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Horizontal Collaboration of Outbound Transport Between Retailers

A Multiple Case Study

Master's thesis in Supply Chain Management

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SUMMARY

Horizontal collaboration is defined as collaboration between actors on the same level of different supply chains. Literature regarding horizontal collaboration involving an independent third party is indecisive and therefore, needs further investigation. Furthermore, this thesis adds to the existing number of reasons why retailers want to collaborate horizontally and which obstacles must be considered. The purpose is therefore, to investigate how horizontal collaboration could be implemented for retailers. This is fulfilled through finding enablers and obstacles to horizontal collaboration between retailers and evaluating three different collaborative structures. An independent third party is further considered in these structures and lastly, the impact on sustainability is discussed.

To fulfill the purpose a multiple case study has been performed. Seven retailers in different industries have been interviewed and each retailer was considered a separate case which are compared with each other. Furthermore, six experts and three representatives from an IT-service provider in the field of logistics have been interviewed to provide an external perspective on collaboration between retailers.

The findings show enablers and obstacles within data sharing, transport requirements, service improvements, coalition formation, motives for collaboration, legal and information sharing technology. Three structures of horizontal collaboration between retailers were both found in literature and suggested by retailers. These are collaboration through a marketplace, collaboration in clusters or a partnership. The role of an independent third party should be to facilitate a platform in a marketplace, coordinate and lead the collaboration in clusters or initiate partnerships and have a neutral role. Horizontal collaborations will bring economies of scale which reduces the number of trucks on the roads. This will lead to cheaper transport solutions and a reduction of pollution, noise and congestion caused by transport vehicles.

This thesis was limited to only outbound transportation and did not consider mathematical solutions to route planning of outbound transports. The thesis was also limited to European retailers. Furthermore, neither inbound transports nor return flows were considered.

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Keywords: Horizontal Collaboration, Retailers, Independent Third Party, Outbound Transport.

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Gothenburg, May 2022

Fredrik Andersson *Hampus Nilsson*

Contents

1 Introduction

This thesis has been written in collaboration with an IT-service provider within logistics. The following chapter provides a background, purpose and research questions, delimitations and the structure of the thesis. Initially, the background elaborates upon the potential of horizontal collaboration and why it needs further investigation. The purpose and research questions describe what is expected to be accomplished with the thesis and why this needs to be investigated. Delimitations describe which areas have been excluded from the project. Lastly, the structure for the remainder of the thesis is presented.

1.1 Background

Road transportation of goods within the European Union has increased with 6.9% during the period 2015-2019 in terms of tonne-kilometres (Eurostat, 2021). In 2020 the total number of transported goods decreased by 3.9% (ibid.). However, this decrease was mainly during the second quarter which was when Covid-19 struck and therefore the increasing trend is assumed to continue. The transportation industry is characterised by many small actors and a consequence of this is low vehicle utilisation and ineffective route planning (Karam et al., 2021). Combining these two trends results in an unnecessarily high number of road transport vehicles and an increase in transportation costs. Furthermore, the increase of vehicles in road transportation cause congestion and an increase in carbon emissions. During the COP26 meeting in Glasgow, the United Nations declared that they will keep their goal from the Paris Agreement to not let the global temperature increase above 1,5 °C (United Nations, 2021). The emissions of road transportation represent about 21% of the total emissions in EU (European Commission, n.d.-b). Therefore, reducing road transportation emissions could be a contributing factor to achieving the environmental goal.

One approach to reduce the number of underutilised vehicles is horizontal collaboration. The concept means that actors on the same level of different supply chains co-operates (Basso et al., 2019). Horizontal collaboration does not include cooperation upstream or downstream in the supply chain, but between actors with the same role in different supply chains. One large EU-project on this topic was *Collaboration Concepts for Co-modality* (Cruijssen, 2012). A common typology for horizontal collaboration was developed through a set of seven dimensions: intensity of collaboration, direction of consolidation, leadership, scope and intensity, scope, competition, assets and objectives, carrier and/or shipper and number of partners (ibid.). However, some of the dimensions have almost the same properties and are therefore merged. The dimensions which will be used in this thesis are: intensity of collaboration, consolidation of goods, leadership, scope and actors. These will be further explained in section 2.2.

Cruijssen et al. (2007c) states that horizontal collaboration in transport enables economies of scale, reduces congestion and emissions. One type of horizontal collaboration is joint route planning which entail that organisations share resources when transporting goods.

This has been found to reduce costs by up to 30% (Cruijssen et al., 2007a). Economies of scale lead to more goods being transported in each vehicle and thus price per unit is decreased. Due to higher vehicle utilisation, fewer vehicles will be needed. This will lead to less congestion and less emissions. Horizontal collaboration enhances a company's possibility to focus on core activities and also give logistic service providers the possibility to broaden their services (Cruijssen et al., 2007b).

Bull Sletholt et al. (2020) describe that the Swedish government has given Trafikverket the assignment to investigate horizontal collaboration during an eleven-year period. The purpose of this investigation is to find if and how horizontal collaboration can contribute to achieving the environmental goals. As of today, it has been found that there are issues regarding laws not being compatible with horizontal collaboration (Bull Sletholt et al., 2020), this is further described in section 2.4.3. It has also been found that there is a lack of facilitators and that trust between organisations is important (ibid.).

Trafikverket has conducted a pilot project investigating a possible collaboration between ICA and SSAB. ICA is the largest Swedish food retailer (DLF et al., 2021) and SSAB is a Swedish steel manufacturing firm. Arvidsson (2017) describes that ICA and SSAB planned to share train wagons for transportation. It allowed them to increase fill-rate and ICA was able to change transportation mode from road to rail which was beneficial for the environment. These environmental benefits were the main result of the collaboration since savings only were marginal (ibid.). However, it was described that the collaboration faced difficulties. ICA had requirements on lead times which affected the transportation schedule for both actors. The cooperation between ICA and SSAB also demanded a new technical solution regarding how to load the goods. Several solutions were tested but all of them had drawbacks. An example of a solution was to stack containers from ICA on top of the goods from SSAB. However, these containers needed to be specially designed due to loading height and therefore deviate from the ISO-standard (ibid.).

Arvidsson (2017) further mentions one example where horizontal collaboration was implemented successfully. The collaboration involved Scania, LKAB and SSAB. Scanias goods had temperature requirements which were not needed for SSABs and LKABs goods. The temperature problems were solved through investments in new containers. SSAB and LKAB had to adapt their schedule to fit Scanias since they were the organisation with the highest requirements on lead times. The collaboration lead to increased control of the inbound flow and higher frequency of deliveries. It was further concluded by Arvidsson (2017) that actors need to share sensitive information for the collaboration to be successful and therefore, trust and transparency are necessary.

It has been shown that actors worry about how the risks and gains are allocated in horizontal collaboration (Cruijssen et al., 2007b). For a collaboration to be viable, the organisations must believe that these allocations are made fairly. Most frequently either an ad hoc solution or the Shapely value method is used for fair allocation (Guajardo & Rönnqvist, 2016). Ad hoc solutions are usually developed to satisfy a specific issue and therefore tend to perform well while measured towards this issue. Shapely value is a method that aims

to compensate for increased efforts. However, it does not always perform well in terms of fairness (ibid.). Furthermore, many allocation methods are not developed to solve practical problems. Instead they are developed based on existing theoretical frameworks (ibid.). Hence some of the frameworks may only work in theory but not in practice. This is a complex problem and one of the barriers to participating in a horizontal collaboration.

Another potential barrier to horizontal collaboration is competition laws. Organisations in competition must act independently and consequently be affected by competitive pressure from other actors (European Commission, n.d.-a). Collaboration between two direct competitors could violate this law. Furthermore, the fear of information disclosure has been found to be the biggest impediment to horizontal collaboration (Cruijssen, 2012). Even though trust and transparency have been proven necessary, it is also an obstacle. Basso et al. (2019) mention other barriers related to the design of the relationship, operations and planning, behaviour and the market. Arvidsson (2017) concluded that organisations often use other alternatives to reduce costs in their logistics system than being a part of a horizontal collaboration. Even though there are benefits to horizontal collaboration, obstacles still exist and need to be overcome.

It was concluded by Karam et al. (2021) that an independent third party can be used to mitigate obstacles. An independent third party could manage sensitive information and allocate the benefits and risks from the collaboration fairly (ibid.). The importance of an independent third party that manage sensitive information has also been emphasised by Cruijssen (2012). The management of sensitive information from an independent third party allow organisations to be more transparent without commercial risks associated with information sharing (ibid.). However, an independent third party acting as a coordinator of the collaboration has been found both beneficial and unnecessary. Arvidsson (2017) concluded that mainly individuals within the organisations managed and pushed for the collaborations to be maintained. Therefore in this context, there was no need for a third party. Cruijssen et al. (2007b) mention a survey where it was found that an independent third party was not necessary for the coordination of horizontal collaborations. On the other hand, Leitner et al. (2011) suggest that in most cases horizontal collaboration needs an independent third part. Because of the inconsistency regarding third party involvement, further investigation is needed.

1.2 Purpose and Research Questions

The purpose of this thesis is to investigate how horizontal collaboration could be implemented for retailers. To fulfill this purpose, the main enablers and obstacles must be found. Thereafter, a structure must be found to understand how horizontal collaboration should be implemented. The involvement of an independent third party is a topic without a clear answer and therefore, the role of a third party will be investigated. Lastly, the impact on sustainability of horizontal collaboration between retailers needs to be investigated to ensure long term usability.

The common definition of a retailer is a firm that sells goods to end consumers or the public. According to Ramanathan et al. (2014) retailers are pushing for improving the environmental impact of their supply chains, developing sustainability strategies and discussing information sharing between organisations. Recently, retailers have begun prioritising warehousing costs and more frequent deliveries (Ballot & Fontane, 2010). Hence, retailers are facing challenges that could be solved with horizontal collaboration and will therefore be investigated. Since retailers are selling goods to end consumers without producing their own goods, the outbound quantity is smaller or equal to the inbound quantity. Therefore, the outbound flow of goods should be more dispersed than the inbound flow. Empty running trucks have been found to increase further downstream in a supply chain, with the lowest fill-rate between distribution centres and physical stores (ibid.). The potential of collaboration between supply chains at this level should be higher than at other levels of the supply chain. A simplified version of both the current information and goods flow in supply chains is depicted in Figure 1.

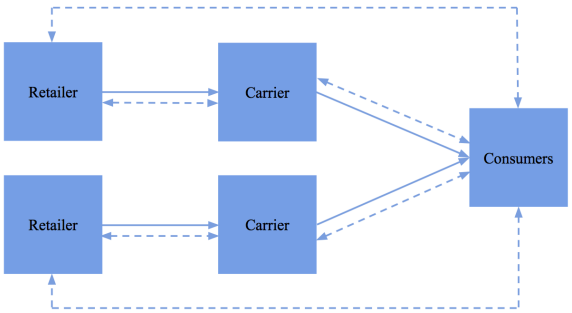

Figure 1: Information and physical flow in current supply chains for retailers. Solid line represent physical flow and dotted line represent information flow.

To implement horizontal collaboration between retailers, it is important to understand the enablers and obstacles. Therefore, the first research question will be:

> *RQ 1: Which are the main enablers and obstacles for horizontal collaboration between retailers?*

Thereafter, once it is possible to understand the enablers and obstacles, one must understand how it could be implemented. There are multiple suggestions in the literature regarding how this could be performed. Karam et al. (2021) suggest collaboration through an electronic market platform, through an urban consolidation centre or entering a partnership with another actor. Basso et al. (2019) on the other hand suggest that horizontal collaboration between more than two or three partners is hard to implement. To understand how retailers would prefer horizontal collaboration, the second research question will thus be:

> *RQ 2: How could horizontal collaboration be structured for retailers?*

Through the introduction of an independent third party, a reduction of carriers can be possible due to the consolidation of the physical flows. The potential flow of information and goods between retailers, customers and a third party in a collaboration can be seen in Figure 2.

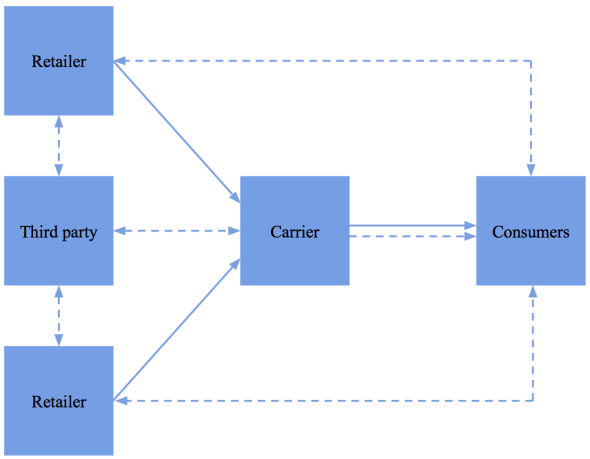

Figure 2: Information and physical flow in supply chains for retailers involving a third party. Solid line represent physical flow and dotted line represent information flow.

Because of the inconsistencies in the literature regarding third party involvement, clarification is needed. Verstrepen et al. (2009) conclude that the motives for horizontal collaborations often are case-specific which creates a heterogeneous range of collaboration initiatives. Karam et al. (2021) mention a pilot study where it was found that 70% of transport service providers were more interested to join a collaboration network if it was managed by an independent third party. Therefore, this could be a more consistent way to develop and manage collaborations. The definition of a third party in this thesis will be a neutral coordinator, which according to Karam et al. (2021) could be for example a research institution or IT-provider. The main reasons to involve a third party were to manage confidential information and for fair treatment (ibid.). Therefore, a third party seems to bring benefits to the collaboration but it is important to understand what its role should be. Hence, the third research question will be:

> *RQ 3: How could a third party be positioned in horizontal collaboration between retailers?*

According to Bull Sletholt et al. (2020), improving transportation efficiency through horizontal collaboration could reduce both energy consumption and the cost of transporting goods. For the solution to be fully sustainable the framework of sustainable supply chain management should be considered (Carter & Rogers, 2008). Kale et al. (2007) explain how previous attempts to develop a market for collaboration were mainly marketed toward environmental sustainability and this was not successful. Furthermore, research regarding

horizontal collaboration and sustainability have historically had either an economical or environmental focus (Chen et al., 2017). Therefore, further consideration regarding the sustainability impact of horizontal collaboration between retailers is needed. Hence, the fourth research question will be:

> *RQ 4: How will sustainability be impacted by horizontal collaboration between retailers?*

1.3 Delimitations

The thesis will not provide a general framework for implementation. The thesis will not investigate any mathematical solutions to route planning problems. Neither inbound logistics nor back-hauling will be investigated. Only the geographical location of Europe will be considered since the market can have different characteristics elsewhere.

1.4 Thesis Structure

The remainder of this thesis will be structured into five further sections. Next, Section 2 will cover the literature which has created an understanding of horizontal collaboration. In Section 3, the method for this thesis will be presented. Thereafter, the data from interviews with experts, the IT-service provider and the retailers will be presented and compared in Section 4. All these will be further discussed in Section 5 and here the research questions will be answered. Lastly, conclusions will be drawn in Section 6 together with suggestions for future research.

1 Introduction

2 Literature review

3 Method

4 Empirical Findings

5 Discussion

6 Conclusions

2 Literature Review

In this chapter, an overview of existing literature on the subject horizontal collaboration is presented. The chapter includes sustainable supply chain management, horizontal collaboration in transport, enablers and obstacles for horizontal collaboration, third party involvement in horizontal collaboration and an overview of collaboration between retailers.

2.1 Sustainable Supply Chain Management

Carter and Rogers (2008) describe that the triple bottom line consist of three dimensions: economic, environmental and social performance. For a supply chain to be considered sustainable, all three dimensions must be considered (Stefaniec et al., 2020). Economical performance of a supply chain refers to the efficiency in movement of people and goods in a system and how well it contributes to societal economic development. Social performance refers to how well a system reaches both individuals and societal needs in terms of health, safety and equality. Environmental performance of a supply chains refer to its ability to manage goods while minimising resource consumption and maximising land-use. Furthermore, it should neither affect the ecological systems nor pollute the environment.

Carter and Rogers (2008) developed a framework for sustainable supply chain management based on the triple bottom line, which can be seen in Figure 3. The aim is to increase the sustainability performance of an organisations and its supply chain. The framework includes the triple bottom line dimensions and supporting facets. Risk management, transparency, strategy and culture are the supporting facets in sustainable supply chain management. Risk management consider risks in terms of likelihood and outcome based on the triple bottom line (ibid.). Carter and Rogers (2008) describe the importance of transparency and that it could be improved both vertically and horizontally in supply chains. By increasing transparency, stakeholder feedback could be used to improve operations. Furthermore, audits could be developed to increase transparency of a supplier and reduce transaction costs for many buyers to the supplier. Another supporting facet is related to strategy and culture where the triple bottom line should be considered when these are developed (ibid.). Combining these strategies is not always easy since it will impact the culture of an organisation.

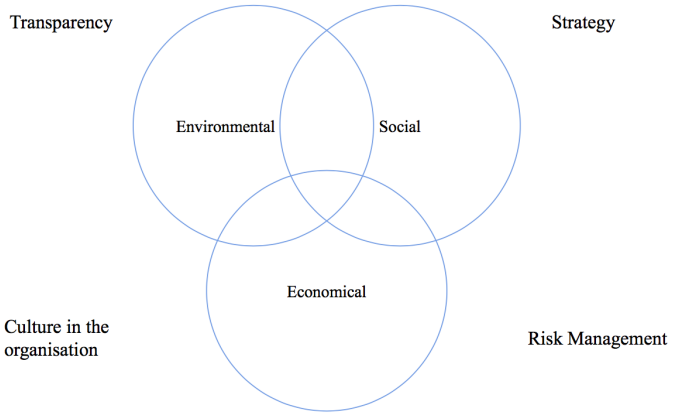

Figure 3: Framework including dimensions and supporting facets of sustainable supply chain management developed by Carter and Rogers (2008).

