Thomas Grønlund
Marius Dunseth

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An investigation of whether retail companies can utilize the facilities at shopping malls in Norway in order to enable direct container deliveries through horizontal cooperation

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Bente Flygansvær

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Marius Dunseth & Thomas Grønlund

Abstract

The core of this thesis is to explore how shopping malls in Norway are facilitated for handling container deliveries. The purpose of this investigation is to identify whether retail companies in Norway can benefit from a solution where imported goods are delivered directly out to the stores at shopping malls, without moving through a distribution center in Norway.

In the first part of our thesis we will provide background information that explains the relevancy of the study. Based on this information we elaborate for the objective of the study which results in our research question, which is formulated as follows:

"How are shopping malls in Norway facilitated in relation to handling container deliveries, and how would such an arrangement affect logistics costs and flexibility for the goods owners?"

We have chosen a multiple case study as our research strategy because we are dealing with a phenomenon that is relatively new in a real life context. Two cases are applied in order to identify how shopping malls in Norway are facilitated with regard to handling container deliveries. These cases are the shopping malls AMFI Moss and Strømmen Storsenter. In addition, we have chosen to look at four retail companies in the clothing industry when identifying the interests of the goods owners. The data in this study was collected through interviews and observations as primary sources in addition to different sources of secondary data.

Our findings show that both our chosen shopping malls are able to handle deliveries of containers, even though Strømmen Storsenter is better facilitated than AMFI Moss. In addition, our findings prove that there is a potential for cost savings if the goods owners utilize the possibility of container deliveries to shopping malls in Norway.

In the last section of this paper we present the limitations of our study. These limitations are the basis for our suggestions for future research.

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Definitions

Shopping mall: a single property that houses different retail- and other stores.

Receiving area: the location where goods are received

As is situation: the real life situation as it is today

Fill rate: amount of utilized capacity. If a container holds a capacity of 100 items and only 65 items are loaded, the fill rate is 65%

Consolidation: a logistics strategy that combines two or more orders or shipments so that a larger quantity can be dispatched on the same vehicle

Milk Run: a route on which a truck delivers product from a single supplier to multiple retailers or goes from multiple suppliers to a single buyer location

HUB: integrated centers for transshipment, storage, collection and distribution of goods.

FCL: shipments that contain goods from one shipper/supplier where all the goods are to be delivered at the same consignee

BCN: when shipments that contain goods from different shippers/suppliers are consolidated in one container at a HUB, and shipped to one consignee

Container chassis: The underpart/frame of trucks where a container is placed upon when transported.

1 Introduction

Early in the process of our master project we were introduced to an interesting question: Would it be possible to deliver containers directly to shopping malls in Norway? We wanted to write a thesis that was innovative and relevant for the business sector. When the question was asked to us by a central representative in the industry, we found the idea intriguing. Hence, we decided to focus our master project on the goods deliveries to shopping malls in Norway, and whether there exist a potential to improve the efficiency through container deliveries.

1.1 Background

In recent years there have been a major focus directed towards more efficient trading- and logistical processes in the Norwegian business sector. On this basis, a new knowledge- and innovation center was established in 2010 to ensure an effective flow of goods, and to increase the competitiveness of Norwegian businesses and institutions (Logistikk&Ledelse 2010). This should be achieved through technology development that leads to increased productivity in the retail sector, which still is an ongoing process. Another field within logistics and distribution that has received attention in recent years is the possibility of reducing the number of trucks on Norwegian roads. In 2012 a project named “Velg Sjøveien” was introduced in Norway. "Velg Sjøveien" is a collaboration between ship-owners, ports and maritime transport organizations in Norway (VelgSjøveien 2012). Their ambition with the project was to encourage goods-owners to ship their goods by sea instead of road. VelgSjøveien (2012), concluded that goods-owners could save up to 55% of direct distribution costs by choosing sea transport instead of road. Additionally, sea transport has proved to be more environmental friendly, with 60-70% reduction in CO_2 emissions compared to trucks. An opportunity within the container delivery solution is connected to the thought of moving goods transportation from road to sea. If the goods do not need to go by a central warehouse, they can be shipped from the main ports in Europe directly to a local port in Norway. From the local ports, containers can be transported directly out to shopping malls where the goods are unloaded. Hence, the distances carried out by trucks are reduced.

