of truck drivers is only rising, meaning that the availability of truck drivers might diminish in the future. This points to another benefit with rail transport since Rodrigue (2020) mentions how one train can carry the same volumes as 600 trucks, meaning that an increased use of rail transport would help mitigate the issues connected to driver shortages in road transport.

However, the rail transport market is currently suffering from a lack of infrastructure according to the empirical findings. There is a lack of both wagons and railway tracks which limits the flexibility of rail transport, just as Rodrigue (2020) states in theory, and this results in that many of Stora Enso's transport routes cannot be easily changed from road to rail transport. Railway tracks are something that Trafikverket is building, but what Stora Enso can do according to the interviews, is to use their influence together with other actors to convince Trafikverket to build new tracks. Additionally, it was stated in the interviews that there is a lack of transparency regarding how a transport is being conducted on the rail transport market since no common platform is in place between the European countries. However, regarding the lack of wagons, the findings show how Stora Enso previously collaborated with Rail supplier C to manufacture their own wagons. Furthermore, the wagon supplier Rail supplier B displayed an openness for designing wagons together with Stora Enso, so that could be a potential collaboration that would allow for more rail transport.

Increasing the amount of rail transport is something that is discussed within Stora Enso, but instead of replacing road transport with pure rail transport, the focus rather lies on changing it to intermodal transport. Intermodal transport is also brought up by theory as an environmentally beneficial replacement for road transport that according to Lumsden (2007) limits emissions, while still keeping the flexibility and speed of road transport to some extent (Rodrigue, 2020). Stora Enso are currently using intermodal transport to a certain degree, for example 40% of their transports from Road supplier B are intermodal, and the majority of the interviewed road suppliers also mention that they can offer intermodal transport. As a result, the potential for more intermodal transport is present for Stora Enso, and setting up more intermodal solutions with their 3PL providers would follow Cichosz et al.'s (2020) findings that show how similar collaborations help to improve sustainability. However, it was also made clear that intermodal transports cannot replace pure road transport on all the current routes. It is explained from the findings that some routes are too uncertain in demand, meaning that they require the speed and flexibility that road transport provides, and the railway infrastructure also is not available for all routes. The benefits and limitations with the two transport modes can also be studied in summary in Table 15.

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Table 15. Summary of the different benefits and limitations that rail transport and road transport have as characteristics

Rail transport	
Benefits	Limitations
<ul style="list-style-type: none">• Dependable• Sustainable• Safe• Can carry large volumes	<ul style="list-style-type: none">• High cost• Lack of infrastructure• Requires stable large volumes• Rigid• Slow• Lack of transparency
Road transport	
Benefits	Limitations
<ul style="list-style-type: none">• Flexibility• Speed• Low cost	<ul style="list-style-type: none">• Unsustainable• Increasing amount of regulations• High amount of accidents• Driver shortage

An interesting aspect in the change towards intermodal transport that was brought up in the interviews is that new regulations will be set in motion in 2022 that prohibits foreign truck drivers from driving in a country for longer time periods without returning to their home country. In combination with the truck driver shortage that is present, this could signal that more rail transport will be needed in the future. Currently, Stora Enso does not seem willing to spend more money for intermodal transports compared to going by road, but these factors could create incentives for Stora Enso to preemptively get ahead of the future regulations by changing more towards transport into intermodal transport already. And, based on the empirical findings, an idea could be to single out the most stable road transport routes and change them to intermodal transport while keeping the uncertain routes in need of flexibility as road transport routes.

5.4 Opportunities for improved social sustainability

Social sustainability is also an aspect that both Stora Enso and the interviewed 3PL suppliers believe is important in a well-performing supply chain. In the interviews it became very apparent that every actor works with providing a good social sustainability for the people involved in the transports. Stora Enso has their supplier code of conduct that every supplier has to follow and this method of ensuring social sustainability is also mentioned by May and Crass (2007) in theory. Furthermore, May and Crass (2007)

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also mention that it sometimes can be hard to investigate if these agreements are being followed by the suppliers or not, for example since a lack of transparency can be present. This is interesting in the case of Stora Enso, since they have expressed a lack of insight into how transports are being performed, and further it was mentioned in the interviews that not all suppliers get audited, with Stora Enso prioritizing the ones seen as possible risks. However, no indications from the findings show that this would be an issue and all interviewed suppliers very clearly state the emphasis they put on following rules and regulations regarding their transports. Theory also mentions ways that technology can improve social sustainability, for example through De Nadai et al.'s (2016) idea of digital monitoring or through the concept of platooning that can create safer transports, according to Tsugawa et al. (2016) since it removes the human factor and the drivers get a chance to rest and regain their energy. These methods for social sustainability with emphasis on technology are not something that the majority of actors seem to work with currently according to the empirical findings. However, Road supplier D stands out by digitally monitoring all of their own trucks to make sure that the drivers follow all rules and regulations to ensure the drivers social sustainability in a way that is similar to what De Nadai et al. (2016) describe in theory.

Furthermore, the choice of transport mode also seems to make a big difference when it comes to social sustainability. The interviewed rail suppliers were all very keen to mention how they thought rail transportation was superior to road transportation when it comes to safety. This is also supported by theory, showing that road transportation is responsible for the largest share of transportation accidents (Facanha & Horvath, 2005; Rodrigue, 2020). Another issue mentioned in the empirical findings is that the working conditions for truck drivers can be very straining on them since it often involves long working assignments for the truck drivers away from their homes. So, with regard to social sustainability, a change of transport mode from road transport, increasing the amount of rail transport would be beneficial for Stora Enso. Furthermore, an increase in intermodal transport would also be beneficial, not only because some road transport gets replaced, but also because truck drivers in intermodal solutions generally only need to drive shorter distances according to one interview. This would make the profession more of a day job, rather than a job where the drivers are away for a longer period of time. The intermodal solutions would thus not only improve the social sustainability on the transport route as a whole but it would also in particular improve the working conditions of the truck drivers. A summary of the main takeaways from this section can be found in Table 16.