Historically, most of the research regarding horizontal collaboration and sustainability have been focusing on the economical or environmental effects (Chen et al., 2017). The social aspects of horizontal collaboration such as personal development and child labour have not been addressed to the same extent (ibid.). This is also mentioned by Sudusinghe and Seuring (2022), who further describe that stability and performance is the most discussed subject in relation to economical performance. Training and education are mostly discussed in literature for social performance and waste management and emission in relation to environmental performance (ibid.). However, Ahi and Searcy (2013) describe that different terms of sustainability in supply chains cover different parts of the triple bottom line. Green supply chain management is mainly focusing on environmental performance, and in some cases also economical performance (ibid.). Sustainable supply chain management on the other hand, includes all three dimensions of the triple bottom line.

2.2 Horizontal Collaboration in Transport

Horizontal collaboration is defined as a collaboration between actors at the same level of different supply chains (Basso et al., 2019). An example of horizontal collaboration is when retailers collaborate in their distribution of goods. There are many different aspects to consider when discussing horizontal collaboration. Cruijssen (2012) have created a typology for horizontal collaboration consisting of seven dimensions. However, in this thesis only five dimensions will be considered and those are: intensity of the collaboration, consolidation of goods, leadership, scope and actors.

2.2.1 Intensity of Collaboration

The first dimension of horizontal collaboration is the intensity. Lambert et al. (1999) have developed a framework for different types of supply chain relationships and their intensities. This framework is developed for vertical collaboration. However, it is argued by Cruijssen (2012) that it is directly applicable to horizontal collaboration. There are five types of intensity in the framework and the outskirts are arm's-length relationship or joint venture (Lambert et al., 1999). The five different types of relationships can be found in Figure 4.

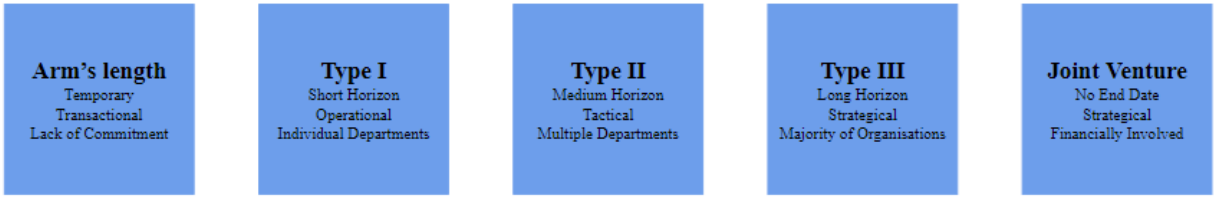

Figure 4: Five types of relationships inspired by Lambert et al. (1999).

An arm's length relationship tends to occur when there is a rapid increase in demand on the market. An example of an arm's length relationship is horizontal subcontracting, i.e., an actor provides extra capacity for another when there is a temporarily increase in demand (Spiegel, 1993). However, they could still be in competition with each other. The communication between the actors is spontaneous and there is commonly a lack of joint commitment (Cruijssen, 2012).

In the type I relationship actors consider themselves as partners. A partnership is usually defined as a relationship between two actors where the result is of higher value than what would have been achieved individually (Lambert et al., 1999). Usually, a type I relationship has a short horizon and occurs between individual departments or functions in different organisations (ibid.). Type I relationships also include coordination of operational activities but to a limited extent. Examples of coordinated activities can be back-hauling or joint distribution (Cruijssen, 2012). In type II relationships, the extent of the collaboration increases. These relationships have a longer horizon and several departments in both organisations are involved (Lambert et al., 1999). Cruijssen (2012) mentions collaboration in multi-modal transport and cross-docking warehouses as examples of commitments in type II relationships. Type III relationships are closer to a joint venture and do not have an end date. In type III relationships organisations view each other as extensions to their own organisation (Lambert et al., 1999). Actions occurring in these relationships are joint investments and network integration (Cruijssen, 2012).

A joint venture goes beyond a relationship between organisations and agreements of shared risks and benefits are common. The main difference between a type III relationship and a joint venture is the sharing of profits. This might not be fully developed in a type III relationship but is necessary to be considered in a joint venture.

2.2.2 Consolidation of Goods

The second dimension of horizontal collaboration is consolidation of goods (Cruijssen, 2012). Through horizontal collaboration, orders from different actors can be consolidated into bigger shipments (Cruijssen et al., 2007a). According to Cruijssen (2012) three different variations of consolidation is possible. In the first approach, two full truckloads travel in opposite directions. It is possible to use the same vehicle to collect the second load after the first one has been dropped off and it reduces empty re-positioning. In Figure 5 the first type of consolidated shipments is depicted.

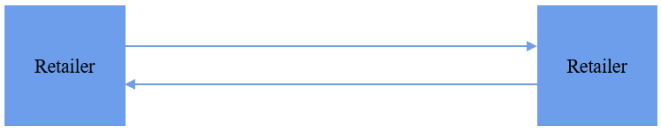

Figure 5: Shared back-haul described in Cruijssen (2012).

Another type of consolidation is a milk-run. This is used when less than truckload shipments are sent back and forth. Additional actors could be added to the network for re-routing of the shipments. This can reduce the travel distance with partially utilised vehicles and thus improve transport efficiency. A milk-run is depicted in Figure 6.

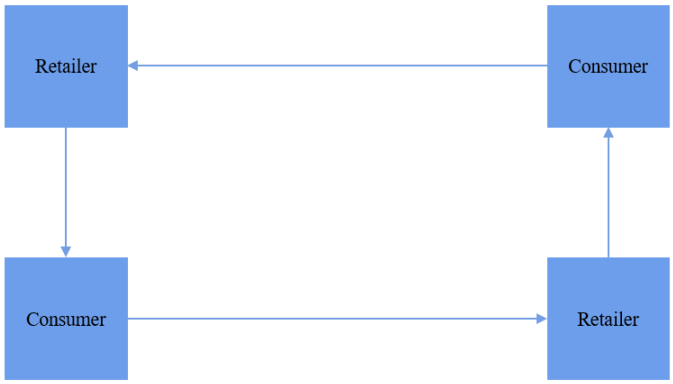

Figure 6: Milk-run shipping described in Cruijssen (2012).

The last approach to consolidate goods is through multi-modal shipping. When many small shipments have similar destinations they can be consolidated into larger shipments. Potentially, the larger shipment will be large enough to utilise another, more efficient mode of transportation, i.e. rail or sea. A multi-modal solution where retailers consolidate all their shipments at a warehouse is shown in Figure 7.

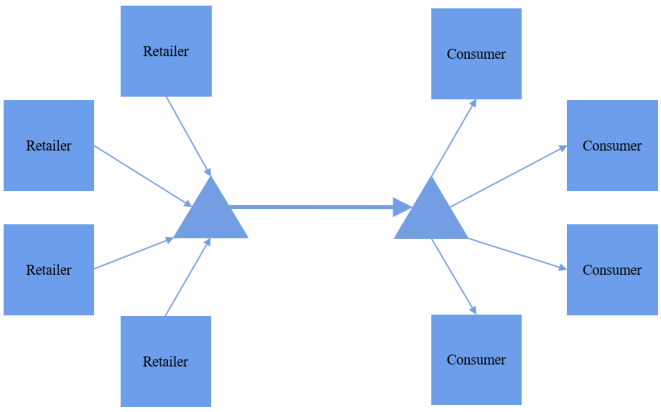

Figure 7: Multi-modal shipping described in Cruijssen (2012). The squares represent actors and the triangles represent consolidation centres.

2.2.3 Leadership

The third dimension is leadership. According to Cruijssen (2012), three types of leaderships have been identified: convened collaboration, primus inter pares collaboration and inter pares collaboration. Convened collaboration has a neutral third party that facilitates the collaboration. The third party should make it easier for actors to collaborate. The author also mention that with this leadership it is hard for the involved actors to control the collaboration. In a primus inter pares collaboration, an actor has been elected to manage the collaboration. The author mentions that this type of leadership makes it hard for other actors to influence it. However, the collaboration is dependent on a successful leadership. The third leadership, inter pares collaboration, can be seen as a neutral and open leadership. All actors have the same mandate in the collaboration and can therefore affect the outcome. However, this leadership demands everyone to share information. It is also resource demanding to make the collaboration successful.

2.2.4 Scope

The fourth dimension of horizontal collaboration is the scope of the relationship. Zinn and Parasuraman (1997) have developed a typology explaining the relationship in a strategic alliance. It is based on the two factors scope and intensity. Scope is measured as the range of services and the intensity is measured by the level of integration. Through the combination of these two factors, four different types of alliances are formed: integrated, focused, extensive and limited. These can be seen in Figure 8.

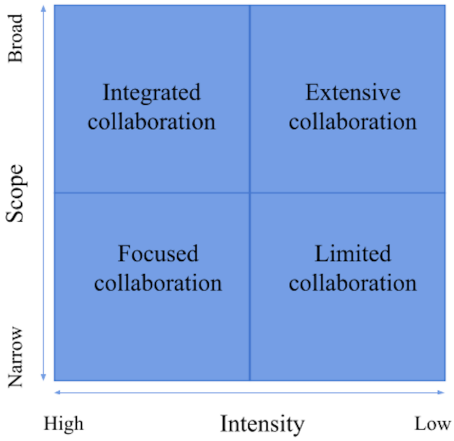

Figure 8: Strategic alliances described in Zinn and Parasuraman (1997).

There are a couple of things to consider when deciding on how to design the scope and intensity. An integrated cooperation can reap the largest cost savings in the overall system. However, in these cases it can be hard to leave the cooperation since the organisations commonly are dependent on each other. Limited cooperation is on the other hand easier to implement but do not bring as large cost savings. It is hence important to know the desired outcome before entering the cooperation (Zinn & Parasuraman, 1997).

2.2.5 Actors

Cruijssen (2012) describes three different types of set ups for actors in horizontal collaboration. In the first one only shippers collaborate. In the second approach, transport providers are collaborating to coordinate a better flow of goods. Finally, in the third approach both shippers and transport providers collaborates in a network. However, Cruijssen (2012) mentions that the third approach requires a lot of effort to be feasible, but has largest potential to improve efficiency. Furthermore, in this approach it could be required to have an independent third party involved to coordinate.

Another dimension that needs to be considered in these collaborations are the numbers of actors involved. Cruijssen (2012) mentions that if the number of involved actors increase, the coordination cost also increases. The author further mentions that no optimal number of actors have been found, but an increase of actors will lead to more opportunities for collaboration. However, too many could also become an obstacle.

2.3 Enablers for Horizontal Collaboration

There are several drivers for horizontal collaboration and these will be declared in this chapter. Operational, strategical and market drivers will be covered. Operational drivers are results of activities in an organisation. Strategical drivers derive from strategical decisions within an organisation and market drivers come from outside the organisations control.

2.3.1 Operational

A summary of the operational enablers to horizontal collaboration and which actors that are affected by these can be found in Table 1.

Table 1: Operational enablers to horizontal collaboration and the actors effected by them.

Enabler	**Affected Actor**
Lower Transport cost	Carriers, Shippers
Lower Carbon Emissions	Carriers, Shippers
Improved Distribution Efficiency	Carriers, Shippers

A frequently mentioned driver for horizontal collaboration is lower transportation cost. Indirect costs connected to distribution can get reduced through consolidation of goods. Cruijssen et al. (2007c) mentions handling costs and purchasing costs as two examples of these indirect costs which are affected. In an early article on the subject, it was found that the potential savings from joint route planning could be approximately 30% (Cruijssen et al., 2007a). Frisk et al. (2010) found savings of 14.2% and Arvidsson (2017) found savings of 1.3%. However, these cases had different circumstances. Cruijssen et al. (2007a) conclude that the largest savings could be found when many shippers with similar businesses collaborate. Further synergistic effects can be found when order sizes are small, customers dispersed and delivery windows narrow. In the case described by Frisk et al. (2010) eight different shippers collaborated to find the savings. However, it was stated that it is unusual for this many shippers to collaborate in transportation (ibid.).

Another driver for horizontal collaboration is the reduction of carbon emissions. Cruijssen (2012) describe that more efficient modes, such as rail or sea transportation, often need a larger scale of operations. Therefore, horizontal collaboration creates the possibility for organisations to collectively create large enough shipments for a more efficient transport mode. In the pilot study between ICA and SSAB (Arvidsson, 2017), 860 000 kg carbon dioxide would be saved per year if the solution would rely solely on rail transport. The author describes that this corresponds to 590 people flying from Stockholm to Bangkok. In cases where a change of transport mode is not possible, horizontal collaboration can still reduce emissions. Frisk et al. (2010) found a 20% reduction of emissions through consolidation of goods in trucks without changing the mode of transportation.

A problem in transport highlighted by Karam et al. (2021) is re-positioning of empty containers. The flow of goods between two locations is often imbalanced. Therefore, utilising horizontal collaboration to create milk-runs or fill the same truck in both directions can improve the transport efficiency (Cruijssen, 2012). Consolidation of goods can also lead to shorter lead times for the customers (Karam et al., 2021).

2.3.2 Strategical

A summary of the strategical enablers to horizontal collaboration and which actors that are affected by these can be found in Table 2.

Table 2: Strategical enablers to horizontal collaboration and the actors which are effected by the enablers.

Enabler	**Affected Actor**
Service Improvements	Carriers, Shippers
Focus on Core Activities	Shippers

A driver for actors involved in horizontal collaboration is the possibility to widen range of services. Karam et al. (2021) describe horizontal collaboration in a network structure. When a network structure is used, the range of services which can be offered to the customers increases. This was depicted in a survey by Lin et al. (2007) where it was found that shippers could consider to purchase services they need from an online market. This online market could be set up in a network structure as described by Karam et al. (2021). The two major services considered to be bought on the online market was online tracking of shipments and requests for quotes (Lin et al., 2007).

Cruijssen et al. (2007b) and Cruijssen et al. (2007c) describe that entering an alliance with another party has the potential to increase the quality of services due to close collaboration. Cruijssen et al. (2007c) further mention that the shipper can specialise themselves to satisfy the specific customer needs. The collaboration between two carriers can further improve the transportation efficiencies since they can make use of each others strengths. When these actors collaborate, an overall faster and better transport service could be delivered to the shippers (Cruijssen, 2012).

Horizontal collaboration allows organisations to reduce costs in non-core activities and focus more on their core activities (Cruijssen, 2012). According to Cruijssen et al. (2007c) it will allow organisations to reduce their purchasing costs of supporting items. Karam et al. (2021) further argues that organisations most likely will have an easier time collaborating with non-core activities since these are not what differentiate the businesses.

2.3.3 Market

A summary of the market enablers to horizontal collaboration and which actors that are affected by these can be found in Table 3.

Table 3: Market enablers to horizontal collaboration and the actors effected by them.

Enabler	Affected Actor
Joint Development Projects	Shippers
Sharing of Logistical Knowledge	Carriers, Shippers, Third Party

Other identified drivers for horizontal collaboration are related to the market. Karam et al. (2021) and Cruijssen et al. (2007c) mention that horizontal collaboration has potential to improve R&D. Karam et al. (2021) describe that it enables access to new knowledge. This is achieved through connecting with other actors and learning from each other. Moreover, horizontal collaboration has potential to improve R&D since several actors can financially contribute and share risks. This sharing of risk can allow for organisations to make larger investments in projects they would otherwise not have access to. Collaboration could also result in the possibility for organisations to learn best practices (Cruijssen et al., 2007c).

Both Cruijssen et al. (2007c) and Karam et al. (2021) describe that horizontal collaboration opens up possibilities to enter new markets. The collaboration could enable new insights for those involved in the collaboration which will open new possibilities. Furthermore, strategic alliances between organisations can give access to new geographical markets (Gulati et al., 1998).

2.4 Obstacles for Horizontal Collaboration

Even though horizontal collaboration shows a lot of promise, there are a few examples of successful implementation (Arvidsson, 2017). Identified barriers for horizontal collaboration in transport will be presented in this section, following the same structure and definitions as Section 2.3.

2.4.1 Operational

A summary of the operational obstacles for horizontal collaboration and which actors that are affected by these can be found in Table 4.

Table 4: Operational obstacles to horizontal collaboration and the actors effected by them.

Obstacles	Affected Actor
Flow of Goods	Carriers, Shippers
Data Sharing	Shippers, Third Party

Some obstacles found in literature are related to goods and data sharing. Karam et al. (2021) mention imbalanced flow of goods on a national level as an obstacle for horizontal collaboration. Since the volume of goods often is heavier in one direction, it could be hard to find a partner that can fit the collaboration and thus balance the flow (ibid.). Bull Sletholt et al. (2020) has also risen fill-rate as an obstacle for horizontal collaboration. The problem is to define fill-rate because of its multiple parameters. The last impediment found regarding to the flow of goods is how to optimise the system (Pan et al., 2019). It is hard to find an optimal solution for whole system and therefore establishing the best transportation routes can be problematic (ibid.).

There are also obstacles related to the flow of information. When sharing data, it must be secured and trustful (Basso et al., 2019). Karam et al. (2021) describe that inaccurate information can result in decisions made on the wrong data. The consequence of this is inaccurate estimations of the outcomes and business decisions. It is further mentioned that a lack of information and communication technology can result in a poor flow of information. Another question related to the flow of information and the interest in data sharing is who owns the data (Bull Sletholt et al., 2020). The owners of transport related data are carriers and shippers and these need to be convinced that their data can provide value at a system level. Furthermore, the data must not be traceable to the actor who shares the data.