Both Logistikk&Ledelse (2010) and VelgSjøveien (2012) are general examples of new ways of thinking related to processes within logistics and distribution, independent of industries. Further, an example related to a specific industry, the retail industry, has been examined by GS1 (2013). Participants were 29 logistical leaders within 25 different retail companies. The research built upon the fact that the Norwegian retail industry had faced a significant increase in productivity during the last decades. In order to maintain this growth in productivity, GS1 (2013) emphasizes that the retail industry has to maintain the focus on efficient supply chains in the future. According to GS1 (2013), there has been a wide range of publications and presentations in recent years where it has been claimed that the winners within the retail sector in the future, will be the ones with the most effective supply chains. Further, different consultancy- and research reports have claimed that the key to an optimal supply chain is related to cooperation and sharing of information throughout the supply chain (GS1 2013). Even though such cooperation to a small extent is conducted practically, all of the participants of the examination unanimously agreed that cooperation is important in order to be efficient in the future. This fact is related to new ways of thinking, and is essential in order to maintain and increase market shares. According to GS1 (2013, 5); "(…) *the recipe used yesterday is not enough in order to win the marked share of tomorrow*". This means that renewal and innovation in supply chains becomes a key focus and investment area for actors in the retail sector in the years to come, both in terms of expertise, new collaborative constellations, and utilization of technology, automation and process innovation (GS1 2013).

With that statement in mind, and the fact that the original idea of our project was introduced by a central actor within retail-logistics, we were confident that our project was both future-oriented and relevant for the industry.

1.2 Shopping malls in Norway

A clear trend in the retail sector during the last two decades is the development of shopping malls. The International Council of Shopping Centers has defined a shopping mall as:

> "A *group of retail and other commercial establishments that are planned, developed, managed and owned as a single property."*
>
> (ICSC 2014)

In Norway, a shopping mall is characterized by a minimum gross leasable area of 2500 m^2 (Andhøy et al. 2012). Through the range of year 1993 – 2008, the Norwegian entrepreneur Veidekke built new, refurbished, and rebuilt 74 shopping malls (Veidekke 2008). In Norway, Veidekke built 65 large and small shopping malls across the country, with the majority in the eastern region, while seven in Denmark and two in Sweden. This trend clearly indicates that the different retail companies centralize their stores into shopping societies located within the same building. With a total of 403 shopping malls, Norway is the country in Europe with the highest density of shopping malls in relation to inhabitants (Andhøy et al. 2012). The total retail sales at Norwegian shopping malls was 121,3 billion NOK in 2011 (Andhøy et al. 2012). This is estimated to be 34,8% of the total retail sales in Norway.

There are several incentives for examining an alternative solution for goods deliveries to shopping centers. One of them is the fact that it exists a general desire to mitigate the emissions from goods transport and reduce the number of vehicles in populated areas (Samferdselsdepartement 2013). At the same time, the Norwegian government has made restrictions on new establishments of shopping centers. The provisions states that commercial buildings exceeding 3000 m^2 cannot be built outside cities or densely populated areas (Lovdata 2008). This might be perceived somewhat contradictory, but it might also be a good possibility for the actors to force new and better solutions for goods deliveries at shopping malls. It also illustrates where the main focus lies when it comes to transportation in relation to shopping malls, namely the people transport. The goods transport and logistics of the malls have often been further down on the priority lists when developing and designing tomorrow's shopping malls. The topic has been subject in several reports during recent years, and the sector is starting to realize the potential for optimization in this area as well.

Stores located at shopping malls benefit from the size and diversity of the mall itself, and use this cooperatively when targeting their customers through different marketing initiatives. The possibility of exploiting this size and tenant mix when it comes to logistics and distribution strategies was a topic we considered as interesting.

Further, bankruptcies within the Norwegian retail sector increased with 30% in year 2013, and the prognosis for 2014 does not look bright either (Solberg 2014). These numbers are not encouraging for the retail sector, and it indicates that the retail companies have to improve their efficiency in order to compete in the market. One of the main reasons for this development is related to tough competition within the market (Solberg 2014). One of the reasons for the tough competition may be related to the fact that Norway has a high density of shopping malls relative to inhabitants. A high amount of shopping malls leads to a high amount of retail stores, which again leads to high competition. Additionally, the emergence of online shopping has increased the competition in the retail sector. This emergence has affected the competitiveness of the retail stores considerably. In the retail sector there are low margins, and only the companies that are good at cost control, purchasing and restructuring, manage to carry their business in the right direction (Solberg 2014). Low margins are one of the drivers when companies outsource their production to low-cost countries in Asia, but if these companies are unable to conduct the distribution of finished goods back to Norway in an efficient way, the low cost project could turn out to be really expensive. Hence, a key factor for success in the retail sector lies within efficient logistics. At shopping malls, the receiving area is the main artery for efficient internal logistics.

1.3 Receiving areas

A receiving area is the location where goods are delivered. At a shopping mall the design and functionality of the receiving area is important in order to obtain an efficient internal flow of goods. In Norwegian, Bugge (2003) has developed a definition of a receiving area. Translated into English, the definition is as follows:

> *"The receiving area is the space allocated for receiving goods. The receiving area must be in close proximity to the ramp. The receiving area must be located and designed so that the goods can freely be pushed forward with the load carriers that the supplier uses (...)."*
>
> Bugge (2003, 4)