Table 16. *The main takeaways from the methods aimed towards increased social sustainability*

Method	Takeaway
Policies	All interviewed actors are very thorough in following rules and regulations. However, Stora Enso do not audit all of their suppliers to see if their code of conduct is being followed.
Digital monitoring	No emphasis lies on digital monitoring of social sustainability among the majority of the interviewed actors. However, one example shows that this can be and is being done successfully to ensure social sustainability
Choice of transport mode	Rail transport is responsible for far less accidents when compared to road transport. Empirical findings also show that the working conditions are less straining in rail transport and that use of intermodal transport would improve truck drivers working conditions.

5.5 Increasing sustainability through partnerships

When it comes to increasing the sustainability performance in their downstream supply chain, the findings indicate that Stora Enso can take more responsibility by moving towards more strategic collaborations with their suppliers. This is an action that is supported by Cole and Aitken's (2020) theory, showing that partnerships with a transport intermediary generally helps to improve sustainability. Currently, Stora Enso has some sustainability requirements that they put on their suppliers and the suppliers hence follow these requirements just as Evangelista et al. (2013) state that they do. However, Evangelista et al. (2017) mention that suppliers generally need external drivers to act towards sustainability, meaning that they will not take any further action towards improved sustainability unless Stora Enso either puts pressure on them (Evangelista et al., 2013), or work together with them, for example by sharing risks through long-term contracts (Evangelista et al., 2017).

Working together on R&D for new solutions is also a method that could lead to better sustainability in the future according to De Stefano and Montes-Sancho (2018) and it is also something that some interviewed suppliers mentioned as a possible collaboration method. The empirical findings also bring up the same factor as De Stefano and Montes-Sancho (2018) when it comes to what is needed by their partner. It is clear that the issue with innovations are the risks and uncertainties, so if Stora Enso can help to limit these, then some suppliers seem interested in developing new solutions. The interest in collaborations towards innovation was also expressed from the internal interviews within Stora Enso. Here, it was mentioned that a possible setup could be that possible improvements are discussed together and then the supplier gets the

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responsibility to develop an innovation while Stora Enso make sure that they provide the commitment needed.

However, the empirical findings do not entirely follow the theory. It was discovered that many suppliers already had implemented various solutions towards sustainability without any specific external drivers leading them to do it. This could perhaps be explained by the increased focus on sustainability in general in the transport industry combined with the theory of Toelke and McKinnon (2021) that shows how suppliers, when aware of sustainability solutions, are more likely to implement them. Interestingly, it was in many cases rather the opposite to theory, with many suppliers finding that buying companies such as Stora Enso was prioritizing price over sustainability, leading them to not be interested in the suppliers' solutions. A notable example illustrating this is that Road supplier D explained in their interview that the majority of their trucks can be driven on HVO instead of fossil fuel, but this is not being done since their customers are not willing to pay extra for a more expensive fuel. Similarly, on the break bulk market, the interview findings suggest that Break bulk supplier A do not invest in vessels that run on alternative fuel since their customers would not be interested in the extra cost that such a change would entail. Furthermore, the internal findings from Stora Enso also acknowledge that unless their own customers demand sustainability, low price generally will be the main priority when choosing transport. However, the fact that their suppliers already have created some sustainability solutions is something Stora Enso can investigate to see if there are any current solutions available amongst their suppliers which could improve their sustainability performance without having to take on risk connected to developing new innovations.

On the other hand, if Stora Enso wants to be a part of developing innovative solutions, then strategic partnerships might be the best way to go. In such a case, Stora Enso might have to give up some of the power they otherwise hold towards suppliers in a competitive transport market, and instead develop mutually beneficial innovations. The partnership in place with Liner services supplier A shows as a good example of this. Here, Stora Enso does no longer have the same flexibility over the volumes as they had when they used their own ships, and due to the limited amount of competitors on the market, Liner services supplier A hold a fair share of negotiating power over Stora Enso, exemplified by the long-term contract in place between the two. However, the empirical findings show that Stora Enso only have positives to say about the partnership, due to all its benefits and it can be likened to Hingley's (2005) ideas about how an organization sometimes are willing to accept an unbalanced relationship since they still gain benefits from it. Furthermore, something notable with this partnership is that it in some ways goes against the theory of Touboulic et al. (2014). Their theory states that partnerships with a powerful buyer generally promotes sustainable supply chains more than partnerships with a powerful 3PL provider, but in this case, as

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illustrated, Liner services supplier A holds a lot of power but the focus is still very much on sustainability.

During the interviews, the suppliers were also asked about the possibilities of having triadic collaborations where two buying companies cooperated together with the supplier to help them keep the load factor as high as possible at all times. However, the empirical findings rather conclusively downplayed the possibility for a successful collaboration of that measure. The suppliers are currently optimizing their transports on their own depending on the orders they currently have, so these measures are being taken without involving their customers. And, their general belief is that if the customers themselves are to set up these collaborations, then the risk for delays and miscommunications will only increase. Furthermore, the difficulties for these types of horizontal collaborations are mentioned by Flodén and Williamsson (2016), stating that vertical collaborations with established suppliers are easier to conduct since horizontal companies might have business secrets that cannot be shared, complicating the collaboration. In Table 17, it can be studied what barriers exist in Stora Enso's work towards increased sustainability and how they can take action towards them.