2.4.2 Strategical

A summary of the strategical obstacles for horizontal collaboration and which actors that are affected by these can be found in Table 5.

Table 5: Strategical obstacles to horizontal collaboration and the actors effected by them.

Obstacles	**Affected Actor**
Coalition Formation	Shippers, Third Party
Cost Allocation	Shipper, Third Party
Practitioner Knowledge	Third Party
Negotiation Position	Shippers, Third Party
Trust	Shipper, Third Party

A barrier for horizontal collaboration is how the collaboration should be structured. The most common motives for a shipper to horizontally collaborate is cost reduction, service enhancement or better market positioning (Cruijssen et al., 2007b). Recently, resilience of the supply chain and environmental improvements have also become more common motives (Pan et al., 2019). According to Cruijssen et al. (2007b), finding a reliable coordinator who is trusted by all parties is a barrier to overcome. Further, it will be important to consider how many parties should be included in the collaboration. It was found by Frisk et al. (2010) that eight companies could collaborate horizontally. However, Basso et al. (2019) argues that it is rare for a collaboration to include more than two or three actors. It is also

important to acknowledge a leader for the collaboration before it is initiated (Basso et al., 2019).

Closely related to the coalition formation barrier is cost allocation which can be solved through cooperative game theory (Guajardo & Rönnqvist, 2016). However, these methods can become fairly complex and therefore be hard to understand. This was found by Frisk et al. (2010) where the equal profit method seems to perform better than others due to its simplicity. Geographical location has proven to be an important factor for cost savings (ibid.). Therefore, when parties understand the importance of this factor, more advanced methods of allocation can become favoured (ibid.). Bull Sletholt et al. (2020) conclude that the most important thing is that the cost allocation problem gets managed but not how it is managed. This is further validated by Karam et al. (2021) who believe that it is more important that the cost allocation method is transparent and straightforward rather than sophisticated and theoretical. Furthermore, a set of methods should be applied instead of a single method since this will allow the participants to negotiate and decide which method would fit their collaboration the most (ibid.). The set-up costs for collaboration are perceived to remove large parts of the savings (Cruijssen, 2020). However, changes in the environmental regulations by the EU or development of a collaboration model by an independent third party could reduce the perceived set up costs for collaborations (ibid.). Horizontal collaboration could thus become more lucrative for participants.

Furthermore, practitioner knowledge is an obstacle described by Basso et al. (2019). It is important to have people with knowledge of how to design the collaboration (ibid.). The author recommend to outsource the designing of the collaboration to an expert with experience within the area, i.e. an academic expert. Another option can be to acquire the knowledge from a fourth party logistics provider, i.e. a management consultant. These can be hired to design and run an advanced supply chain solution (Cruijssen, 2012). However, the fourth party arrangement does not suit all collaborations and should be kept at an arm's length relationship. Otherwise a collaboration expert who is independent from the parties would be more suitable (ibid.).

According to Basso et al. (2019) it is important to consider the collaborating partners negotiation power before the collaboration and dynamical over time. The reason is that the party with better negotiation position will most likely benefit more from the collaboration than the party with a worse position for negotiation (ibid.). In the case by Frisk et al. (2010), rules for the collaboration were negotiated before the collaboration was initiated. It was concluded that this was one of the reasons for the successful collaboration. Karam et al. (2021) suggest a similar solution where the benefit sharing mechanism should be negotiated before the collaboration is initiated. However, opposed to Frisk et al. (2010), a set of mechanisms should be negotiated instead of just one. With this method smaller actors can easier use the method which is the most fair for everyone. Cruijssen (2012) emphasises that it is important that the negotiation end in a win-win situation. Otherwise, the relationship will be unsustainable in the long term.

Trust between actors is also an obstacle for horizontal collaboration. When there is distrust in a horizontal collaboration, transaction costs and other costs related to managing the collaboration will increase significantly (Ik-Whan & Taewon, 2006). In the worst scenarios it can result in an opportunistic behaviour (Cruijssen et al., 2007b). According to Basso et al. (2019) trust needs to exist toward the system, partners and data. If the involved actors believe that the relationship is beneficial, there will be trust of the system. It is mentioned by Karam et al. (2021) that there can be distrust towards the coordinator or other actors in a network. This type of distrust can make partners hesitant to share information with the coordinator (ibid.). Trust between partners refer to the belief that other parties will act for collective benefits. Market position, objectives, structure and similarities of flows all influence the trust between partners (Pan et al., 2019). Distrust in this regard has been found the toughest to overcome since it often led to issues with information sharing (Karam et al., 2021). Lastly, trust towards data refer to the belief that shared data by other parties are true to the real value (Basso et al., 2019). It has been found that organisations with a low level of digitisation often have more inaccurate data than organisations with a higher level of digitisation (Karam et al., 2021). Furthermore, data can be measured differently in different organisations (Bull Sletholt et al., 2020). Therefore, if two organisations want to collaborate but have different definitions on for example fill-rate, they can begin to distrust the data since it is collected differently.

2.4.3 Market

A summary of the market obstacles for horizontal collaboration and which actors that are affected by these can be found in Table 6.

Table 6: Market obstacles to horizontal collaboration and the actors effected by them..

Obstacles	**Affected Actor**
Legal Barriers	Shippers
Information Sharing Technology	Carriers, Shippers, Third Party

Legal barriers are another obstacle for horizontal collaboration. Basso et al. (2019) describes collaboration rules and how they vary between countries. For example, competition laws regulate the collaboration between competitors to avoid negative effects for consumers. *GDPR* is another legal barrier regulating how data can be collected and shared (Bull Sletholt et al., 2020). Collusion is a further risk in collaborating horizontally (Basso et al., 2019). It is important that the collaboration does not create an unfair advantage for any parties. Laws regulating competition mainly affect bigger companies and does not influence smaller companies to the same extent (Karam et al., 2021). Small and medium sized companies do not affect the possibility to compete to the same extent and is therefore often not affected and restricted by the laws as bigger companies. However, it would still be illegal for them to coordinate price or capacity (ibid.). Furthermore, horizontal collaboration is also affected by local laws. Two examples in Sweden are the *Public Access*

to Information Act and *Security Act* (Bull Sletholt et al., 2020).

Obstacles related to information sharing technology are also identified. Basso et al. (2019) describe that sensitive information need to be shared for a collaboration to be feasible. However, companies are not always open to share sensitive information. It was found by Cruijssen (2012) that the biggest impediment to horizontal collaboration is the fear of sensitive information being leaked. This hesitancy towards information sharing creates a problem since sharing information is important to create an efficient transport system (Pan et al., 2019). Lastly, Karam et al. (2021) raise IT-systems for information sharing as an obstacle for horizontal collaboration. Furthermore, insufficient IT-systems can result in incomplete or inaccurate data which create inefficiencies in the systems.

2.5 Third Party Involvement in Horizontal Collaboration

Cruijssen (2012) refers an independent third party as being neutral, transparent and trusted. The author concludes that an independent third party must be present for the collaboration to be successful. A further benefit of an independent third party is the avoidance of competition laws. Otherwise, it could make the collaboration not work as efficient as possible and lead to unfair work distribution in the long run. Cruijssen (2012) mentions that an independent third party should act as a safeguard of confidential data. It should also be responsible of legal foundations and handle contracts. Furthermore, it could be beneficial to involve an independent third party in the start up of a collaboration since this could ease the process of initiation of collaboration (ibid.). Rossi (2012) mentions uneven power positions as a reason for why collaborations fall apart. The author also states that the involvement of an independent third party could mitigate this since it avoids any party getting an unfair advantage. However, Cruijssen (2012) mentions a wide uncertainty in literature regarding the involvement of an independent third party in horizontal collaborations.

Three different types of horizontal collaborations are presented by Karam et al. (2021). The first type is an electronic marketplace platform where companies can build short term collaborations for transportation. These collaboration are often without any formal documentation and connect shippers, carriers and logistic service providers. The third party facilitates the platform in this case. The information flow and physical flow in a marketplace structure can be seen in Figure 9.

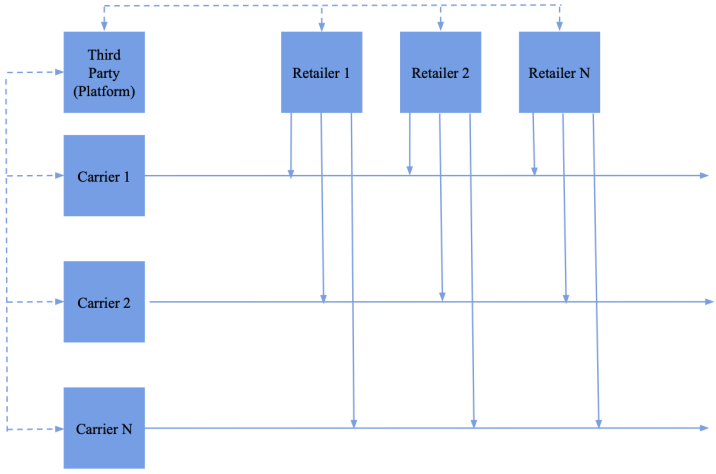

Figure 9: Dotted line represents the information flow and the solid line represents the physical flow in a marketplace.

The second type is close collaboration between few actors. These are characterised with long strategical alliances where the third party might not even exist. Collaborating partners have formal contracts and agreements to ensure that they are on the same page. The information and physical flow in such a structure can be found in Figure 2. Lastly, urban consolidation centres are mentioned as a type of horizontal collaboration. Organisations ship their goods to a consolidation centre outside of a city which they share with multiple other organisations. The goods are then reloaded to smaller last-mile vehicles. The structure can be seen in Figure 10.

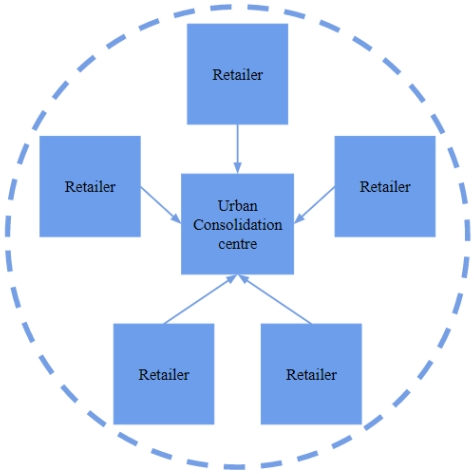

Figure 10: Representing the physical flow in a cluster.

A Swedish example of a successful horizontal collaboration is *Skaraborg Eco shuttle* (Arvidsson, 2017). It is a collaboration between a Swedish retailer and a carrier. The retailer has contracted the carrier to operate a train for incoming goods from a harbour to a dry-port. Other shippers with an interest in transporting goods along this distance can join the collaboration and consolidate their shipments to improve fill-rate. Introducing a new partner to the collaboration is challenging and takes about 2-3 years until they are fully operating. The main obstacles are related to trust since the new partners need to be fully trusted. The result for organisations who join is reductions of up to 10% in costs and 80% of pollution.

Vanovermeire and Sörensen (2014) mention several examples of third party involvement. An example is between Kimberly-Clark and Unilever-HPC in the Netherlands. Both parties are consumer goods producers with shipments mostly to the same customers. The aim of the collaboration was to increase the delivery frequency and thus being able to send less goods separately, but still having a high fill-rate in the truck. They collaborated through sharing a warehouse managed by an independent third party logistics provider. A report was published regarding cost allocation and how the Shapely value method was used in the Unilever-HPC case (Vanovermeire et al., 2012). Through creating an incentive for flexibility with Shapely value, a better result was found in the collaboration since more opportunities of consolidation arose. Another example described by Vanovermeire and Sörensen (2014) is between the plastic manufacturer JSP and the metal forger Hamerwerk who both sent trucks from Germany to Czech Republic. In this case, they involved a third party logistics provider for goods transportation and an independent third party to guide the collaboration. The collaboration led to a higher delivery frequency, environmental benefits, and reduction of inventory-in-transit costs.

Vanovermeire and Sörensen (2014) describe how the University of Antwerp has created an organisation called TriVizor with the main goal of being an independent third party in horizontal collaborations. TriVizor is tasked with coordinating and contracting shippers and transport providers when collaboration is demanded. However, it is mentioned that the process is time consuming and inconvenient. It was stated that they in the future want to develop a cost allocation method which encourage behaviour that improves the collaboration. Another example of a third party is Seven Senders. Their goal is to connect retailers with parcel carriers and thus create a network where retailers can send shipments with a low cost and short delivery times. They act as a control tower for parcel delivery in Europe where they can create a more optimised network for shipments than what would otherwise be possible (Wurst & Graf, 2021). Furthermore, the European Commission have provided projects for horizontal collaboration (Cruijssen, 2020). One of these projects was named NEXTRUST with the goal to develop a logistical network for both horizontal and vertical collaboration. The project aimed to integrate shippers, logistic service providers and intermodal operators as equal parts in the network to both build higher volumes in each shipment but also increase the quantity shipped by rail or sea.

2.6 Overview of Collaboration Between Retailers

Ramanathan et al. (2014) have researched the possibilities for collaborations among supply chain partners with the goal of achieving environmental sustainability and improve business performance. Two approaches were found for reduction of negative environmental impact. A company can either force their suppliers to reduce emissions or try to reduce its own emissions through improved logistics, production or raw material. A retailer can change their order sizes to achieve an overall improved environmental effect. Increasing the batch size will reduce the energy consumed in transport but will increase inventory carrying costs (ibid.). Furthermore, the main reason for the increasing demand of green supply chains have come from pressure by different stakeholders (ibid.). It was concluded by Ramanathan et al. (2014) that both intra- and inter-organisational collaboration is necessary to achieve green supply chain management.

In an interview with a large food retailer in the UK it was found that environmental issues are driving consumer choices (Hingley et al., 2011). Therefore, solving these issues could be used for marketing purposes (ibid.). Furthermore, Frankel et al. (2002) mention that another enabler for entering a collaboration for retailers in the grocery industry is to drive innovation. Innovation was interesting since the collaboration could lead to better results than working separately. However, the same retailer which was mentioned in Hingley et al. (2011) was hesitant to the suggestion that collaborative approaches, for example vertical and horizontal collaboration, could reduce the cost pressures in the current economic environment. Furthermore, the retailer was confident that their management of suppliers was superior to their competitors. If this is the general case for retailers, it will be hard to collaborate since no one would want to compromise nor have someone else manage their supply chain. Lastly, smaller actors with less power in their respective supply chain might be more willing to collaborate (Hingley et al., 2011).

In some cases it can be beneficial for retailers to collaborate in their physical distribution (Stephens & Wright, 2002). The main reason is that retailers usually do not consider physical distribution as their core activity. Thus it can be more efficient from a system point of view to outsource the logistical function (ibid.). An interesting aspect brought up by Stephens and Wright (2002) is the diminishing returns from supply chain innovation caused by the rapid spread of best practises within the area.

Problems with the relation between retailers and suppliers including trust and power have been documented in vertical collaboration (Aastrup et al., 2007). Business relationships of this type can bring competitive advantages but require a positive notion of trade-off between benefits and sacrifices. The operational benefits in terms of know-how and time to market are the most important. The sacrifices to consider is giving up full control and negotiation power (ibid.). Furthermore, retailers seem to collaborate better with suppliers who are only working with them and no other retailers (Hingley et al., 2006). Improving trust, collaboration and co-operations have been found to improve the relationship between retailers and suppliers (ibid.).

Ballot and Fontane (2010) conclude that pooling of supply networks for retailers lead to different benefits depending on the size of the retailers. Larger retailers usually have higher fill-rate of their trucks than smaller retailers. Therefore, larger retailers do not find as large benefits from supply network pooling as smaller retailers. Further, it was found that economical benefits and ecological benefits can be acquired at the same time.

In order to increase the possibility for horizontal collaboration without the involvement of a third party, logistical clusters can be utilised (Sheffi et al., 2019). A logistical cluster is defined as a geographical location where both shippers and carriers are located (ibid.). This set up eases the process of finding possible partners for horizontal collaboration due to a physical proximity, which enables consolidation without a long detour from the planned route. However, the physical proximity is not enough for the shippers to collaborate, a joint value proposition also needs to be developed. Trust and social interactions in these scenarios were also found to be a important for successful collaboration (ibid.). More formal interactions and contracts should not be absent since these are important to secure fair resource sharing and avoid opportunistic behaviour.

3 Method

The following chapter describes the method that was used through the thesis. It contains the research approach, data collection, data analysis, ethical considerations and research quality.

3.1 Research Approach

A multiple case study was conducted in order to find answers to the research questions. Yin (2009) describes that a case study is most advantageous when the research questions contain "how". The author also mention that the researchers should not influence the events and have a real-life context that could bring value to the thesis. All these requirements were fulfilled and therefore a case study approach was suitable. Since the research questions aimed towards inter-organisational horizontal collaboration, the study needed to involve more than one retailer to provide a reliable answer. Therefore, a multiple case study was more appropriate to use than a single case study. Bryman and Bell (2011) mention that a multiple case study can be used when the researchers aim to find similarities or differences between cases. Yin (2009) recommends that a multiple case study should be designed to include six to ten cases. Two to three of them should find literal replications while the others should identify theoretical replications. However, due to limitations in both time and resources, only two literal replications were considered. These were fashion retailers with a global customer base and who both managed an e-commerce solution. Further, six different industries were examined to find theoretical replications. Every case involves a retailer with business towards end consumers.