Table 17. *Barriers that hinder Stora Enso from increasing their sustainability today and how they can take action to improve it*

Barrier for increased sustainability	Reason	Possible action for Stora Enso
Not enough innovation	Developing new solutions requires investments which entails high risks and uncertainties	Provide support and show commitment to the supplier, possibly through a long-term contract
Present sustainability solutions are not being implemented	The cost of these alternative solutions is higher than the current option	Agree to pay a higher price for transport to promote a more sustainable supply chain.
Stora Enso leveraging suppliers on the competitive transport market to avoid risks	By using the competitive market to their advantage in negotiations, beneficial contracts can be written for Stora Enso. However, this does not lead to innovations towards sustainability	Stop leveraging the suppliers against each other and instead focus on developing a mutually beneficial partnership with a chosen supplier
Difficult to set up triadic partnerships in the network	3PL suppliers are preferring to optimize their transports without involving customers	Focus on setting up vertical partnerships with 3PL suppliers rather than horizontal partnerships

5.6 Contracts designed for strategic partnerships

As displayed in the empirical findings, Stora Enso do not currently have many strategic partnerships with their land-based 3PL suppliers. One aspect that might be an underlying reason for this is the current contracts between the actors. Most contracts are negotiated annually, mainly because Stora Enso wants to maintain their flexibility since their products have a fluctuating demand, and also because they can use the competition on the market to ensure the best contract possible. Here, Frydinger et al. (2019) mention that such traditional contracts limit the opportunity of creating a strategic partnership and one internal interviewee also acknowledged that the short-term contracts with annual negotiations do not allow for much time for discussions about innovations. So, instead of these traditional contracts, Frydinger et al. (2019) emphasize that less detailed contracts should be used to promote innovation and collaboration. Furthermore, when looking at the factors in Stora Enso's business relationships, many conditions point towards the possibility of applying these less detailed contracts.

Martínez-Jerez (2014) brings up three conditions that have to be in place for these types of contracts to be effective. Firstly, the service in question, in this case transportation, has to be deemed high importance for the company. And, in the case of Stora Enso, this holds true since logistics is a big cost that has a considerable effect on Stora Enso's financial results. Secondly, Martínez-Jerez (2014) mentions that the supplier needs to hold a larger competence within the field when compared to the focal company. This is also something that holds true in the case of Stora Enso since they outsource their transports to 3PL providers that are specialized on that. Lastly, and most importantly in this case is that the future outcomes have to be uncertain in some regards, according to Martínez-Jerez (2014), for it to be advantageous with this kind of contract. This is important since Stora Enso find it hard to commit to volumes in the future since the demand is difficult to forecast, meaning that all of Martínez-Jerez's (2014) conditions are met, which can be seen in Table 18. However, Stora Enso is currently handling this uncertainty with short-term contracts to keep flexibility although theory shows that a longer contract could still be possible, only that it should be of less detail, and these contracts could then prove to be a good foundation for a more profound partnership. Furthermore, Martínez-Jerez (2014) advises that a contract should include incentives that encourage innovation and value creation rather than focusing on delivering solid KPIs. This is not something that Stora Enso have implemented as of yet, even though the possibility has been discussed with one road supplier that they have a longer contract with. So, at the moment, Stora Enso are following the more traditional contract structure that measures performance through KPIs.

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Table 18. *Martínez-Jerez's (2014) conditions for less detailed contracts and how they compare to Stora Enso's current situation*

Conditions according to theory	Stora Enso's current situation	Fulfillment of the conditions?
Transportation has to be considered being of high importance	Logistics is a cost that has considerable effect on Stora Enso's financial results	Yes
The supplier must hold higher competence in the field of transportation, compared to Stora Enso	Stora Enso does not want to perform their own transportation, instead they outsource it to specialists	Yes
The future outcomes of the business must include some uncertainties	Stora Enso signs mostly short-term contracts since their future demand is difficult to forecast and they thus cannot commit to volumes	Yes

The empirical findings within Stora Enso also show that longer, less detailed contracts already exist to some extent. It is mentioned that some contracts longer than one year are in place where no volume commitment is made and furthermore in the liner services division, the contract with Liner services supplier A is long-term. It was also mentioned during the interviews regarding the partnership with Liner services supplier A that it was difficult to write contracts that covered everything, but it was not seen as an issue since the belief was that if anything unexpected would arise, they would solve it together. From this, it can be analyzed that a strong relationship with a lot of trust allows for the implementation of the less detailed contracts recommended by Frydinger et al. (2019) since it can cover for the loss of controlling aspects that a traditional contract has.

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The discussion will consist of three parts. The first part revolves around the first research question and investigates how well Stora Enso's current supplier relationships fulfill the discovered prerequisites. The second section in the discussion is centered around the second research question and discusses what types of sustainability improvements Stora Enso can make by collaborating with their suppliers. Lastly, the discussion centers around the purpose of the report by discussing what measures Stora Enso can take to achieve an enhanced sustainability performance in their supply chain through the use of partnerships. For the discussion, only the relationships with road and rail suppliers are discussed, as the focus of this report lies on Stora Enso's land-based suppliers.

6.1 Evaluation of fulfillment of prerequisites in the current relationships

To initiate a partnership, some various prerequisites for a partnership were identified in the analysis, as seen in Table 13 in Section 5.2, based on the theoretical findings along with the internal and external interviews. With the purpose of identifying potential partnerships, Table 19 summarizes general findings of how well these prerequisites are fulfilled in the current relationships Stora Enso has with their suppliers, where the following part will discuss the underlying reasons of the result.

Table 19. *Showing how much of the discovered prerequisites that are fulfilled in Stora Enso's current relationships with their land-based suppliers*

Prerequisites for partnerships	Rail suppliers	Road suppliers
Good relationship characterized by trust	Fulfilled	Fulfilled
Open communication with high levels of interaction	Partly fulfilled	Partly fulfilled
Mutual benefits and goals	Not fulfilled	Not fulfilled
Common values	Fulfilled	Partly fulfilled
Mutual dependencies	Partly fulfilled	Partly fulfilled
Enabling of innovation	Not fulfilled	Partly fulfilled

For the first prerequisite, to have a *good relationship characterized by trust*, the findings show that this is clearly fulfilled for both the rail and road suppliers, which to a large degree seem to come from the long history Stora Enso have with most of the suppliers interviewed. This is exemplified in the relationship between Stora Enso and

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Rail supplier A, where Rail supplier A are temporarily sending empty wagons to Sweden even if this is not profitable, as they see this as a long-term relationship in which they value loyalty and trust. The second prerequisite is about having *open communication with high levels of interaction*, and in general this seems to be fulfilled to some degree, where in particular the suppliers emphasize that the communication with Stora Enso works very well, although Stora Enso also believes that more information sharing is possible by sharing more detailed data with each other. This also relates to the concept of trust, which is believed to promote more information sharing as brought up by Kumar (1996).

The third prerequisite, *mutual benefits and goals* is where it becomes more obvious that these factors are not fulfilled in the relationships as seen in Table 19. A common wish to achieve more sustainable transports can be distinguished from all actors, which indirectly gives some common goals among Stora Enso and its suppliers, but there are no mutual goals or vision that Stora Enso decide upon together with their supplier. Adding this to the fact that Stora Enso often holds the power in the relationships, not having clear aligned goals might be a hindrance that needs to be overcome in order to build long-term partnerships, if considering the aspects of trust and power asymmetry brought up Cuevas et al. (2015). Even if high levels of trust are present in the relationship currently, entering a deeper relationship may require more trust than there is currently, and having aligned goals will be important for this. As stated in the table the relationship should also be mutually beneficial, and Kumar (1996) talks about the importance of treating the weaker party fairly and ensuring sustainable profitability to the other party. Although there were no complaints from suppliers about Stora Enso trying to get advantages on behalf of themselves or not being treated fairly, deeper partnerships may require Stora Enso to take extra care to not exploit their power, since the risk is that the weaker party may leave the partnership as described by Xu and Beamon (2006).

Common values is the only prerequisite that was not brought up in literature, instead it was mainly the suppliers bringing this prerequisite up, where they related it primarily to values concerning social and environmental sustainability. Even if Stora Enso did not speak specifically about common values, their code of conduct was considered important for them, and could be seen as a way to ensure that suppliers have the same values as themselves. Although common values are not mentioned explicitly in the theoretical framework, this could be related to trust and aligned goals, which Cuevas et al. (2015) bring up and which are some of the prerequisites already mentioned. When there are common values, this could be assumed to promote higher levels of trust and make it more likely that common goals will be found among the companies. From Stora Enso's perspective, the code of conduct is one way that can ensure that Stora Enso's values are fulfilled, but to really fulfill the prerequisite of common values, it could be good to talk with the potential partner about these things in order to make sure that there is a mutuality regarding the values, and not only something that Stora Enso forces on the supplier. However, the rail suppliers already make a clear statement that they feel

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that they have shared values with Stora Enso, while the road suppliers, even while stating the importance of shared values, do not express that this is in place as clearly as the rail suppliers. Therefore, this discussion would be even more important with the road suppliers, although it could be good to double check that there is a consensus on this with the rail suppliers too.

In contrast to the prerequisite of common values, *mutual dependency* was only found in literature, but was not mentioned as a prerequisite in the empirical findings. Instead, dependencies are in some cases brought up as something that is tried to be avoided by Stora Enso and its suppliers, in order to decrease risk. For example, Stora Enso want to have several options for each route, and even if one reason for this is to have ensure that they have capacity for their fluctuating volumes, it could also be seen as a way to decrease dependence on a specific supplier, and to be able to keep the prices down by having more supplier options. However, Buono (1997) states that in partnerships, mutual dependencies are necessary, and furthermore, Dubois and Pedersen (2002), believes that adjustments that create interdependence should be seen as a positive thing which can bring productivity and innovation. At the same time, this does not mean that all dependencies are good, and that is why Gelderman and van Weele (2003) suggest leveraging suppliers when several alternatives exist, unless there are possibilities to achieve competitive advantage by developing partnerships, and thereby creating mutual dependencies. For how the relationships with the rail and road suppliers look at the moment, there are some dependencies, mainly related to certain routes, but in general there are not so strong interdependencies between Stora Enso and its suppliers. The leveraging strategy that Stora Enso to some degree use makes sense according to literature, but if closer partnerships would be initiated, some of the flexibility may need to be sacrificed, and increased mutual dependence will be necessary.

The final prerequisite is *enabling of innovation*, which is mainly brought up in literature and by Stora Enso. As mentioned earlier, Gelderman & van Weele (2003) talks about how developing partnerships with suppliers classified as leverage only should be considered when they have more advanced technology to offer. Although the concept of advanced technology is not clearly defined, it can be assumed that the supplier should have something to offer to Stora Enso that is beyond what other suppliers can offer in a more transactional and leverage-based relationship, in order for a partnership to be relevant. This also relates to the wish for partnerships that contribute to innovation as brought up by Stora Enso. Exactly what kind of innovation that would take place in partnerships with Stora Enso is not entirely clear, but they express the wish that the suppliers develop solutions and improve processes together with Stora Enso. When studying the current suppliers Stora Enso have, it is notable that the rail suppliers do not fulfill the prerequisite of enabling innovation. Here, future development will probably be centered more around increasing the infrastructure and improving the current solutions rather than creating new innovations. The road suppliers on the other hand do partly offer opportunities for new innovations. The interviewed suppliers show

an openness towards developing better sustainability solutions and acknowledge that this could be a result of a closer partnership. Furthermore, the findings also display that the road suppliers already are working with some initiatives towards increased sustainability, which strengthens the perception that the prerequisite enabling of innovation is partly fulfilled in the current network of road suppliers.