In Figure 11 the used method can be seen. Before the purpose and research questions were formulated, the topic of horizontal collaboration was explored through a literature review and interviews with experts. When the purpose and research questions had been formulated, the data collection phase began. A qualitative approach to collect data was used and hence, answers during interviews, context and opinions were preferred over statistics (Bryman & Bell, 2011). Empirical data was coded and compared in a cross-case analysis. In parallel to the cross-case analysis, interviews with an IT-service provider were performed. The findings from the cross-case analysis were compared with the data from the expert interviews, the literature review and the IT-service provider interviews. Finally, conclusions were drawn based on the comparison between the data collected.

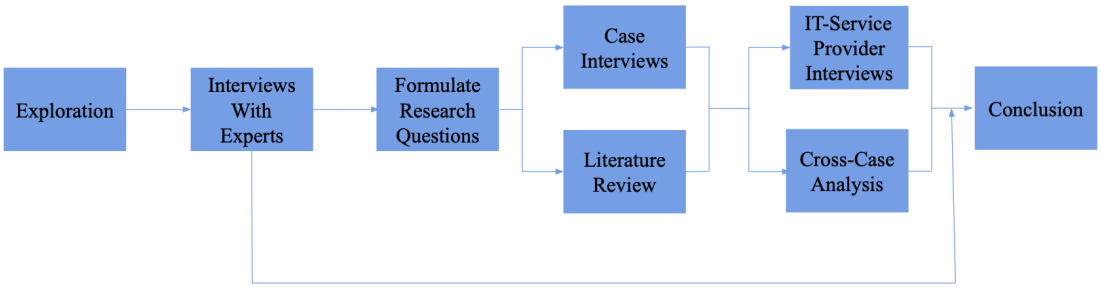

Figure 11: Qualitative research approach.

3.2 Data Collection

A qualitative research approach is appropriate to use when researchers are interested in the interviewees point of view (Bryman & Bell, 2011). A semi-structured approach provides structure to the empirical data which will help the researchers perform a multiple case study. Structured data will be easier to compare than unstructured data. Therefore, interviews in this thesis have been performed with a semi-structured approach.

Interviews were held with experts from the field to develop a thorough understanding of what has been done previously within the area of horizontal collaboration in Sweden. These interviews were not recorded but notes were taken. Furthermore, these interviews were semi-structured but did not follow the same structure as the case interviews. The expert interviews followed the structure which is provided in Appendix A and these questions were sent to the experts before the interview. An overview of the experts who were interviewed can be seen in Table 7. All interviews were performed online and in Swedish.

Table 7: Overview of interviews made with experts from the academia.

Expert	**Organisation**	**Role**	**Time**
I	University	Docent	45 min
II & III	Non-profitable Research Institute I	Head of investigation	60 min
IV	Non-profitable Research Institute II	Senior researcher	30 min
V & VI	Authority	Programme director & Project manager	60 min

Convenience sampling was used to find participating retailers since the opportunity to speak with many retailers in different industries presented itself. The interviews were semi-structured and the questions can be seen in Appendix B. Each interviewee was asked for permission to be recorded. If an interview was not recorded, it was either due to a lack of consent or technical difficulties. The interview was chosen to be recorded to

capture both the answers but also how they were framed (Bryman & Bell, 2011). Furthermore, recording an interview allow the interviewers to concentrate on the interview instead of taking notes. However, Bryman and Bell (2011) mention that interviewees often become more cautious of their wording and Jacobsson and Åhlström (2007) describe how answers can become more politically correct. Although these are valid counterarguments, the benefit of recording outweighs the drawbacks. An overview of the interviews can be found in Table 8. Individuals with key positions within logistics such as head of logistics or distribution manager at the participating organisations have been interviewed. A risk while interviewing retailers is a lack of knowledge regarding horizontal collaboration. The interviews therefore started with a quick overview of the subject to make sure that the interviewees had a sufficient understanding.

Table 8: Overview of interviews from representatives of retailers.

Code	**Company**	**Time**	**Language**	**Online or Offline**	**Recorded**
Representative I	A	30 min	Swedish	Online	No
Representative II	A	30 min	Swedish	Online	Yes
Representative III	B	30 min	Swedish	Offline	Yes
Representative IV	C	40 min	English	Online	No
Representative V	D	30 min	Swedish	Offline	Yes
Representative VI	E	40 min	Swedish	Online	Yes
Representative VII	F	30 min	Swedish	Online	Yes
Representative VIII	G	30 min	Swedish	Online	Yes

The interviews at the IT-service provider were sampled through convenience sampling and the interviews were semi-structured. All three representatives at the IT-service provider were field experts in the logistics industry. The questions were not sent to the interviewee before the interview to get more spontaneous answers. The questions which were asked can be found in Appendix C. Furthermore, the interviews were recorded if permission was given by the interviewee. An overview of the interviews can be found in Table 9.

Table 9: Overview of interviews from representatives of IT-service provider.

Code	**Time**	**Language**	**Online or Offline**	**Recorded**
Representative IX	50 min	Swedish	Offline	Yes
Representative X	50 min	Swedish	Offline	Yes
Representative XI	40 min	Swedish	Offline	Yes

3.3 Data Analysis

The process to analyse the collected data was inspired by the steps of qualitative analysis provided by Williamson (2002). The pursued steps were:

1. Transcript interviews
2. Categorise data
3. Brainstorm ideas
4. Organise ideas
5. Validate theories with literature

The data collected from the interviews was transcribed with the help of the transcript-tool in *Word Online*. This approach was chosen since there is a high risk of human errors while transcribing an interview (Bryman & Bell, 2011). These errors are mainly connected to the ability of concentration while transcribing a whole interview. It was mentioned by Bryman and Bell (2011) that a one hour interview could result in five to six hours of transcription. However, a software tool is not always fully correct. Therefore the transcribed file was checked by the researchers to ensure data quality.

When the data transcription was completed, the data was coded and categorised. The information was sorted for patterns to be found in the data. While brainstorming, the categories of information were viewed from different perspectives. The ideas which sprung from the brainstorming were organised following the structure of: operational, strategical and market. The ideas and theories were compared with the literature review to validate their feasibility. The empirical data from both the experts and representatives from the IT-service provider was used to get an external perspective to horizontal collaboration between retailers.

An important aspect to consider while conducting the research is the level of analysis (Bryman & Bell, 2011). Bryman and Bell (2011) mention that the level of analysis could be conducted on an individual, group, organisational or societal level. This is further emphasised by Yin (2009) who describes that a key reason to define the level of analysis is to know where the boundaries should be drawn. Through this thesis, the level of analysis was organisational. To find differences between industries and a broader perspective, key individuals from companies in different industries has been chosen.

3.4 Ethical Considerations

Bryman and Bell (2011) mention harm to participants, a lack of informed consent, invasion of privacy and deception as the most important principles to consider when conducting business research. During the data collection, all these were considered. Questions regarding sensitive topics could cause stress to the interviewee. To avoid this potential harm, the

interviewee was informed that they could choose to not answer questions if it made them uncomfortable. The interviews were not recorded if the interviewee did not consent. Furthermore, for the commercial safety of the interviewees and participating organisations, they were kept anonymous through the thesis. To avoid any invasion of privacy, only questions regarding the concept of horizontal collaboration and the organisations opinion towards it was asked. Lastly, to avoid any deception, the interviewee was given a clear description of the concept of horizontal collaboration and how their participation would contribute to the research.

3.5 Research Quality

The validity and reliability of the collected data will be discussed in this section.

3.5.1 Validity

Validity can be addressed from three angles: construct, internal and external validity (Yin, 2009). Construct validity addresses the validity of the method used to collect the data. It is important that the studied concepts are clearly defined and that operational measures are connected to these concepts. The concept of horizontal collaboration has been defined and discussed between multiple stakeholders to the thesis. Furthermore, the data was collected from multiple cases which further enhance the construct validity.

Internal validity address how the data was analysed. However, Yin (2009) mention that internal validity is often a concern when conducting an explanatory study. Since this is more of an exploratory study with the aim of creating a foundation for future horizontal collaboration, internal validity was not considered.

External validity address whether the findings of the study can be generalised or not. To find interviewees, convenience sampling was used which reduces external validity of the results since it is hard to know if the sample represent the full population. However, to mitigate this uncertainty multiple cases and sources of data was used.

3.5.2 Reliability

Reliability is discussed to minimise potential errors or biases throughout the study. For the data collection to be standardised, a set of questions were developed before the interviews and these were asked during all of them. Furthermore, the interviews were recorded when permitted and transcribed afterwards. Content created during the thesis was stored for the possibility to go back and revisit any information previously gathered. A common critique toward case studies is that the social setting changes over time and they can therefore be hard to replicate (Bryman & Bell, 2011). The interviews were performed during a short time frame and therefore randomness related to the time frame could be captured.

4 Empirical Findings

In this section empirical data from the interviews with the retailers will be presented. Thereafter, answers from the retailer interviews are categorised and compared and lastly, the experts and the IT-service provider's point of view on the categories will be presented.

4.1 Retailer Perspective on Horizontal Collaboration

In this section, the retailers perspective on horizontal collaboration will be presented. Table 10 lists the retailers with their respective industry, whether they are local or global and if they operate through brick and mortar or e-commerce. A local retailer operates only in Sweden while a global retailer operates in multiple countries. If many organisations are part of a group who share income statement, then they are referred to as subsidiary. If the organisations within the group do not share income statement, they are referred to as affiliated.

Table 10: An overview of organisations that are interviewed.

Retailer	**Industry**	**Local or Global**	**E-commerce or Brick and Mortar**
A	Pharmaceutical	Local	Both
B	Fashion	Global	E-commerce
C	Fashion	Global	Both
D	Grocery	Local	Both
E	Sports	Global	Both
F	Cosmetics	Global	Both
G	Convenience	Global	Brick and Mortar

4.1.1 Retailer A

Retailer A have been involved in a pilot project regarding horizontal collaboration. It was a collaboration between retailer A and another subsidiary of the group and it was only performed in one city. The goal was to deliver last-mile goods simultaneously to customers of both companies. However, the customers had to make two separate purchases and the goods were consolidated in the transport phase. It was active during six months but recently put on hold due to updates in the communication system. Overall, the customers appreciated the offer since they got shipments from two actors in the same delivery. An obstacle during the project was the lack of a standard system for data sharing. Furthermore, they are planning to re-initiate the project when the updates have been implemented.

Further, two other possibilities of collaboration had been examined by retailer A. The first involved a sports equipment retailer with a warehouse nearby retailer A's warehouse and they bought transport services from the same carrier. Due to problems with timing

of pick-ups, uncertainty regarding the outcome and a negative attitude from the carrier, the project was never launched. Another examined collaboration was together with two manufacturers of medicine. It was found that all three actors delivered daily to the same dispersed stores. Therefore, they wanted to merge these shipments to improve transport efficiency. An obstacle was resistance from the carriers which hindered the collaboration to launch.

> *Carriers do not open up so much for collaboration. ... They would rather sell to two parties and have double purchases. (Representative II, personal communication, translated from Swedish)*

Retailer A has different transport solutions for delivery to the stores and last-mile delivery. Stores receive deliveries five times a week from their central warehouse and the transportation is outsourced to a third party logistics provider. It is negotiated together with other subsidiaries to increase the volumes. Except for these negotiations, there are no further collaboration between these subsidiaries since they have different systems for tracking, tracing and back-hauling. Another reason is due to temperature requirements for distribution of pharmaceuticals. Their e-commerce solution on the other hand is taken care of by other smaller transport providers specialised in last-mile transportation. The retailer usually purchase their last-mile transport per parcel instead of a fully outsourced solution. To optimise these parts of the distribution network, carriers utilise milk-runs. The e-commerce warehouse is located with proximity to other customers to the carrier and they can therefore optimise their fill-rate in this area.

To share the volume and forecast data with an independent third party was not considered a problem, since transportation of goods is not part of their core business. However, there needs to be an incentive for them to share the data.

> *I can not see any issues with it, it is not our business to transport goods from A to B. Our business is in our stores, websites and to meet the customer. ... However, there must still be an aim with it, and it must be a benefit that comes with it. (Representative II, personal communication, translated from Swedish)*

An enabler for retailer A to participate in horizontal collaboration is to further develop their customer offerings. This was a benefit they found in the pilot project and they were able to reach new customers with no previous relation to retailer A. Through increased economies of scale, more frequent pick-ups could be possible and thus, lead times to customers could be reduced. However, there were some scepticism towards the involvement of a third party from retailer A. It was described that a third party logistics provider already accumulate volumes and optimise a network and thus, an independent actor doing a similar activity would be unnecessary. Another possible enabler for retailer A to horizontally collaborate would be to reduce transportation costs. The recent price increase in fuel costs was mentioned as one reason for them to further investigate cooperative solutions in transportation.

> *It would of course be cost reductions, I would say. It is, as you know, also depending on how it looks on the world market with fuel prices and so on. (Representative II, personal communication, translated from Swedish)*

Lastly, the environmental factors were mentioned as an enabler to further collaborate. However, there must not be any reduction of transport quality or delivery precision compared with the current solution.

In the pharmaceutical industry, the *Patient Safety Act* regulates what type of data can be shared. It should, for instance, not be possible to connect the content of a package with its wrapping. During the pilot with the other subsidiary, laws regarding which data they could share became troublesome. Today, retailer A shares data for both volume and forecasts with their contracted carrier. It was further highlighted that the competition law could be an obstacle when retailers collaborate.

4.1.2 Retailer B

Retailer B has historically been a subsidiary in a company group of fashion retailers. In the group, they negotiated the shipping contracts together with other subsidiaries in order to increase volume. It was stated that the collaboration worked well since they were part of the same group and thus had the same structures and no allocation problems. The carriers did not have any problems with this structure of collaboration. However, the group have since then broken apart and they are therefore not collaborating anymore.

Retailer B is sending goods form their central warehouse to consumers in multiple countries. Transportation from the central warehouse to the local warehouse is performed with one carrier and the last-mile transportation is managed by a local carrier with knowledge in the individual market. This is usually negotiated as a full solution provided by carriers. In some countries the transport solution requires specific adjustment to fit the environment. However, they deviate from buying transport per parcel when large enough volumes to the destination are accumulated. Frequently, volume become a deciding factor since larger volumes create a more advantageous negotiation position and better solution can be bought. Back-hauling is structured around different warehouses in Europe. The back-hauling solution is fully outsourced and cover everything from check and control to payback. Thereafter, it is sent back to the central warehouse and it is thus ready to be re-sold.

The retailer was open to share data regarding shipments.

> *If it is business critical data, I believe, it will be hard to share it. If it is data that can be anonymised in order to create a volume, then it should surely be easier to do it somehow. (Representative III, personal communication, translated from Swedish)*

However, it was emphasised that the content must be anonymous and not contain business critical information. Information that can be used to increase volume was not regarded business critical and is shared with carriers today. A concern regarding the willingness of carriers to participate in horizontal collaboration was mentioned. Selling transportation is their core business and if their customers begin to collaborate, they would be affected and sell less transports. Furthermore, the decision of who to collaborate with, what information that should be shared and why should come from higher positions in the organisation.

Retailer B is open for a future horizontal collaboration but consider it important to know their partners and their motives. The retailer had a positive attitude towards third party involvement acting as a coordinator of the collaboration. However, retailer B was sceptical towards practical implementation of a third party. The businesses must have an aligned view of the collaboration to avoid different opportunistic behaviours. Trust is an important facilitator for them to be comfortable in a collaboration. It was also important for the retailer that a plan for how to end the collaboration was developed before it was initiated. The potential for collaboration was believed to be largest when transporting from a warehouse to the market. However, a concern regarding the possibility to find partners with transport needs between the same nodes at the same time was mentioned.

An enabler for the retailer to participate in horizontal collaboration is higher frequencies of deliveries.

> *I think a driver could be to get a higher frequency and faster deliveries to the market. Yes, and then it would obviously lead to lower costs. (Representative III, personal communication, translated from Swedish)*

Through horizontal collaboration, a full truck load can be accumulated faster and thus enable more frequent shipments and shorter lead times to customers. Shipping larger volumes lead to economies of scale which reduce the shipping costs per package.

It need to be an easy way to understand if there is a demand from other actors to send goods to similar locations. However, how the goods should be shipped also need to be considered. It is not in the shippers core business to transport the goods and therefore, carriers need to be open to collaboration. Scepticism regarding how horizontal collaboration should work in a real context exists however. Coordination, information and volume gathering is what many carriers have as their core business today.

4.1.3 Retailer C

Retailer C has examined a potential collaboration project together with an e-commerce company and a coordinator of horizontal collaborations. Due to operational problems regarding which carrier and trucks were used and when the shipments would be collected, retailer C withdrew from the collaboration. During the project with the e-commerce retailer and coordinator, issues regarding cost allocation and coordination of the collaboration was encountered. It was important for retailer C that the quality of transportation was not below their standards and therefore, they wanted to keep the transport provider already in

use. When the coordinator wanted to use a cheaper solution with poorer quality, retailer C lost interest in collaborating. However, retailer C is willing to collaborate in the future. To ensure the quality of their transports, they want to have direct contact with the freight forwarder which was not possible if they wanted to collaborate with the coordinator and e-commerce company. Furthermore, contractual and insurance issues was reported as obstacles to the collaboration.

The retailer had a central warehouse for flat packages and another warehouse for hanging packages due to different requirements. The hanging packages needed to be transported with a hanger and thus required special transport. The flat goods could be transported as general goods otherwise. Furthermore, these two types of packages could be combined while transported, flat packages at the bottom and hanging at the top. They also have regional distribution warehouses in countries with high sales, managed by third party logistic providers. The outsourced solution includes warehousing and last-mile transportation. Items which were not sold in stores was sent and managed at specific warehouses in Europe. The items are checked, refreshed if needed and sent to outlet stores.