6.2 Opportunities for improved supply chain sustainability

To succeed in becoming more sustainable through the use of partnerships within their 3PL network, Stora Enso have to change the way they currently do business with these suppliers. Stora Enso expresses a desire for more innovation from their suppliers that would help to improve the sustainability performance of Stora Enso's transports. However, as De Stefano and Montez-Sancho (2018) state, these innovations generally entail risks and uncertainties, which can make suppliers hesitant to make investments towards innovations. Therefore, Stora Enso could play the role as an external driver for the suppliers, for example by sharing the risk with them, to increase their willingness to develop new innovations (Evangelista et al., 2017). When looking at Table 14 in Section 5.3, it is also notable that some of the road suppliers are in a phase where they are discussing new sustainable implementations. Although some of the concepts, like heavy electrical vehicles and platooning are not yet relevant for some years, according to the empirical findings, there are concepts such as aerodynamic trailers that are being discussed and deemed closer to implement by some road suppliers. Such an implementation would lead to better performance from the trucks according to Sivanandham and Gajanand (2020), which in turn would lead to lower amounts of emissions. This concept has yet to be implemented and Stora Enso would benefit from this solution, meaning that they could look to provide support in developing this solution. Another intriguing initiative that Stora Enso have shown interest in is a common IT-platform where they can take part of measured emission data from their suppliers and control that rules and regulations are being followed by the truck drivers. Road supplier D have already shown that it is possible to develop such a platform, but the other road suppliers have yet to focus on it, meaning that it might be an opportunity for Stora Enso to influence the other suppliers into creating a similar platform. However, a factor that might complicate the implementation of such a platform could be that not every road supplier owns all of their trucks. Road supplier D owns the majority of their truck fleet, which simplifies their process of connecting all the trucks to their platform, while a supplier such as Road supplier A sometimes contracts smaller carriers to perform the transport and thus it might be problematic to get every carrier Road supplier A utilizes to connect their trucks to their IT-platform.

Nevertheless, such an IT-platform would help to increase Stora Enso's insight into the environmental sustainability of their transports and this method has also shown how it can help ensure the social sustainability of a road supplier by digitally monitoring the drivers. Similar to the proposal of De Nadai et al. (2016), digital monitoring can make

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sure that the rules and regulations are being followed. Therefore, a common IT-platform can help Stora Enso gain increased transparency over both the environmental sustainability, as well as the social sustainability of their 3PL suppliers. These benefits do also correlate with Stora Enso's expressed need of getting more emission data, at the same time as it could help them to ensure that their suppliers follow their code of conduct. By using a digital monitoring system and a common IT-platform this could give them insight into how their suppliers work without having to conduct physical audits, which would enable Stora Enso to more easily control a larger amount of their suppliers, including those that are not seen as high-risk suppliers which otherwise might not have been audited as things stand currently.

Furthermore, it has been discovered through the study that the 3PL suppliers already have implemented some sustainability solutions on their own initiative without any external drivers motivating them, proving that Evangelista et al.'s (2017) ideas about the need for external drivers do not necessarily hold true today. An explanation for why these initiatives already have been developed can probably lie in the fact that sustainability awareness has shown to increase in the transport industry since Toelke and McKinnon's (2021) theory displays how 3PL suppliers are more likely to implement sustainability solutions if they have awareness of them. However, regardless of the underlying reason for these initiatives, it gets clear that Stora Enso already have multiple opportunities to improve their sustainability, but the obstacle lies in the fact that Stora Enso and the rest of the industry are currently not willing to pay anything extra to gain the sustainability benefits. It was for example noted by Road supplier D that the majority of their trucks already are compatible to drive on HVO fuel instead of on diesel, but that this is not being done since no customer wants to pay the extra fuel cost. However, the solution is already present and from the interviewed road suppliers, it was only Road supplier B that currently could not offer trucks running on alternative fuels. This means that Stora Enso can improve their KPI regarding CO₂-emissions without having to develop any new innovations, by choosing to interest themselves into the sustainability initiatives present on the road transport market and be willing to pay an extra cost for them. An alternative for Stora Enso could also be to get their own customers' support when choosing a more sustainable option. Instead of waiting for their customers to increase their sustainability demands, Stora Enso could try to get them to support the sustainability initiatives and agree to pay more towards Stora Enso for choosing these initiatives since a more sustainable supply chain for Stora Enso translates into a more sustainable supply chain for their customers as well.

On the subject of already existing methods to improve sustainability, change of transport mode is also a viable alternative. Using rail transport instead of road transport is stated to be better from both an environmental standpoint (Rodrigue, 2020), as well as from a social standpoint (Facanha and Horvath, 2005). Furthermore, Stora Enso have good relationships with rail suppliers that believe Stora Enso's products are well suited for railway transport. However, it cannot be understated that the speed of road transport,

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and maybe more importantly in the case of Stora Enso, its flexibility is difficult to replace. Therefore, an intermodal solution that is combining the benefits of these two transport modes could hold a lot of potential. Here, Stora Enso can have the safety and dependability of rail transport where rail infrastructure is present while also gaining speed and flexibility of road transport on the more critical parts of a route. In addition to this, Stora Enso will also limit their emissions if they use intermodal transport instead of road transport according to Lumsden (2007). Stora Enso is already using intermodal transport to a certain amount, but it was expressed in the internal interviews that they believe that more transports can be performed this way. And, the interviews with their road suppliers show that three of the four interviewed actors can provide intermodal services. However, it must also be noted that Road supplier B who provides the most intermodal transport for Stora Enso have the opinion that intermodal transport only is chosen if the cost is smaller than for road transport. Again, Stora Enso might have to be willing to pay more for intermodal transport, which on the other hand would help them improve both the social sustainability by having their goods transported with a safer transport mode, that has less straining working conditions for the drivers, while the environmental sustainability also would improve by using a transport mode responsible for less emissions.