The retailer was restrictive to sharing data since they have a high security level. They could agree to share encrypted data with a third party but not with a competitor. Furthermore, data regarding specific customer addresses was fully restricted. Data that could be encrypted and shared is transport information and package specifications, i.e., volume and weight. The high security standard was also found internally in the organisations and a majority of employees had limited access to information.

Clustering of parties was suggested as a possible solution of how to coordinate a horizontal collaboration. It would enable retailers with similar requirements on transportation to collaborate. An independent third party was suggested as a coordinator who could manage multiple clusters and divide the gains fairly. The lack of a good information sharing system was a barrier for horizontal collaboration according to retailer C. A good system should have an easy on-boarding, the possibility to collaborate in clusters and good visualisation of results. Furthermore, last minute changes were described as a potential problem for the system, since these are common but change the prerequisites for the transportation. Lastly, it would be beneficial to have the opportunity to prioritise which carrier to use and manage other requirements.

A global trend which can increase the need for collaboration is increasing container prices. Suppliers are often entitled to transport goods to their local ports. However, after the goods arrive at the port, they are managed by personnel at the port which is financed by retailer C. However, there are a lack of coordination of goods at the port and consolidation of goods from different customers rarely happens. Lastly, inbound flows were mentioned to be more immature than outbound flows and could therefore have higher potential for collaboration.

Economies of scale was the main enabler for retailer C to horizontally collaborate. This would lead to cheaper transportation, improved range of services and a reduction in lead time to customers. Faster deliveries are sometimes needed and this forces the package to

be transported in an inefficient way. Thus, it raises the prices and have an environmental impact which could be reduced through collaboration.

4.1.4 Retailer D

The retailer has been involved in a potential project with other grocery retailers. Several actors withdrew from the project while retailer D still wanted to proceed with the project. The driving part in this project was a carrier who wanted to consolidate the goods. In the grocery industry, goods have temperature and lead time requirements which does not apply to other industries. Transport requirements is therefore an obstacle when grocery retailers collaborate with other industries. Thus, retailer D only considered competitors in the same industry as possible actors to collaborate with.

Half of the shipments are last-mile deliveries and this is provided at the largest geographical areas by retailer D. The other half are click and collect deliveries, i.e. ordered online and collected at a store. The first one has the largest potential for horizontal collaboration. The whole distribution chain is expensive and it was estimated that it stands for a third of the marginal loss. Even if they bill the customer for part of the transport, they do not pay for the whole transport since it would become too expensive for the customer. It is common in the grocery industry that companies have their own vehicle fleet for transportation. This is unique in the industry while other industries often share carriers. Retailer D emphasises that collaboration in the grocery industry should be possible, but the benefits of better price, more frequent deliveries and an increased service level must be secured. Horizontal collaboration do require investments in software, route planning systems and functionality, which is an obstacle for the initiation of a collaboration.

Retailer D was very restrictive about sharing their data. It was important for them to have trust in the collaborating partner and even more so for the coordinator of the collaboration.

> *It is very sensitive so a collaboration model like this, we need to have trust for the partners who participates and who creates the prerequisites. If it now is as we say today a driving part is the carrier, then we can very much share according to the right contractual agreements and with the right trust. (Representative V, personal communication, translated from Swedish)*

Sharing data to a third party logistics provider was not seen as a problem if they had trust in the partner and contracts that regulates the collaboration. However, sharing data directly to a competitor will never be considered, and thus there is need for a neutral third party.

> *No, not a chance. ... Who would own the data in this case? It would be a very though situation where a neutral part is necessary, I would believe. (Representative V, personal communication, translated from Swedish)*

Retailer D saw the potential to reach customers in new geographical areas with their offerings through collaboration. Collaboration between retailers with customers in the same area would allow them to send more frequent deliveries with higher vehicle utilisation. Hence, it enables customers in dispersed areas of Sweden to use their last-mile service. Developing this transport solution with a competitor and a neutral third party would not be a problem since the retailer do not consider transportation as part of their core business. The neutral third party should be the leader of the collaboration while the retailers are flexible enough for the collaboration to be efficient.

The main enablers for retailer D to participate in horizontal collaboration was cost savings and improved distribution efficiency.

> *We need profitability on the channel and then I must say that the effectiveness and cost savings is the main reason for us. (Representative V, personal communication, translated from Swedish)*

Environmental benefits were acknowledged and considered a side-benefit but would not be sufficient for retailer D. Furthermore, it was emphasised that if the retailer did not get the results they expected from a collaboration, they would not hesitate on withdrawing and continue on their own.

4.1.5 Retailer E

Retailer E is part of a company group with affiliate stores in several countries. A collaboration between the affiliates in Europe was considered in a project but due to problems regarding the allocation of costs, it never launched. Cost allocation also became a problem in collaboration between different national affiliates since everyone wanted the biggest advantage. There were no obvious reason why international collaborations are harder to implement than national collaborations, but politics and individuals involved in the collaborations were possible explanations. Since the collaboration was examined, a high turnover of individuals had happened. Today, the contact between the international affiliates is worse.

Their supply chain can be divided in two flows. One flow is from suppliers in Asia, through their central warehouse in Europe, to warehouses in each country. The transportation from Asia to Europe is consolidated to increase volumes and reduce price per unit. Furthermore, the second flow is nationally transported goods to affiliated stores. At this level, there are collaboration between affiliated stores to reach some economies of scale. Retailer E transports a majority of its goods through their national warehouse. This is their preferred solution since it gives them control of the transports. In some cases, their suppliers have a more efficient distribution network than retailer E and therefore, they could be allowed to transport their goods directly to the stores. The e-commerce solution is outsourced to smaller actors specialised in last mile transports. If an article is out of stock at the national warehouse, some of their affiliated stores act as back-up inventory. Furthermore, the transportation from Asia to the central European distribution centre is mentioned to

has the largest potential for consolidation. There is also a potential for collaboration in the shipments to local warehouses. However, they are affiliated companies and thus, cost allocation and politics can become an obstacle.

Retailer E shares forecasts to all their suppliers regarding expected purchasing volumes. Furthermore, an IT-service provider connects their system to their suppliers ERP-systems and therefore, the IT-service provider also has access to the forecast data. Data regarding sales is also shared between the affiliated stores. However, retailer E would not share data directly to a competitor to enable collaboration.

> *But to other companies who are not part of brand E, concrete no. However, you have rather good knowledge regarding how your competitors are doing in which stores (Representative VI, personal communication, translated from Swedish)*

Today, it is possible to get some overall data from their competitors through an industry union. This enables them to understand their competitors' sales and turnover, but it is not possible to find detailed data.

An obstacle mentioned by retailer E for horizontal collaboration is related to rules and contracts between countries. Today, collaborations work well when they are executed on a national level. Concerns have been raised regarding gain sharing in these collaborations, but it has been easier to solve. However, the retailer does not see any potential to collaborate with their competitors. They have considered developing a third party logistics solutions, which they can sell to organisations in different industries. However, it was never launched due to high costs.

The main enabler for retailer E to participate in a horizontal collaboration would be a reduction in transportation costs. Environmental affects were mentioned as a side-benefit, but it would not be sufficient to initiate a collaboration.

> *Everything is about the bottom-line, in other words making money. Then, if we cut costs through improve fill-rate in containers, it will also lead to environmental benefits. (Representative VI, personal communication, translated from Swedish)*

4.1.6 Retailer F

Retailer F has created two delivery options for their customers to improve their distribution possibilities. Their customers can either choose to get express deliveries which makes their shipments prioritised by Retailer F or standard deliveries with a wider delivery window. When a truck is filled, express deliveries are loaded first and then standard deliveries fill the remaining space of the truck to increase the fill-rate. Retailer F has also put requirements on the carriers regarding the frequency of pick-ups. Carriers can not diverge against this frequency, i.e. instead of two trucks picking up their goods, there is one truck with an extra trailer. This is done to increase the fill-rate. Furthermore, they have built their distribution network together with other retailers to make the sorting and consolidation as

efficient as possible. For example, when a carrier picks up goods at one retailer it is sent to a common distribution centre. While it is sorted, the carrier pick-up goods from retailer F and transports it to the same distribution centre. This is done to make an efficient distribution network and to increase the fill-rate.

An important aspect to consider according to retailer F is to choose partners with an inverse flow of goods. The retailer has a spike in outbound deliveries early during the week and it would therefore be beneficial to collaborate with another company with deliveries later in the week. The flow of goods can therefore become more balanced for both actors. However, the collaboration must not affect the delivery precision negatively. Retailer F has examined this type of collaboration but came to the conclusion that it would not be scalable enough.

For a system of consolidated shipments to be possible, data sharing is a must according to retailer F. Data sharing is described as a prerequisite to enable horizontal collaboration. Therefore, they are open to share data.

> *No, but it is more about taking the goods from point a to b. Then it is a prerequisite to do it. (Representative VII, personal communication, translated from Swedish)*

Concerns regarding delivery precision could become a problem in systems like this. It was stated that some actors have fees for late deliveries and these must be agreed upon if actors share transportation.

Retailer F suggested a hypothetical spot market for goods as a solution to problems concerning horizontal collaboration. This solution could allow carriers to report that they pass a location in a certain direction with excess capacity. Shippers can then purchase the left-over space and ship goods to a desired drop-off point. This solution would enable carriers to optimise their fill-rate at the same time as the shippers could find transportation at a lower price. Lastly, cost and tax allocation are another aspect which must be considered in a network like this.

> *So, the carriers would love this! It would result in them being able to drive less empty trucks. (Representative VII, personal communication, translated from Swedish)*

Retailer F assumes that carriers would be positive about the solution of selling empty space in their vehicles. However, requirements regarding conditions for the chauffeur must be ensured. Specific goods requirements, i.e. temperature or lead time, also need to be considered. Small and medium sized organisations have the largest potential for benefits from the solution described.

The main enabler for retailer F to collaborate horizontally would be societal effects and to reduce congestion.

> *It should become better for the society. ... but above all, maybe one less truck on the roads (Representative VII, personal communication, translated from Swedish)*

Small savings was also mentioned but these would not be the main enabler for the change. Positive network effects need to be found in collaboration and new technology could be an enabler for it to become expandable. Without an AI planning the routes, it could become very resource intensive.

4.1.7 Retailer G

Retailer G has had discussions with a competitor to develop a collaborative transport solution. The project failed since it needed investments in facilities and vehicles. Development of a collaborative transport solution would also require knowledge in supply chain management, which neither of the organisations had.

> *So I believe that people are a bit scared of it and you do not have knowledge ... People are not good at logistics and therefore it scares them. (Representative VIII, personal communication, translated from Swedish)*

Since then, they have begun to hire supply chain managers to develop their logistical network.

Retailer G are collaborating vertically with a wholesaler from whom they buy most of their goods. The wholesaler purchases large volumes of goods from manufacturers and can therefore provide retailer G with a lower purchasing cost than they could have managed on their own. Retailer G has many stores with proximity to their competitors who also are customers to the wholesaler. Therefore, the wholesaler can transport goods to many of them at the same time. Currently, they have different distribution centres for frozen, perishable and dry goods, but these will be combined in the near future to a large central warehouse. The new warehouse will be fully automated and therefore, flexibility for retailer G will become worse since last minute changes can not be made.

In the convenience industry, almost all retailers are purchasing their goods from the same wholesaler. This has created a monopoly and they can therefore charge a high fee for their services. Furthermore, it reduces need of innovation for the wholesaler. Retailers do not have any options if they would want to switch wholesaler and therefore, they do not need to innovate. Another problem with the fact that the convenience industry is managed by a few actors is the legal obstacles.

The wholesaler has access to data from retailer G, since most of their goods are bought from them. However, retailer G is not willing to share data directly to any of their competitors.

> *So we do not share the data to any competitors, rather we share the data to the wholesaler or so. It became them who owns the data one can say. Then I would not say that we share with our competitors. It is in that case to a collaboration partner. I would say. (Representative VIII, personal communication, translated from Swedish)*

Contracts have been signed with the wholesaler to regulate and avoid that competitors get access to data from retailer G. Unfortunately, retailer G do not have any option to share data with the wholesaler since there are no possibilities to purchase similar services elsewhere. Lastly, retailer G is willing to share data to a collaborating partner if they would be part of a horizontal collaboration.

The main enabler for retailer G to collaborate is to reduce costs or increase revenues.

> *Money, saving money, and to become more close and flexible. (Representative VIII, personal communication, translated from Swedish)*

In the northern areas of Sweden, the daily volumes are often smaller and therefore, deliveries to this area have the largest potential for collaboration. Furthermore, flexibility in purchasing was mentioned as another enabler for collaboration. If a store needs a specific product in a small quantity, this order could be denied and they must create a higher volume instead. Hence, collaboration could enable the retailer to order smaller volumes per delivery, since a partner could help them increase the overall size of the shipment.

4.2 Comparison of Retailers

In order to compare the findings from the retailers, the information will be categorised into: operational, strategical and market. These levels of comparison will be depicted in Figure 12. The operational level will refer to activities regarding outbound transportation performed by the retailers and the strategical level will cover strategical decisions made by the retailers. Furthermore, the market level refers to outside forces affecting the industry and the retailers, for instance laws.

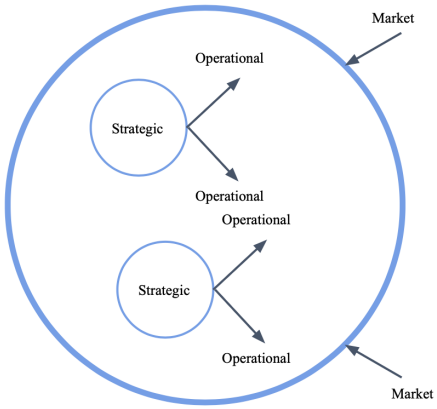

Figure 12: Overview of the three levels of the comparison. The large circle represent the retailer industry and the small circles represent retailers.

To create an overview of which the enablers and barriers are within each category, two tables are present with the key findings from the retailer interviews. Enablers can be found in Table 11 and obstacles can be found in Table 12. The categories are developed from the enablers and obstacles found in Section 2.3 and 2.4. However, the categories transport requirements and motives for collaboration were mentioned during interviews but were not found in literature. The categories data sharing and transport requirements are on the operational level. Service improvements, coalition formation and motives for collaboration are on the strategical level while legal and information sharing technology are on the market level.

Table 11: An overview of enablers found in retailer interviews.

Category	**Enabler**
Data Sharing	- Anonymous Data - Avoid Business Critical Data - Independent Third Party for Data Handling
Transport Requirements	- Not Identified
Service Improvements	- Geographical Expansion - Improved Delivery Frequency
Coalition Formation	- Involving an Independent Third Party - Distinct Leadership
Motives for Collaboration	- Main Enabler is Economical Incentives - Side Benefits are Environmental and Social
Legal	- Not Identified
Information Sharing Technology	- Not Identified

Table 12: An overview of obstacles found in retailer interviews.

Category	**Obstacles**
Data Sharing	- Internal Policies
Transport Requirements	- Industry Specific Requirements - Delivery Precision - Outsourced transport solutions
Service Improvements	- Not Identified
Coalition Formation	- Collaboration between Competitors - Cost Allocation
Motives for Collaboration	- Not Identified
Legal	- Competition Laws - Data Regulation Laws - Local Laws
Information Sharing Technology	- Investments Needed - System Design

4.2.1 Operational

Data sharing was a topic mentioned in all interviews. Retailer A stated that they had no issue with sharing this kind of data since it was not part of their core business. However, they needed a good reason to share it. Retailer B was also positive towards data sharing, as long as it is anonymous and not business critical. Retailer D and G were positive towards sharing data to a trusted third party but they would never consider it to a competitor. Retailer F considered data sharing as a necessity for a collaboration to work. Retailer C and E were not as positive towards sharing their data. Retailer C had high security levels and was therefore resistant to any type of data sharing. All employees did not have access to all types of data. However, if they could encrypt the data, it could be possible to share it with an independent third party. Retailer E was almost completely opposed of sharing data to any other retailer. Today, they share data with their affiliated stores and suppliers, but this is their limit. To summarise, a majority of the retailers were positive towards sharing transport data which is not business critical. The data need to be encrypted and secured by a third party.

Many retailers had specific requirements on their transport solutions. Retailer A, D and G had temperature requirements on their goods. However, retailer A operate in the pharmaceutical industry which have a different temperature interval than groceries. Retailer D and G had the same temperature requirements since they offer both frozen, perishable and dry goods.

Retailer A mentioned further requirements in terms of both delivery precision and quality of delivery. Retailer D had lead time requirements that were not applicable to other industries and therefore they thought it would be hard to collaborate with others than grocery retailers. Problems with lead time were also raised by retailer G since they had requirements on timing due to many stores in close proximity. Concerns regarding delivery precision was raised by retailer F and stated that it must not become worse in a collaboration. Furthermore, retailer C mentioned special requirements due to transporting hanging goods. They also mentioned, as retailer A and F, the concerns regarding delivery precision. It was also important with a clean truck. Retailer B and E did not mention any requirements on the transport. Overall, retailers in different industries have different requirements on their transports.

All retailers except D and G have outsourced their transportation to a third party logistics provider. Retailer D runs their own distribution chain and retailer G purchase their goods from a wholesaler who manage the transportation for them. The warehousing is managed differently for all the retailers. Retailer A have two warehouses close to each other which are divided to support either brick and mortar or e-commerce. Retailer B has a central warehouse for all their distribution. Retailer C has two warehouses which are divided by product requirements, i.e. hanging and flat goods. Retailer D has divided their warehousing into three distribution centres based on product requirements: perishable, frozen and dry goods. Retailer E has a central warehouse in each country it operates in, and a central warehouse in Europe. Retailer F has a central warehouse in Sweden. Retailer G does not

operate a warehouse since they buy their goods through the wholesaler which are delivered directly to stores. Most of the retailers have outsourced their transportation to a third party logistics provider. Some of the retailers have multiple warehouses and in these cases, products were split based on their storing and transport requirements instead of based on location.

4.2.2 Strategical

Retailer A see horizontal collaboration as a possibility to reach new customer segments. Through a pilot project with another subsidiary they reached new customers through the combined offering of products. Retailer D and G think that it is possible to reach a new geographical areas through horizontal collaboration. They would be able to increase delivery frequency in areas with lower volumes and make it profitable. Retailer B, C, F and G assume that horizontal collaboration could reduce lead times, and thus improve the customer experience. Trucks would be filled faster and thus, they can send them more often. Retailer C mention that this probably will lower the prices of deliveries which need a short lead time and reduce the number of inefficient express deliveries. Retailer G described that shorter lead times could enable them to buy smaller quantities and thus become more flexible. To summarise, retailers assume that horizontal will affect their services through more frequent deliveries and higher volumes to dispersed areas.

Retailer B, E and F were all sceptical towards collaborating horizontally with competitors. Retailer B stated that collaboration with competitors would be hard to accomplish since they likely had the same type of outbound flows. Retailer E, on the other hand, were more cautions of their business and that collaboration would improve their competitors market position. Retailer F stated their geographical locations as a problem to collaborate with a competitor. Oppose to these three retailers was retailer D and G. They believed that it would only be possible to collaborate with competitors since these were the only one who would match their transport requirements.

Most retailers were positive towards the involvement of an independent third party in horizontal collaboration. Retailer B, C, D, E, F, and G were all on board with the idea of having a third party as a coordinator of the collaboration and manager of data. Retailer B emphasised trust in the relationship. However, they were sceptical to the practical implementation of a third party. It was described that their collaboration with other subsidiaries worked well since they had similar structures and no cost allocation problems. Retailer C stressed the importance of deciding who should be the leading part of the collaboration. Retailer D and G found it highly important to involve a leading third party since collaboration only was possible with competitors. Retailer E stated that the third party should be involved to divide the gains from collaboration. Retailer F described that a third party should coordinate the flow of goods or to build a spot market for transportation. The only retailer who was opposed to third party involvement was retailer A. They did not understand the contribution from a third party in a collaboration and assumed it to be a similar role as a third party logistics provider already has.

Most retailers stated that the main enabler for them to participate in horizontal collaboration would be economical benefits. Only retailer F stated societal benefits and reducing the number of trucks on the roads would be sufficient reasons for them to collaborate. Retailer A, D and E stated that environmental benefits were seen as an enabler for collaboration, but neither of them thought that it would be sufficient on its own. Retailer A thought another enabler to initiate a horizontal collaboration was to create a new customer offer. Economies of scale enabled by horizontal collaboration would allow for more frequent deliveries and shorter lead times for customers. The economies of scale were mentioned by retailer B, C, D, E and G. Retailer G also mentioned the possibility to become more flexible in their purchasing as an enabler for horizontal collaboration. A majority of the retailers found economical reasons for entering a collaboration. Even if the environment was mentioned, it was never a sufficient reason on its own.

4.2.3 Market

Only a few retailers mentioned legal issues regarding horizontal collaboration. Retailer A emphasis that they are affected by the *Patient Safety Act* which restricts what kind of data they can share. It is important that the data is encrypted and that it is not possible to connect any of it with their customers. They faced problems regarding this when they conducted the pilot project. Furthermore, a concern was mentioned regarding competition laws by retailer A and G. The wholesaler retailer G purchase most of their goods from has a very strong market position. Therefore, they were worried that collaboration could get affected by the law. Retailer E raised a concern with international collaboration and that it might be affected by local laws in different countries. Overall, the laws which could affect horizontal collaboration according to the retailers were either regarding competition or data security.

A lack of an information sharing technology was mentioned by several retailers. Retailer A, B and D mentioned a lack of a system for communication between organisations. Furthermore, a system where the demand for collaborative transports could be visualised was mentioned by retailer B and D. Retailer D also mentioned that to set up a collaboration there are a need of investments in software, route planning and functionality. Two retailers came with more clearly defined requirements on what they desired from a system. Retailer C described how they was in need of a system where actors can collaborate in clusters and where a third party facilitates and coordinate these clusters. Similar transport requirements, similar destinations and suitable volumes for collaboration should be incorporated in such a system. Late changes in volumes and transport requirements were mentioned by retailer C as important to be managed by the system and it should also be able to clearly visualise the results of the collaboration. Both retailer B and C described that the on-boarding and usage of the system should be easy for retailers. Retailer F described another possible information sharing technology in the form of spot market for transport. A carrier should be able to list left over space in a transport along a specific route. Retailers and other transport purchasers should then be able to either bid on this space or purchase it at a market price. It was very important for retailer F that it did not affect the drivers

condition negatively. To summarise, information sharing technology need to be developed to manage communication, find partners and visualise the benefits of the collaboration.

4.3 Experts from the Logistics Field

In this chapter, the perspective from experts in the field of logistics will be presented based on the categories presented in Section 4.2. Not all of the categories were covered by the experts and therefore the categories *Service Improvements*, *Legal* and *Information Sharing Technology* are not included.

4.3.1 Data Sharing

According to the experts, retailers do in general have a significantly positive more attitude towards sharing transport related data than carriers. However, they are interested in understanding what they would gain from sharing the data. More recently founded organisations are more often willing to share data since they have a better understanding of why the data need to be shared. Older organisations are generally more restrictive and desire more control.

4.3.2 Transport Requirements

Actors tend to maximise fill-rate in their transports based on different parameters. No common definition on fill-rate seem to exist and therefore, it is common that either volume or weight becomes sub-optimised. Time and flexibility are also important parameters for horizontal collaborations since companies have different requirements. Fill-rate is often sensitive information for carriers but not as sensitive for shippers. Therefore, it could be possible to collect this data directly through the shippers.

4.3.3 Coalition Formation

Horizontal collaboration is often in need of vertical collaboration since the collaboration rarely happen at only one level in a supply chain. For instance, collaborating in outbound transports will not only involve the retailers, but also the carriers who will transport the goods. However, it is usually easier to perform vertical collaborations since the services can be purchased on an open market. Horizontal collaboration needs to be negotiated and there must be a leader who drives the collaboration forward. Someone need to take responsibility and make sure it is economically sustainable. There is always a risk of failure in collaborations and since large investments are needed organisations can suffer financial losses. Due to the potential financial risk, organisations often choose other ways than horizontal collaboration to improve their businesses.

Route planning is an important part of horizontal collaborations since one of the main goals is to reduce empty running trucks. It is therefore important to have flows in different directions or flows which can balance each other out. If a counter flow is missing, it could be interesting to enter a triangular collaboration where the three organisations can complement each other.

An example of a successful project of horizontal collaboration exists in the middle of Sweden. A transport provider is operating rail transportation in close collaboration with a shipper. This shipper is responsible for the profitability of the collaboration and therefore, the carrier can operate the train with a low risk. However, the shipper is solely responsible to cover costs if the collaboration would not make any profit. If it is profitable, the carrier and shipper share the profits. Other actors who want to transport goods with the train can negotiate the possibility to join and thus improve the system efficiency. The risk and profit sharing model could be an enabler for the collaboration.

Another project of horizontal collaboration was examined between food retailers to evaluate collaboration in non-core activities. The goal was to examine possible changes to competition laws but the project failed since the organisations would rather compete than collaborate with each other. To avoid this problem, collaboration between actors in different sectors could be beneficial. Organisations would thereby not improve their competitors systems.

4.3.4 Motives for Collaboration

Horizontal collaboration often results in societal benefits. Improved efficiency in delivery to rural areas and reduced environmental impact from transports are potentials of the concept. However, third party logistic providers can be negatively affected since horizontal collaboration optimises the volume between their customers and therefore reduce the number of transports they sell. Therefore, it is important to have a societal mindset when developing horizontal collaborations.

4.4 Representatives from the IT-Service Provider

In this chapter, the perspective of the IT-service provider will be presented based on the categories presented in Section 4.2. Not every category was covered by the IT-service provider and therefore the category *Service Improvements* will not be included.

4.4.1 Data Sharing

In the IT-service providers experience, retailers tend to be hesitant to share information regarding transport requirements. However, through keeping the retailers anonymous it will be harder to connect them to the data if it were to be leaked. Thus, anonymity could make retailers more open to share data. Retailers can also be afraid of sharing data since they or individuals within the organisations have much to lose if it would be exposed. The hesitancy could also be due to an uncertainty about what will happen with the data and

how it will be used. Then it is easier to decline any request of data sharing. Furthermore, it is also problematic to get data from carriers. They are restrictive to share data regarding transport efficiency since it is part of their core business to optimise their transport systems.

4.4.2 Transport Requirements

It is necessary to consider transport requirements for collaboration between retailers to be achievable. Retailers in different industries have minor commonalities in their business except for potentially similar transport routes. Hence, shippers need to adapt to each other to enable transportation with the same carrier since goods have different characteristics in different industries. Actors in the same industry will have similar characteristics of their goods but these will probably be competitors instead. However, collaboration between non-competitors will lead to less knowledge sharing and operational improvements since they do not have the same type of business.

4.4.3 Coalition Formation

An independent third party in horizontal collaborations could neutralise a politically tense situation through equal communication to all parties. They can also create transparency and visibility and ensure that everyone has the same information at the same time. It is important for them to find a position in the collaboration where they can stay independent. However, the third party will be in a position of managing sensitive information and could therefore become vulnerable to threats. Furthermore, it will also be important that they can provide expertise to the collaborating partners to ensure competence in the collaboration. Retailers need to trust both the involved actors and the technology for the system to function. A platform as a third party could become more trusted than an organisation, since the platform can be more neutral. An organisation acting as a third party will be run by humans which tend to be biased.

> *We are still humans, we can not become 100% unbiased even if you as an organisation wants to represent yourself and act as one, there will anyway exist some kind of bias when you work with people in any form. (Representative X, personal communication, translated from Swedish)*

There are uncertainties regarding how horizontal collaboration will affect business models and therefore, it is often safer for retailers to continue with business as usual. It was speculated by the IT-service provider that few people want to initiate a change since there is a risk of failure. Therefore, the uncertainties must be clarified for the concept to be implemented. For example, there must be answers regarding how it will affect the retailers business and contact network. Furthermore, it will be hard to convince carriers since horizontal collaboration can reduce the number of purchased transports and hence affect their profits.

Furthermore, no successful business model has been found for horizontal collaboration. Risk allocation need to be considered in horizontal collaboration since it affects the desire to participate. In some successful cases only one actor takes on the full commercial risk and then open up for others to join. However, this is not considered sustainable since it will lead to ad hoc solutions.

> *My recognisance is that there need to be a clear leader without having a too dominant leader. The leader should remove the risk from the other parties of the collaboration. (Representative IX, personal communication, translated from Swedish)*

4.4.4 Motives for Collaboration

According to the IT-service provider, there are many obvious benefits both economically and environmentally in horizontal collaboration. But anyway, it is not commonly implemented. The reason can therefore be less rational and more dependent on human factors such as leadership or trust between partners.

> *As I often experience it, the obstacle is not technical nor rational and have nothing to do with the real world. We can sit here and calculate it and find out that this is the thing of the world, why did we not do this three weeks ago? But yet, it does not happen. (Representative IX, personal communication, translated from Swedish)*

The IT-service provider has experienced this in one of their own projects. They took the risk and the cost of the project and thereafter, others who initially were not interested wanted to join. Therefore, this phenomenon could be applicable to horizontal collaborations, i.e., there needs to be a leading part of the collaboration that absorb the risk. Furthermore, incentives to join can be created through economical benefits from the collaboration. It was mentioned that it must become cheaper to be environmentally friendly, since only environmental benefits will not suffice.

4.4.5 Legal

Other obstacles for horizontal collaboration are related to legal and contractual issues. It is hard to get data from retailers and it is often restricted through contracts. It is important that no legal or political opinions force retailers into a collaboration, since this can lead to opportunistic behaviour. Furthermore, a collaboration can often take a long time to implement due to long negotiations and handling of contractual issues. Non-competitors can avoid legal problems and will have less to lose if business sensitive information is shared to a non-competitor. An independent third party could be a facilitator to get around legal and contractual issues and open up new possibilities for collaborations.

4.4.6 Information Sharing Technology

The IT-service provider has seen a demand for more collaborative models in the market. The problems seem to exist in how to sell the concept since everyone has different reasons for why they want to collaborate. Developing a technology for collaboration increase in complexity the larger the network becomes but the technology is not a problem itself, according to the IT-service provider.

> *The network can become complex when the scale is over the whole world, but these are not unsolvable problems. I think that the large problem lies in the business part and that people need to trust each other. (Representative XI, personal communication, translated from Swedish)*

5 Discussion

In this chapter the data from Section 4.2 will be compared with the experts, the literature review and the IT-service provider's point of view to find the main enablers and obstacles. There will then be a discussion regarding suitable structures for horizontal collaborations between retailers followed by the role of an independent third party in the collaboration. Lastly, the suggested designs will be discussed from a sustainability perspective.

5.1 Enablers and Obstacles from Multiple Perspectives

The purpose of this thesis was to investigate how horizontal collaboration could be implemented for retailers. To answer *RQ 1*, a comparison between retailers, the literature review, experts and the IT-service providers point of view is necessary to understand enablers and obstacles.

5.1.1 Data Sharing

Overall, retailers were positive towards sharing transport data to a third party that are not business critical. However, the retailers were very restrictive towards sharing data directly to a competitor. The interviews with experts indicated that retailers generally have a positive attitude towards sharing transport related data, but that there is a lack of understanding regarding how they will benefit from sharing their data. Furthermore, the IT-service provider had a different view on this topic. They have experienced resistance when they have tried to get data from retailers and carriers. This can be due to a lack of knowledge among retailers regarding how the data can be used. Contractual issues was brought up as an obstacle to data sharing since negotiations tend to get stuck here. Cruijssen (2012) also emphasises that fear of sharing data is an obstacle in horizontal collaboration. Trust between the collaborating partners is therefore important, otherwise data sharing might not be possible. An independent third party could coordinate shared data and could therefore also be an initiator for collaborations. An attempt at developing collaborations by an independent third party was found by Vanovermeire and Sörensen (2014) where the University of Antwerp launched the organisation TriVizor. However, it was stated that the process they used was inconvenient and lacked incentives for flexible behaviour.

Retailers, experts and some literature argue that sharing data to an independent third party should be easier than sharing it directly between retailers. However, it was not considered to be that simple by the IT-service provider. They often got stuck in contractual negotiations regarding data since they needed to very explicit. A reason could be that many organisations want to be open to share data but are not sure about the consequences. It was stated by one expert that younger organisations often were more open to data sharing than older ones. Only during the recent years organisations have begun digitising and collecting data and therefore they are not that experienced. Many saw retailers in the US in the beginning of the last decade growing rapidly due to digitisation and therefore

wanted to do the same. Thus, companies began doing data science and are still new to it today and are therefore not experts. Many organisations have seen how powerful data can be if it is used properly and therefore, they have become restrictive towards sharing it. Older organisations already had an existing working culture when they began digitising and therefore, changing the way of working might run into internal resistance. Younger organisations would have built their companies around the technology instead and thus, they have a more open mind regarding data sharing.

Furthermore, cyber security is a topic which is getting more attention in media. Therefore, organisations are getting more cautious about possible leakage or intrusion. If a decision has been made to share data, someone will be responsible and that might lead to fear of making these decisions, as mentioned by the IT-service provider. There is a lot to win with data sharing but also a lot to lose if something goes wrong. To conclude, the hesitancy regarding data sharing seem to grow from fear and a lack of knowledge regarding what will happen to the data. Therefore, it is important to ensure the safety and transparency of what will happen with the data from a third party perspective. Retailers need to feel safe to begin sharing their data. Anonymity can become a useful tool to create a feeling of safety at the retailers but will probably not be enough, there need to be a relation as well. Furthermore, where the data is anonymised is a factor which can affect the retailers desire to share data. If it is anonymised before it is sent to the independent third party, the risk that the data will harm the retailers is lowered and thus less trust is needed. The risk is that retailers will compile data differently and this will harm the reliability. On the other hand, if it is anonymised by the third party, retailers must trust them but this will enable similar information and increase reliability.

5.1.2 Transport Requirements

There are different transport requirements to consider in industries. Retailers emphasised that requirements are important to consider for the operational part of horizontal collaborations. They had different opinions regarding the possibility to collaborate between industries due to delivery precision and goods specific requirements. The IT-service provider mentioned that collaboration within an industry tend to involve competitors which have similar transport requirements. It seems that the retailers with specific transport requirements are more open to collaborate with competitors. Stephens and Wright (2002) believed that collaboration in physical distribution should be beneficial since it is not part of the core business for retailer. However, the retailers who were restrictive towards collaboration with competitors argued that they did not want to benefit them nor encounter legal issues. Collaboration with a third party could mitigate some of these problems since they can manage encrypted data and therefore avoid sharing business critical information. The IT-service provider framed knowledge sharing as a benefit of horizontal collaboration. However, when the collaborating partners are anonymous, the possibility to exchange knowledge is lost.