During the study, it was also examined whether there were any opportunities present for a triadic partnership between Stora Enso, a supplier and a third actor to optimize transports and ensure a high load factor at all times. However, as mentioned in the analysis, this is something that the 3PL suppliers did not show any particular interest in since they currently optimize their transports on their own and their belief is that involvement from their customers would complicate the process rather than simplify it. The theory also brings up possible difficulties with triadic partnerships, with Flodén and Williamsson (2016) for example stating that horizontal partnership can be troublesome due to the two companies holding business secrets towards each other. Therefore, triadic partnerships, albeit not impossible, might not be the starting recommendation for Stora Enso when looking to increase the amount of strategic partnerships. Instead, initially placing the focus on finding strategic partnerships only involving a single 3PL supplier.

6.3 Recommendations for Stora Enso

One part of the purpose with this report was to evaluate which suppliers that hold more potential to establish partnerships with and looking at the prerequisites for partnerships in Table 19 in Section 6.1, none of the existing relationships with the suppliers within rail or road fulfill all criteria. However, this does not necessarily mean that partnerships cannot be established with these suppliers, but the establishment of a partnership will require Stora Enso to make sure that they work on the things that are not fully in place. This means to sit down with the suppliers to agree on how there can be more information sharing, and also to make sure that the values are aligned. Furthermore,

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since there are no clear aligned goals in the current relationships, it is of particular importance that this is thoroughly discussed with the supplier before initiating the partnership to see if it is possible to come up with common goals that will be beneficial for both parties. Regarding mutual dependencies, these will increase as a consequence of the partnership, and since this is a conscious choice, this should not be considered as a problem as long as the other prerequisites are fulfilled. However, the one prerequisite that may be harder to fulfill is for the partnership to enable innovation, as this requires the suppliers to possess capabilities or resources that can justify them being moved from a leverage supplier into a strategic supplier. In this area, the rail suppliers show few opportunities for innovation regarding sustainability, but at the same time, rail already provides much lower emissions compared to road transport. The road suppliers on the other hand, have more interesting opportunities for innovation and new solutions, and also provide intermodal transports which provide lower emissions compared to traditional road transports.

When looking further into what sustainability initiatives Stora Enso can implement with their road suppliers, the findings show that there are already existing solutions as well as opportunities for new innovations, as mentioned in Section 6.2. Of the already existing initiatives, intermodal transport is the main method mentioned in the internal interviews and three of the four interviewed road suppliers have the ability to offer intermodal transport. Stora Enso is currently using the intermodal services of two of these suppliers, but it is mainly with one of them where a significant percentage of the transports are intermodal. Consequently, there is an opportunity for Stora Enso to replace more of their current routes performed by road transport with intermodal transport instead. The challenge here lies in discovering which of these routes have the infrastructure required to have part of it being transported by rail and also that the route is stable enough so that the larger volumes needed for rail transport can be ensured. Furthermore, three of the road suppliers also showed that they have trucks in their fleet that run on alternative fuels. Stora Enso could come to an agreement with these suppliers that they want their transports to be performed with alternative fuels which, according to Dey et al. (2001), would result in Stora Enso getting a smaller carbon footprint.

As mentioned, there are also opportunities present for new innovations together with the road suppliers. The most intriguing possibility for Stora Enso might be to develop a common IT-platform with their suppliers where emission and driving data can be stored and analyzed. This is something that Stora Enso have expressed a need for in the internal interviews and Road supplier D have already shown that such a platform is possible to develop since they have done it themselves. Additionally, all the other suppliers also acknowledge that they measure their emission data already, meaning that the data exists, only that the platform is missing. Therefore, Stora Enso could look to work together with their suppliers, as De Stefano and Montez-Sancho (2018) proposes, to create such a platform or they could take the approach mentioned in the interviews