Arvidsson (2017) described a case between ICA and SSAB where the partners had to adapt their requirements to find a common solution. These compromises might not have been made if there were no relationship between the parties and shows that it is possible to collaborate between industries. It was mentioned by the experts that flexibility is important to enable this. Another approach to find partners with similar transport requirements is to develop a larger network of actors. The larger the network grows, the higher the probability that there is someone with similar requirements. However, managing a large network can become fairly costly, as was concluded by Cruijssen (2012). The relational aspect will also be limited in a bigger network since it is costly to manage multiple close relationships. Thus, if the retailer has many requirements it might be preferable to have a close relationship with a few actors to negotiate a suitable solution. Finding partners in a larger network can be beneficial since there will be more to choose from.

Another important transport requirement is the structure of the distribution network. Most retailers had a centralised structure with negotiated contracts with a third party logistics provider who managed their distribution. The location of the warehouses is important to consider when developing horizontal collaborations since these determine where the carriers will drive. Furthermore, in-house transportation solutions are easier for retailers to control and enable collaboration. An outsourced transportation solution indicates that an organisation rather purchases a logistical solution than develop it. Therefore, introducing the concept of horizontal collaboration to a retailer with an outsourced solution would not bring any value since they lack insight in their process. However, it was concluded by Ballot and Fontane (2010) that a big retailer has larger volumes and will benefit less from collaboration. The experts described that to find a suitable collaboration partner, it is important to find counter flows and balance these. A problem for multiple retailers was deliveries to northern Sweden. This is a dispersed area which often is quite costly to send deliveries to and the flows are often imbalanced since more goods are sent north to south than the opposite. Karam et al. (2021) mentioned that many organisations have larger flows in one direction than the other. Triangulation was mentioned as a possible solution by the experts. Then three or more retailers can collaborate and create a milk-run for better transport efficiency. If a collaborative distribution hub would be developed in northern Sweden, many actors could use this hub together with their partners to reduce the empty running back and forth to this area and increase the delivery frequency.

5.1.3 Service Improvements

An enabler mentioned by retailers was an improvement in range and quality of services. About half of them mentioned that horizontal collaboration would allow them to reach new geographical markets and others mentioned improvement of their services through more flexibility in customer deliveries. Increasing the number of shipments to dispersed areas could enable retailers to improve frequency of deliveries and thus, introduce improved services in these areas. These were the main effects the retailers stated but the IT-service provider was not as certain that it would only be beneficial. Making changes in the distribution network will affect the business model and hence, unexpected effects could appear.

Gulati et al. (1998) describes that strategic alliances can lead to geographical expansion but whether this would be true for all types of collaborations is less certain. If a network with many arm's length relationships is built, retailers might join to increase their services geographically. However, if they do not get the intended benefits they can get disappointed and more hesitant to future collaborative attempts. Cruijssen et al. (2007b) and Cruijssen et al. (2007c) mention that the quality could be increased since you work close with your partners in horizontal collaborations, and therefore could be specified towards the customer needs. This could lead to an increase efficiency and thus, faster and higher quality services could be enabled. However, the same conclusion which is made above can be applicable here. If the business model is not delivered through close partnerships, they might not get the intended benefits. The IT-service provider described uncertainties regarding the effect on business models and that these must be solved before horizontal collaboration can be developed more consistently. Carriers must also be convinced since they are the vehicle owners. They should have interest in the concept since it will reduce their costs of operations due to improved distribution efficiency. However, it could require a restructuring of their business model if they are selling transportation per truck instead of transportation per package.

Building a network for collaboration can lead to issues regarding different expected outcomes. The IT-service provider mentioned that all actors have different business goals and this will affect their actions in a collaboration. However, collaboration with a few actors will be more dependent on the business goals of each retailer since these need to be aligned for them to trust each other. A close partnership could increase the shared knowledge between the retailers and thus further improve the quality of services.

5.1.4 Coalition Formation

Most of the retailers had a positive attitude towards third party participation in horizontal collaboration, with the function to manage data and coordinate collaborations. Furthermore, a third party would be necessary to avoid sharing business critical information to other parties. It was stated by Cruijssen et al. (2007b) that it is important in horizontal collaboration to have a trusted coordinator and Basso et al. (2019) argued that a leader and coordinator should be chosen before the initiation. However, if the third party would have a leading and coordinating role they would have a powerful position. There is a risk that they will make decision which is beneficial for one party but not for others in the collaboration. Another responsibility for the third party mentioned by one retailer was to divide the collaborative benefits fairly. Risk allocation was also mentioned by the IT-service provider as an important part of the role of a third party.

A benefit with the involvement of a third party brought up by the IT-service provider was that it can neutralise a politically tense situation. It requires that the independent third party is a skilled mediator and transparent with their own agenda for the collaboration. Otherwise, it will be hard for retailers to trust them. It is important that they stay neutral in the collaboration to avoid disturbing the power balance. It was further mentioned by the

IT-service provider that a collaboration needs someone to take initiative and be a leader. This was also found in the successful example in the middle of Sweden described in Section 4.3.3. The shipper took all the commercial risk and decided to hire a carrier to run a train, even if the shipper would be the only ones using it. Other parties were allowed to join the project which would improve its performance, but it was not necessary. When the shipper announced this, other actors wanted to join and it became a successful collaboration. In this case, the shipper was the leader and ensured the possibility to join the collaboration.

5.1.5 Motives for Collaboration

A majority of the retailers mentioned economical aspects as the main driver for entering horizontal collaborations. Environmental and social aspects were also mentioned as motives, but these were not considered sufficient on their own. The IT-service provider also found this true and stated that it must become cheaper to get environmental benefits. Since the retailers are goods owners in a horizontal collaboration, there must therefore be economical benefits to attract them to join. The literature review provided several potential savings from collaboration, ranging from 1.3% to 30%. This uncertainty regarding savings was also mentioned by the retailers as a reason not to horizontally collaborate since there is a commercial risk without knowing the payoff. However, the experts described that economical gains should not be the main focus of horizontal collaboration. Organisations must understand societal benefits and find that as a reason to collaborate. The environmental benefits recorded by Frisk et al. (2010) was a 20% decrease of emissions. Arvidsson (2017) stated that the reduction of emissions in the ICA and SSAB case would correspond to flying 590 people from Stockholm to Bangkok. The uncertainty regarding the economical benefits seem to be an obstacle for the retailers. It will be important to give them an easy to understand incentive to attract them to collaboration. Furthermore, environmental benefits of collaborations could be translated into economical benefits through environmental taxes and a fuel price increase. However, it was stated by the IT-service provider that collaborations where partners are forced to collaborate tend to fall apart over time.

The IT-service provider pointed out a reason that horizontal collaboration has not yet been implemented can be less rational since the benefits are obvious. It was concluded that risk allocation and the business model must be developed before collaborations will become more common. Another reason could be human factors and the fear of making poor business decisions. A successful implementation will make organisation save a lot of money, while a failed collaboration will probably become costly. Investments in developing horizontal collaborations have been mentioned in multiple interviewees and these would get lost if a collaboration fail early in the process. In a worst case scenario, the organisations internal logistical functions have been discontinued and they will need to begin from scratch. Furthermore, many retailers have been involved in logistical collaborations within the company group. As long as the organisations have financial commitments with each other, purchasing transports and collaborating in the distribution does not seem to be a problem. This suggests that close partnerships with other parties can be need retailers

to have enough faith in the collaboration. This points in the direction that the problem might be strategical rather than operational.

5.1.6 Legal

The *Patient Safety Act* and competition laws was mentioned as potential problems when collaborating by retailers, experts and literature. However, it is believed that an independent third party would reduce this obstacle to some extent. The goal of for example competition laws are to ensure fair competition between all actors in a market. With the involvement of an independent third party, collaboration between competitors could be enabled since there will be a neutral party involved. This will ensure the sustainability at a system level, reduce the risk of collusion and avoid unfair advantages. However, many retailers were sceptical towards being part of a collaboration which involved a competitor. Furthermore, exactly how laws affect collaboration with a third party need to be further investigated since historical projects with this goal did not launch.

Horizontal collaboration could be affected by local laws and this was mentioned by a retailer and Bull Sletholt et al. (2020) as an obstacle. These local laws can affect how data is allowed to be collected and stored. Furthermore, contractual issues regarding data sharing and how data can be used could also affect opportunities for collaboration. It was mentioned by the IT-service provider that many retailers have high security regarding their data and how it can be used. The result of high security standards is often anonymous data, which was emphasised by the retailers as necessary. However, the IT-service provider contradicts that retailers are open to share data and argues that they are restrictive.

5.1.7 Information Sharing Technology

The last subject mentioned by retailers was the lack of information sharing technology. Retailers mentioned that they lacked both a system for easy communication and where they can find new partners for collaboration. Both the stock market and cluster were mentioned in this regard and that these functions should be available on a platform. Furthermore, the system must be easy to understand and use according to retailers. Hence, providing information sharing technology would be an enabler for horizontal collaboration to be more consistently developed. Karam et al. (2021) described a hypothetical platform for selling and purchasing transports as a marketplace. However, it was stated that the system needed to be precise to avoid incomplete or inaccurate logistics data since this could create mistrust in system. The fear of information leakage was mentioned by Cruijssen (2012) as an obstacle of creating a system for effective collaboration. The IT-service provider explained that the problem is not due to underdeveloped technology, but due to lack of business model and difficulties in data collection. This gap between the IT-service provider and retailers' point of view can be explained by their roles. Retailers do not have the same technical knowledge as the IT-service provider and therefore they blame the technology. It is important to understand what type of value the technology should bring, instead of stating that the technology is missing. There must be an understanding if it should provide

value to the collaboration or be implemented just for the sake of having technology. Hence, there is a need to clarify the purpose an information sharing technology.

5.2 Dimensions for Horizontal Collaboration

To answer *RQ 2* and *RQ 3*, the enablers and obstacles from Section 5.1 must be considered together with structures of collaboration which have been found previously. Firstly, three different structures for horizontal collaborations will be discussed and thereafter these will be evaluated through the lens of the dimension: intensity of collaboration, consolidation of goods, leadership, scope and actors.

Karam et al. (2021) described three different types of horizontal collaborations: marketplace, urban consolidation centres, and close partnership. Throughout the interviews, the marketplace, collaboration in clusters and close partnerships were mentioned. The marketplace is a concept where the third party facilitates an online market platform for shippers and carriers to find non utilised space in already existing transports. It could be developed with either the retailer or carrier as an initiator. The first would focus on the retailer sending an order to a marketplace that they want a delivery between point A and B during a specific time window. Carriers could then view this order and if they are passing by with leftover space, they can accept it. The second would turn this around and let the carriers notify goods owners that they have empty space and sell this space at a fixed price or to the highest bidder. Karam et al. (2021) emphasised that collaborations like these often was without formal documentation. However, Cruijssen (2012) stated that the cost for coordination increase with the number of actors, but so does the opportunities for collaboration. Such a system might not be suitable for large scale operations since the leftover space would develop inconsistently or there would be uncertainty regarding if anyone would come and pick the goods up.

Clusters of retailers would be similar to the logistical clusters discussed by Sheffi et al. (2019) or the urban consolidation centres described by Karam et al. (2021). The difference to the urban consolidation centres is that there is a third party who coordinates the transports and that transportation not only is limited to city logistics. A figure of the structure without the limitations urban deliveries can be seen in Figure 13. It was further suggested by a retailer as a solution for them to feel comfortable in the collaboration, since they could collaborate with other retailers with similar transport requirements. The third party should in this type of collaboration act as a coordinator and lead the clusters. Furthermore, all actors in a cluster should be known to each other to enable trust to be built between them. A successful collaboration between more than two or three actors was described by Frisk et al. (2010), where eight different organisations collaborated.

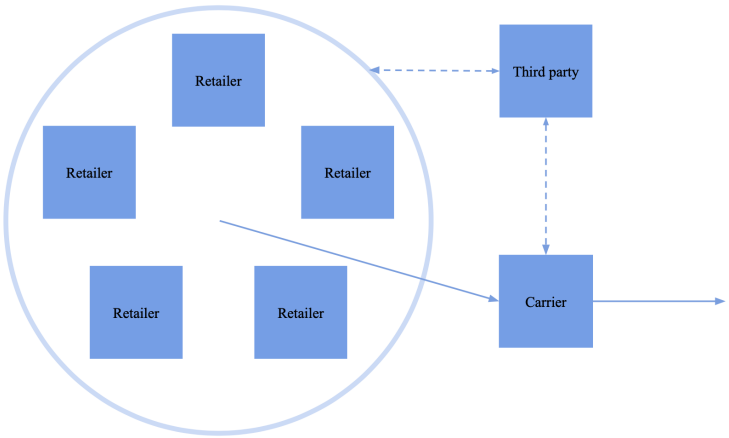

Figure 13: Solid dark blue line represents the physical and the dotted line represents the information flows in a cluster.

However, Basso et al. (2019) argues that horizontal collaboration is optimal with two or three actors. The third solution is a partnership where the collaborating retailers have many collaborating functions, as suggested by Basso et al. (2019). The third party either leave the collaboration once it is up and running or it stays and manages sensitive information between the actors. This type of collaboration proved to be successful in the case between ICA and SSAB (Arvidsson, 2017). The marketplace, cluster and partnership will be discussed further in the chapter through the lens of the dimensions.

5.2.1 Intensity of Collaboration

The first type of collaboration is a marketplace where shippers and carriers can interact through short term collaborations. Karam et al. (2021) state that in a collaboration like this, most interactions will be informal and without a contractual agreement with the aim to satisfy a short term demand. It is suggested that the relationships between collaborating partners are at arm's length based on these collaboration characteristics. Data need to be shared between the shipper and the third party or the carrier and the third party, depending on who initiates the collaboration. Furthermore, the data must be anonymous since it must be shared with the public for interactions to be created.

Collaboration through clusters will have a longer horizon than a marketplace. The collaboration will mostly be on an operational level and the independent third party should manage strategical decisions and coordination of goods. This is to ensure fair gain sharing and data management. The data needed from the retailers is the amount of goods that need to be transported, and thereafter the availability will be checked. Thus, the intensity of the collaboration is somewhere between type I and type II between each other since the collaboration is mainly operational but still with a longer horizon. This model will also become more proactive compared to the marketplace model.

In the third type of collaboration, a partnership between two or three retailers is initiated by an independent third party. In a collaboration where the third party is supposed to leave, trust is required between the retailers. Therefore a type III relationship between the retailers is recommended. One potential issue with collaborations like these is the laws regulating competition since the retailers will have close collaborations in many functions. Hence, if they were competitors before the collaboration, there is a risk that they become too integrated and create an unfair advantage to other actors in the industry. The third party can alleviate these problems, but can also limit the trust between the retailers. In a case where the third party stay in the collaboration, retailers should have a type III relationship to the third party and trust them with sensitive information.

5.2.2 Consolidation of Goods

A milk-run is suggested as the type of consolidation in a marketplace since small orders will be sent from multiple actors. A main route should be decided for the carrier before the available space is offered to the marketplace. It will be important that stops does not deviate too much from the main route. Transport requirements must also be considered already when the orders are created to make sure that for example frozen goods can be transported with the truck. This solution should reduce costs for small shipments and help carriers increase the fill-rate. A drawback with this type of collaboration is the restrictions of not being able to transport goods with specific requirements at all times. Supply and demand will therefore be unpredictable.

For the clusters, it will be beneficial to use multi-modal shipping to consolidate goods. However, clusters could also make use of milk-runs if it is allowed by the geographical locations and transport requirements. Karam et al. (2021) suggest this solution in terms of urban consolidation centres where multiple actors consolidate long-haul shipments outside of cities. Since many retailers had a central distribution centre, it would be appropriate to consolidate goods from multiple retailers outside cities. Furthermore, it would be necessary for the third party to have transport requirements in mind when coordinating clusters since everyone does not have the same prerequisites. They could thus pair retailers with the same or similar requirements. However, the retailers must be adaptable to fit a cluster.

In a partnership, the suggested consolidation of goods is either a milk-run or a shared back-haul, depending on the warehouses geographical locations and the flows of goods. If the shipments are sent to similar locations with low fill-rate, a milk-run can be more suitable. Collaborating with only a few actors will make it easier to find someone with the same or similar transport requirements. Therefore, a retailer in a close partnership will not need to compromise to the same extent as in any of the other types of collaboration.

5.2.3 Leadership

The marketplace should be facilitated by the third party and therefore, a convened collaboration with the third party as a leader is suggested. Retailers have to adapt to the system which is provided by the third party and therefore, they have limited control of the system. Most retailers interviewed were positive to having a third party as a leader and initiator of collaborations. The third party need to be the actor who ensure fair gain allocation and manage risks.

Leadership used in clusters should be convened where the independent third party leads, coordinates and designs the collaboration. Certain requirements by the retailers must be considered when the collaboration is designed. Beyond that, the retailers will not have much impact on the strategical part of the collaboration. Furthermore, it is important that the retailers have trust in the independent third party as the leader and their competence regarding strategical decisions.

Inter pares leadership are suggested for partnerships since the retailers should be equals to each other. If the third party should stay in the collaboration, inter pares leadership is suggested since the third party only will manage data and have a supporting role in the collaboration. If the third party would be phased out, the leadership still must be shared between the retailers. Otherwise, there is a risk for opportunistic behaviour and unfair advantages.