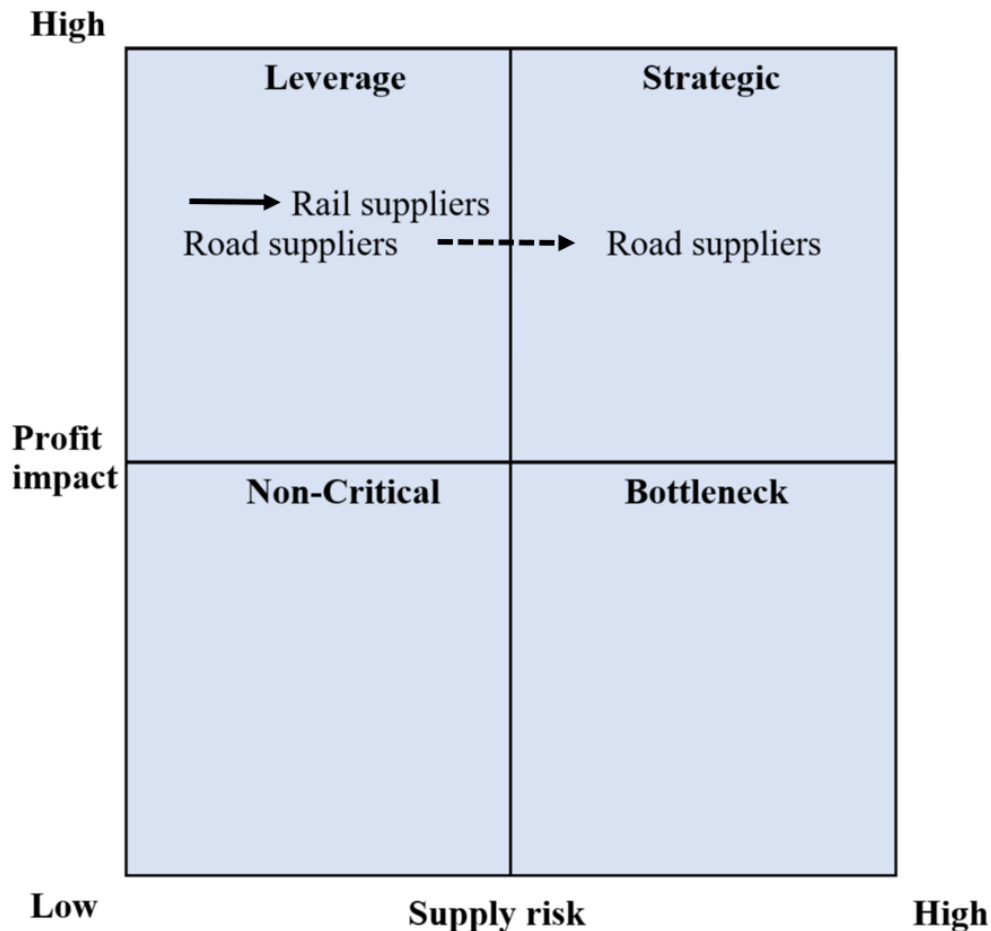
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of tasking their suppliers of creating this in return for long-term commitment, more so taking the role of an external driver, similar to the theory of Evangelista et al. (2017).

The purpose with this report was also to determine what type of partnerships that Stora Enso should establish to become more sustainable. It is apparent that there already exist multiple opportunities that Stora Enso can implement to become more sustainable in the short-term perspective, meaning that the need for innovation in a partnership is not the most pressing matter. As a result of this Stora Enso should focus initially on establishing partnerships that contain Lambert et al.'s (1996) core values of trust, integration and sharing of assets. Here, Stora Enso could strive to gain as much benefit as possible from the sustainability initiatives that their suppliers already have implemented and also find ways to move more transports by rail instead of road, both through intermodal transport as well as through conventional rail transport. Stora Enso has expressed a wish for their supply chain to become more sustainable and rail transport is a better option than road transport, in regard to both environmental and social sustainability. Although the rail suppliers will still be placed in the leverage quadrant of the Kraljic matrix since they do not offer opportunities for new innovation, Stora Enso could move them a bit closer towards the strategic quadrant, as seen in Figure 6, meaning that more focus still gets put on establishing a partnership. This is also thought to be wise since there are few actors on the rail market, meaning that it is of higher importance for Stora Enso to have a close relationship with their rail suppliers since there are few alternative options on the market.

Even if Stora Enso should focus on establishing partnerships with their road and rail suppliers that allows for them to implement the existing sustainability solutions in the short-term, they have also expressed the wish to gain sustainability advantages through new innovations. To gain such advantages, Stora Enso should look to establish strategic partnerships with some of their suppliers that prove to be capable of developing new solutions and the findings show that it is Stora Enso's road suppliers that hold the highest potential for such initiatives. When looking at the Kraljic matrix, it could therefore be an option, according to Gelderman and van Weele (2003), to move one or several of the road suppliers that are believed to offer the best opportunity for innovation into the strategic quadrant by developing strategic partnerships with them, while the majority of the road suppliers will remain in the leverage quadrant, as seen in Figure 6.

Figure 6. Updated Kraljic matrix based on Kraljic (1983), displaying how some suppliers can be moved in the matrix



Furthermore, if Stora Enso are to develop strategic partnerships with some of their road suppliers, it means they have to change their current approach of leveraging suppliers against each other when it comes to negotiations. Although leveraging suppliers is a very common strategy among businesses, it is not very compatible if partnerships are to be established. Stora Enso want to establish partnerships that lead to innovative solutions, and a leveraging approach is more likely to lead to short-term contracts which Frydinger et al. (2019) explain often hinders innovation. For a strategic partnership, Frydinger et al. (2019) believe that longer, less detailed contracts are most beneficial since those contracts allow for innovation. Furthermore, Frydinger et al. (2019) also suggest that incentives can be used to motivate supplies into developing better solutions. This kind of contract is believed to fit Stora Enso since their current situation fulfills all of Martínez-Jerez's (2014) conditions regarding when longer, less detailed contracts are appropriate, as seen in Table 18 in Section 5.6.

7. CONCLUSION

This thesis set out to answer two research questions as well as to end up with strategic recommendations to Stora Enso on how they can improve their sustainability through the establishment of partnerships with their 3PL suppliers.

The first research question was to examine what prerequisites that are needed in a relationship for a partnership to be established. From the study it has been identified that these prerequisites are a relationship characterized by trust, open communication between the actors with high levels of interaction, mutual benefits and goals, common values, mutual dependencies and enabling of innovation. It is also of note that the prerequisite enabling of innovation does not necessarily have to be present in all kinds of partnerships as it rather becomes a prerequisite when looking to establish strategic partnerships. Furthermore, the study shows that none of Stora Enso's current supplier relationships fulfills all of the identified prerequisites that are needed in a partnership. However, the potential for partnerships does still exist, but it requires Stora Enso to communicate with their suppliers and make sure that the missing prerequisites get fulfilled. If Stora Enso manages to fulfill these prerequisites, then both their road suppliers and their rail suppliers hold potential for partnerships.

This leads into the second research question which was to investigate how partnerships with Stora Enso's 3PL suppliers can be developed to achieve more sustainability in the supply chain. Although the potential for partnerships is present in both cases, the type of partnership that is recommended differs some between the two. Rail suppliers do not currently offer any real opportunities for new innovations, so a strategic partnership is not recommended here. However, for Stora Enso to become more sustainable, an increased use of rail transport would result in huge improvements regarding both environmental and social sustainability. Therefore, it is proposed to establish partnerships that focus on the core values of trust, integration and asset sharing, in order to find routes that hold the opportunity for more rail transport. For the road suppliers, Stora Enso are recommended to initially focus on establishing similar partnerships as with the rail suppliers, allowing them to benefit from the already available sustainability initiatives, and helping them to set up more intermodal transports. These actions would help Stora Enso optimize their sustainability without having to take part in the risk that is associated with new innovations. Worth noting here is also that one obstacle today is the focus on minimizing cost rather than optimizing sustainability, so the willingness to pay has to increase if they are going to be able to truly benefit from the present solutions. Furthermore, Stora Enso are recommended to establish strategic partnerships with some of their road suppliers that carry the most potential for new innovations to be able to gain competitive advantages in the industry regarding sustainability. Here, the conditions in place advocate for longer, less detailed contracts instead of annual negotiations, as these contracts will help create an environment that fosters innovation.

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APPENDICES

Appendix A – Questionnaire for the external interviews

- What is your role in the company?
- How is your relationship with Stora Enso? Do you have any closer collaborations or partnerships?
- How much of the relationship is controlled by agreements? How detailed are the agreements?
- Challenges with the relationship at the moment?
- Future opportunities with the relationship?
 - Where do you see the most potential for more sustainable transport?
- In what ways do you work with sustainability with Stora Enso, and has this led to any improvements? Could be both environmental and social sustainability
- Do you see any risks related to the current relationship?
- In general, do you see any prerequisites for a potential partner?
- What common goals do you recognize among you and Stora Enso?
- How dependent are you on each other?
- How important is trust in your relationship?
- What does the communication between you and Stora Enso look like?
 - How much information do you share with each other? Is there information that would enable closer cooperation but that is considered too sensitive to share from either of the parties?
- How long-term are the agreements with your buyers? What do the contracts usually look like? What are the reasons behind how they are formed?

Appendix B – Questionnaire for the internal interviews with the managers handling the 3PL suppliers

- What is your role at Stora Enso?
- How do you work with improving sustainability?
- How many logistic suppliers do you have?
- Are they bigger or smaller?
- Do you have closer collaboration or partnerships with some of them, and if so, can you describe them?
 - What results have the partnerships given?
- Have you seen any improvements in regard to sustainability/emissions? Do you have any data that shows the improvements?
- What factors made the partnership possible?
- How close relationships do you have with your suppliers?
- What does the communication between you and the suppliers look like?
- How long-term are the agreements with your suppliers? What do the contracts usually look like? What are the reasons behind how they are formed?
- Challenges with the relationships at the moment?
- Where do you see possibilities for further partnerships?
- Are suppliers generally interested in having partnerships with Stora Enso? Especially regarding sustainability?
- How important is trust in your relationships? How much of the relation is controlled by agreements?
- How important is it for you in a relation like this to share common values?

Appendix C – Questionnaire from interview with Stora Enso’s manager of Network & Routing

- What is your role in the company?
- What does the word networks mean to you?
- In what ways do you work with networks?
- How much insight do you have in the lower network levels? Suppliers supplier.
- In what ways does your team actively work towards improved sustainability?
- In what ways do you see that partnerships could contribute to more sustainability at Stora Enso?
- How are the KPI’s cost, service and sustainability measured?
- How would you describe your relationship with your suppliers?
 - What are the main challenges in regard to the 3PL suppliers?
 - Do you have common goals together with your suppliers?
 - Do Stora Enso use power towards actors in their network, or does the focus lie in creating mutual benefits?
- How do your different routes look, are some more stable than others? Are routes more stable in Sweden
- How do you handle fluctuating volumes?
- What is a partnership for you?
- Do you see any prerequisites for a potential partner?
- How important is it for you in a relation like this to share common values?
- How important is trust in your relationship?
- What is your viewpoint on contracts longer than one year?
- Joint investments?

Appendix D – Questionnaire from interview with Stora Enso's sustainability manager within Sourcing & Logistics

- Who are you and what is your role within Stora Enso?
- What are the major challenges in your work?
- From what we understood, sustainability is considered a main competitive advantage at Stora Enso. However, competitors are also in the pulp and paper industry, which in its nature is renewable. So, in what way do you distinguish yourselves from your competitors in this area?
- How do you work to become more sustainable in regard to the logistic aspects?
- How well is the sustainability culture integrated in the company, and in what ways does it show?
- Where do you see the largest potential for improvements in regard to sustainability? And more specifically in the area of transportation?
- How much does your customers ask for sustainability? Do you provide more sustainability than they would ask for? What is the major driver of your sustainability work?
- What type of partnerships is it that you have? With what actors?
- Do you have partnerships with 3PL suppliers regarding sustainability?
 - What benefits do you get out of this partnership, how much better sustainability?
- How do you measure sustainability? Do you keep any data on the sustainability part, KPIs?
- How long does a partnership last approximately?
- If you are to enter a partnership with a 3PL provider, what criterias does that provider have to fulfill to be a reasonable partner?
- How close do you keep in contact with your suppliers?
- How involved are you in your 3PL suppliers network and in what ways?
- Do you have any sustainability collaborations with other companies than 3PL? For example, do you share transports with other companies?
- Only 2% rail at the moment, possible to do more? Intermodal transports?
- How does the load factor look, is it FTL or sometimes less than full truck loads?

- What do you do to prevent trucks from driving empty?
- Electrical transports in the future? Would you be willing to invest together with a carrier in electrical trucks?

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