5.2.4 Scope

Collaboration through a marketplace will involve a network of partners. Therefore, it will not be possible to have a close relationship with everyone. The main purpose of the suggested network is to purchase leftover transport space and hence the scope of the collaboration is narrow. Due to the large number of actors, the intensity of collaboration will also be low. Thus, the collaboration between the retailers is limited. The scope of the relationship between the retailers and the third party will have the same characteristics since they are only used for buying transports. Therefore, the collaboration will also be limited.

In collaboration through clusters the scope will be different between retailers and third party or just between retailers. Retailers will have a limited collaboration since they will have limited interactions and mainly collaborate operationally. Thus, the intensity will be low and with a narrow scope. The relation between retailers and third party is different since the third party coordinate the clusters of retailers. The intensity will thus be high but with a narrow scope since they will need to have frequent communication but only regarding transportation. Therefore, the collaboration will be focused. If the third party would also coordinate a consolidation centre, it would become an integrated collaboration since the intensity will still be high, but with a broad scope.

In a partnership, collaboration will be close between a few actors and hence, the intensity will be high. Few actors will also allow retailers to collaborate in multiple functions and this will lead to a broad scope. Overall, the collaboration will be integrated. The collaboration between retailers and the third party in the case where the retailer is supposed to be phased out will be focused. They will have the role of initiating the collaboration and therefore have intensive collaboration while they are in the collaboration. However, their scope will be narrow since their only goal is to make sure that the collaboration is working. Furthermore, collaboration between retailers and third party when the third party is supposed to stay will be integrated instead. They will have the role to manage data and coordinate the collaboration while the retailers have a limited collaboration with each other.

5.2.5 Actors

In a marketplace there will be a need for retailers, carriers and a third party. The third party should facilitate the platform while carriers and retailers interact. An aspect which must be considered for this platform is the amount of actors needed for it to become efficient. If the platform would reach this critical mass, it could create savings on a system level. Hence, incentives must be created for retailers and carriers to join before the network reaches this point. The third party also need to ensure that costs do not increase at the same rate as the number of actors or else, it can become too expensive to operate.

The structure of a cluster will consist of retailers connected an independent third party. Furthermore, there should be a connection between retailers as well to develop enough trust to collaborate operationally. The more actors involved in the cluster, the more possibilities there will be for collaboration. However, Cruijssen (2012) mentioned that to many actors will increase coordination costs.

The partnership model consists of retailers and a third party. The number of retailers should preferably not be higher than three according to Basso et al. (2019). Furthermore, the third party could alleviate possible legal obstacles through managing sensitive information or through partnering two actors with similar requirements. It is also important to discuss how to end the collaboration for retailers to be able to depart from each other.

5.3 Sustainability of Horizontal Collaboration

This section will aim to answer *RQ 4*. The structures which were described in Section 5.2 will be evaluated based on their impact on sustainability. The structures economical performance, environmental performance and social performance will be considered and discussed.

5.3.1 Economical

Most retailers had economical motives for participation in horizontal collaboration. Therefore, economical incentives must be created for retailers to become interested in collaborating horizontally. Economical incentives can include reduced costs or increased flexibility in their offering. Furthermore, better utilisation of vehicles can also be seen as an economical driver for collaboration since it enabled by economies of scale.

In a marketplace, improved fill-rate would lead to a reduction in cost per transported package both for the carriers and retailers. However, developing a network with many actors can lead to increasing cost of managing the collaboration (Cruijssen, 2012). Facilitating an online market platform can avoid a rapid increase in management costs since actors can both join and leave without long negotiations. It was described by the IT-service provider that negotiations regarding data management can become long and costly. Removing the need for negotiation should therefore be beneficial for all parties. The third party could be the facilitator and connect retailers with carriers for fast shipments and smaller shipments. These smaller shipments are described by a retailer to be costly and could with this system the need for expensive transports could be reduced.

Horizontal collaboration through clusters should also lead to a higher fill-rate. Since multiple actors are collaborating, economies of scale will be created through higher volume and hence, the possibility to change mode of transportation can arise. Proper coordination could also smooth fluctuations of demand and combine actors with different demand cycles. There are also risks when multiple companies are collaborating such as cultural differences and different demands. Collaboration through clusters could demand investments in systems and resources which creates a commercial risk if it would fail. However, these investments also tie the actors together economically and this should create incentives to be flexible and ensure a long term collaboration.

Horizontal collaboration through partnership will lead to a higher fill-rate. Since there are only a few actors collaborating, optimised route planning will become easier to perform. A few actors involved in the collaboration reduce the need to compromise on requirements or needs. Few actors in the collaboration will also increase flexibility through fewer potential opponents to change. It also reduces the risk of large cultural differences between organisations. The same reasoning regarding joint investments and resources described for a cluster is also applicable for partnership.

5.3.2 Environmental

A couple of retailers mentioned environmental benefits as a motive for horizontal collaboration. However, it was often only considered a side-benefit and not sufficient on its own. The IT-service provider also mentioned this and emphasised that it must become cheaper to be environmentally friendly.

If the marketplace would be used as a solution to facilitate horizontal collaborations, routes and fill-rate would be affected. The routes would become longer since the truck will need to deviate from the original route but less trucks will be needed in the system. The benefits with higher fill-rate should compensate for the longer routes. However, there is a risk that the marketplace does not reach the critical mass to create network efficiencies. If this would be the case, the environmental benefits of it will never be reached and the current system will not change.

By using the cluster approach, larger volumes can be accumulated for long-haul transportation and the mode of transportation could be changed. It will demand a higher degree of planning but will lead to fewer trucks on the roads. A solution to ensure a higher fill-rate is to give the customers a larger time span for delivery and therefore create more flexibility in the delivery time. Furthermore, collaboration through clusters give the retailers a better negotiation position towards the carriers since they will have larger volumes. That could make the retailers demand that carriers provide environmentally friendly options for transportation. It could also lead to economies of scale in sparsely populated areas. One risk is that if an actor withdraws from the collaboration, others might follow. That could make the involved actors to go back to their old transport solutions. However, if the collaboration have been going on for a while, there is a risk that the retailers have scaled down their logistical function which could make them develop even less efficient transportation than they had before.

In a closer partnership for horizontal collaboration where the third party is suppose to act as a coordinator, it would be their responsibility to optimise the system accordingly. Hence, environmental benefits would be reached through consolidation of goods into larger shipments. In a situation where the third party will leave the collaboration, it will be important that they initially find a good match between retailers. Otherwise, the retailers can lose interest in collaboration and continue on their own. This could leave the organisations in a worse state and with a less efficient transportation network than initially.

5.3.3 Social

Only a single retailer considered social benefits as a driver for horizontal collaboration. Furthermore, experts mentioned social benefits as one aspect which need to be more considered by retailers since less congestion and improved geographical availability are two benefits with horizontal collaboration. It is mentioned by the IT-service provider that retailers should not be forced into a collaboration. An independent third party could also get into a vulnerable position if it has the role as a coordinator of the collaboration.

It will be necessary to ensure the health of the chauffeurs if horizontal collaboration through a platform is developed. Their routes can become longer and hence, higher stress levels and longer shifts must be avoided. A platform like this would improve small to medium sized companies possibility to compete with large international carriers according to the IT-service provider. An explanation is that local carriers can compete with bigger carriers since they can reach the same customers and take on smaller deliveries which are not

interesting to a large carrier. There would also be a lower risk for collusion compared to other solutions due to anonymity. Less traffic as a result of fewer trucks being purchased will reduce congestion and noise in cities. This will in turn lead to lower stress levels for individuals living in cities and close to highly trafficked roads.

There is a possible risk for corruption in the cluster approach. If the cluster is designed around competitors, it puts pressure on the independent third party to facilitate the collaboration fairly. If the actors are not treated fairly, it could give individual actors in the cluster an advantage such as skewed cost and gain allocation. Furthermore, increased volumes will lead to less trucks on the roads, and thereby less congestion and noise. The mode of transportation can be changed if the accumulated volume is large enough and thus, these improvements can become even larger.

In the partnership approach without a third party, the risk of opportunistic behaviour is larger than in other suggested types of horizontal collaborations. However, if the third party is involved, they can clearly see if anyone is taking advantage of the other and thus, mitigate the risk for opportunistic behaviour. Furthermore, when volumes are accumulated, fewer trucks will be needed overall and thus, noise and congestion in cities will decrease.

6 Conclusions

Key findings and answers to the research questions will be presented in this section. Thereafter, limitations of the thesis and recommendations for future research on the subject of horizontal collaborations will be presented.

6.1 Key Findings

> *RQ 1: Which are the main enablers and obstacles for horizontal collaboration between retailers?*

One enabler for retailers to horizontally collaborate would be improved customer services. Both geographical expansion of their existing services and improvements regarding time and flexibility in their current delivery network was mentioned as examples. An independent third party could enable horizontal collaboration through managing data, risks and coordinating collaborations. Involving the third party could further neutralise politically tense situations and be the initiator when retailers are hesitant. Economical benefits were also mentioned as an enabler for horizontal collaboration between retailers. Social and environmental improvements were mentioned as drivers, but were not sufficient on their own.

The main obstacles found throughout the project are related to data sharing, transport requirements, legal and information sharing technology. Retailers were in general open to share data regarding transportation. However, the IT-service provider did argue against this and stated that they tend to be restrictive. The hesitancy from retailers could be explained by a fear and lack of knowledge regarding what will happen to their data. Furthermore, it has been found that retailers in different industries have different transport requirements and this can be an obstacle for collaboration since retailers in similar industries often are competitors. Most retailers were not open to collaborate with competitors and therefore, transport requirements could limit the pool of possible partners. This obstacle was not found in the literature and therefore contributes to the knowledge of horizontal collaboration between retailers. Legal obstacles were found to affect the possibility for horizontal collaboration. Competition laws affect who can collaborate and local laws can affect for instance which data can be shared. Furthermore, contractual issues were also found to be a problem since contracts often becomes long and complex. Finally, there is a gap between retailers and the IT-service provider regarding information sharing technology. Retailers blame the lack of technology as an obstacle for not collaborating horizontally, while the IT-service provider state that the technology is not the problem but the humans who makes the decisions. The different categories of horizontal collaboration are summarised in Figure 14.

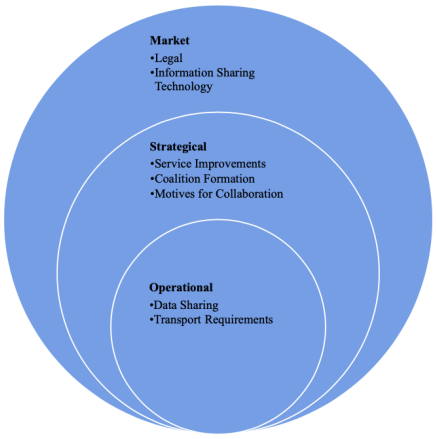

Figure 14: Seven categories for enablers and obstacles identified for horizontal collaboration.

RQ 2: How could horizontal collaboration be structured for retailers?

Three different options for horizontal collaboration has been found: marketplace, cluster or partnership. A marketplace is a network of retailers and carriers where they can buy and sell leftover space for goods. Clusters contain multiple retailers with similar transport requirements who can consolidate their shipments. Partnerships would contain two or three actors that collaborate in their logistical solutions.

RQ 3: How could a third party be positioned in horizontal collaboration between retailers?

Overall, the third party should reduce the risk of breaking competitive laws and manage data between the actors. In a marketplace, the third party should have the role of facilitating the platform for collaboration. The third party should in a cluster have a coordinating role with the responsibility for managing the collaboration. Hence, they should manage risk and cost allocation and be the leader. For a partnership, the third party should be responsible for the initiation and thereafter stay as a neutral part or leave the collaboration.

RQ 4: How will sustainability be impacted by horizontal collaboration between retailers?

The main economical benefit for horizontal collaborations will be gained from improved fill-rate and thus, economies of scale. Retailers can possibly change mode of transportation to a more efficient mode and through the involvement of a third party, the coordination of collaborations could be performed more effectively. Financial risks are related to negotiation costs and costs of managing the collaborations. Increasing the number of actors can increase coordination costs but also opportunities for collaborations. Furthermore, investments will be needed in a cluster or partnership to have shared communications platforms

and shared vehicles. Since the marketplace will aim to optimise already existing vehicles, investments will only be needed for a communication platform.

Most of the environmental benefits with horizontal collaborations originate from the improved fill-rates and increased volumes. Routes can become longer and the vehicles heavier but this should be compensated with fewer vehicles overall. Furthermore, increasing volumes can improve retailers negotiation position towards carriers. Thus, they will be able to demand environmentally friendly transports. Increased volumes can also provide the possibility to change mode of transport.

Social benefits related to horizontal collaboration also originates from the improved fill-rate and reduction of trucks overall. It will lead to less congestion and less noise from roads in densely populated areas. Furthermore, fewer heavy vehicles on the roads will reduce the wear on the roads and thus, less need for resurfacing. Developing horizontal collaborations with a third party will reduce the risk of opportunistic behaviour. The third party should be independent and treat the parties fairly. Lastly, collaborating through a marketplace should improve the competitiveness from small and medium enterprises. They will be able to reach customers that they normally are not doing business with, and thus be able to compete with large and well-established transport companies. An overview of the sustainability impacts of horizontal collaboration can be found in Figure 15.

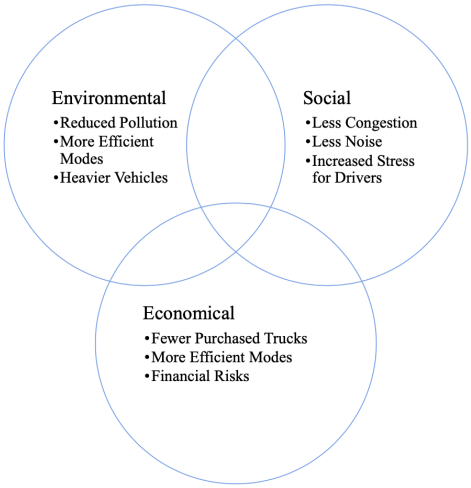

Figure 15: Impact on sustainability by horizontal collaboration.

6.2 Limitations and Future Research

Several interesting subjects within the area of horizontal collaborations were found during this thesis but have not been further examined due to limitations. These will be presented as suggestions for future research.

Inbound transportation was excluded due to time and resource limitations. However, it was stated by two retailers that the inbound logistics tend to be more immature overall and therefore could have a potential for collaboration. Another flow which also could be further investigated is the return flow of goods. This flow has a more uncertain demand since retailers do not know when a consumer want to return a product. Therefore, transports could be more inefficient than the outbound transports from warehouse. The perspective of carriers need to be examined since they have a role in the collaboration. If the carriers would not be interested, transporting goods would require retailers to purchase their own trucks and develop a transport solution on their own.

Furthermore, economical benefits have been found to be a large driver for retailers to horizontally collaborate. However, it was stated by retailers that the benefits of the concept are unknown and therefore they were hesitant towards it. In the literature, many different numbers have been found regarding the savings of horizontal collaboration mostly on a system level. This does not explicitly represent what they will save through collaboration and therefore, finding how much each retailer could save is a must for them to consider horizontal collaboration.

Lastly, an obstacle found during the thesis irrational reasons for not launching collaboration projects. Furthermore, multiple retailers have internal collaborations within their group, yet they do not want to collaborate horizontally with other organisations. The reason for this was also unclear and implies irrationality. Thus, this behaviour should be further examined in order to understand the reasons why horizontal collaborations does not succeed, even though it brings social, environmental and economical benefits.

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A Appendix - Expert Interview Questions

In this appendix, a list of the common questions which were asked to the experts will be presented. These questions were prepared and sent to the experts before the interview.

- What is your opinion on horizontal collaborations?
- What happened after the project *Horisontella samarbeten för ökad transporteffektivitet*?
- How does horizontal collaborations look on an European level?
- Do you find potential of horizontal collaboration for retailers?
- Have you researched any collaborations where an independent third party was involved?
- Do you know anyone else who we should interview?

B Appendix - Case Interview Questions

In this appendix, a list of the questions which was asked to all interviewees will be presented. These questions were sent to the interviewee at least two days before the interview for the interviewee to be prepared.

- Have you had any previous horizontal collaborations? What was the result? Were you satisfied?
  - If not, would you be open to horizontal collaboration with another retailer?
- For a horizontal collaboration to be possible, data sharing will be necessary. Who would you be open to share data with? (partner in collaboration, independent third party or no one)
  - How intense do you think the collaboration should be?
  - Would you prefer to be the leader?
- How is your logistical network designed today? (warehouses, distribution centres, etc.)
  - How do you purchase transport for products? (full truck loads, part truck loads, per sent parcel)
  - Which part of your supply chain do you think has the highest potential for horizontal collaboration?
- What would be your main incentive to participate in a horizontal collaboration? (financial benefits, environmental benefits, more frequent deliveries, etc.)
- Do you know anyone else who we should interview?

C Appendix - IT-Service Provider Interview Questions

In this appendix the questions which guided the interviews with the IT-Service provider are presented. The sub-questions were used to guide the discussion if needed. These questions was not sent to the interviewee before the interview.

- Do you have any experience of horizontal collaborations?
- How do you think a horizontal collaboration should be developed?
  - Which actors should be involved and how many?
  - How close should the relationship be?
  - Who should be the leader?
  - What would be the role of a third party?
- Which are the main obstacles for a third party to coordinate horizontal collaborations?
  - Are there any legal problems with horizontal collaboration?
  - Could there be obstacles related to international differences?
  - Can carriers or retailers be an obstacle for horizontal collaboration?
- Do you think retailers are open to share data regarding transportation?
- Why (why not) should a third party be interested in horizontal collaboration?
  - What would make retailers interested in this concept?
  - What would make carriers interested in this concept?
- Do you have any further thoughts?

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