Based on the definition, the receiving area is important for the consignee,

whatever the location. On the other hand it is reasonable to say that the receiving area is much more important for a shopping mall than for a grocery shop, for instance. The grocery shop is a single actor, while at a mall there are several stores using the same receiving area. Therefore, the receiving area is important in order to establish an efficient flow of goods at a shopping mall. According to the report made by Bjørnland, Bjerkelund, and Granquist (2001), this importance is not prioritized by the retailers. For the retailers, store location in relation to customer flows are priority number one, not the deliverability of goods. Further Bjørnland, Bjerkelund, and Granquist (2001) argue that it is the transport companies that possess the close interest of developing a higher focus in regard to logistics and deliverability at shopping malls. This statement does not necessarily hold in the year of 2014. Supply chain integration has increased in importance during the last decade, and logistics has become a strategic tool in business management in order to create sustainable competitive advantage (Bjørnland, Bjerkelund, and Granquist 2001). Hence, the focus of efficient and proper receiving areas is highly relevant in the current situation.

1.3.1 ColliCare InStore

ColliCare Logistics is a logistics provider which offers a service at shopping malls called InStore. They describe the service at their homepage:

"*InStore handles the goods from the point when arriving at the receiving area or the store. Focus is controlled and cost-effective flow of goods, which frees up time to increase sales and improve service in stores. In addition, InStore services contribute to tidy and customer friendly shops, which in turn help increase earnings and increased conversion rate in the stores*."

(ColliCare 2014)

All these advantages are in line with the work that Bjørnland, Bjerkelund, and Granquist (2001) presented. What is interesting is that the InStore service provided by ColliCare (2014) is acknowledged to be a future oriented, innovative solution, even 13 years after Bjørnland, Bjerkelund, and Granquist (2001) revealed the same service. The InStore solution is implemented at two different malls; Storo Storsenter and Strømmen Storsenter (ColliCare 2014). This means

that at least one (Strømmen Storsenter) of the nine shopping malls that did not have a manned receiving area in the study of Bjørnland, Bjerkelund, and Granquist (2001), now has it.

The theoretical concepts from 2001 are now tested in practice. According to ColliCare (2014), their operation of receiving areas at shopping malls leads to an efficient and organized flow of goods. This statement is confirmed by a report presented by Berg and Grønland (2008). Their study evaluated the frequency of deliveries and average time spent when unloading goods in areas located in city centers. Part of the study evaluated the unloading situation at shopping malls. Their studies showed that, on average, the transporters reduced the time spent with 15 minutes when delivering the goods to a manned receiving area. That corresponds to a 40% reduction compared to the regular receiving areas where the transporters deliver to the stores inside at the malls. The main reason for the increased efficiency is related to the fact that the transporters stop their delivery process at the receiving area rather than inside each individual store. A positive ripple effect in addition to improved efficiency is connected to the stress levels of transporters.

In their study of the truck drivers work environment, Enehaug and Gamperiene (2010) identified that the transporters are affected by stress in their workday. This stress is based on the requirement of punctual deliveries in combination with poor delivery conditions. If there are problems related to delivery conditions at the place of delivery, the transporters have to be creative since their task is to deliver the ordered goods into the relevant stores (Enehaug and Gamperiene 2010). Hence, a large amount of time is spent on irrelevant tasks that lead to delays in the delivery route, which again lead to stress. Manned receiving areas at shopping malls should reduce this kind of stress because operations that are conducted by the transporters can be done by specialized staff instead. Finally, Berg and Grønland (2008) argue that a manned receiving area at a mall will involve less need for parking spaces for unloading, but greater need for temporary storage of deliveries. Therefore Berg and Grønland (2008) argue that the design of the receiving area should be a vital criteria when constructing new shopping malls.

2 Objective

The objective of this study is to explore whether shopping malls in Norway are facilitated for accepting deliveries of containers. What makes this objective interesting is that such solution could benefit the tenants at shopping malls. The tenants at shopping malls are commonly retail companies where a large proportion is companies within the clothing industry. Further in this paper we will use the word retail company as a description for retailers selling clothing.

A well-known fact is that retail companies selling clothing have outsourced their production to low cost countries in Asia. When the garments have been manufactured, they are shipped to Norway in containers before they are put up for sale at retail stores. Since a large proportion of the tenants at shopping malls in Norway are retail companies, these companies should be able to cooperate on the distribution of finished goods from Asia to Norway. Logistically this is an interesting approach, and through this study we will identify whether such an approach is feasible for the retail industry in Norway.

Linking the cooperative approach to shopping malls in Norway, it is interesting in the sense of utilizing the location of the stores. If a container can be loaded in Asia with goods that are to be delivered to different retail stores at one single shopping mall without going through a distribution center in Norway, we believe that there exist a potential for improved efficiency.

2.1 Research question

Based on our objective and the provided background information, we developed the following research question:

"How are shopping malls in Norway facilitated in relation to handling container deliveries, and how would such an arrangement affect logistics costs and flexibility for the goods owners?"

3 Literature review

The scope of our thesis is quite extensive and touches upon several different areas. As a consequence of this, this literature review does not reflect on only one theory or one single concept. The literature review will build the foundation from which we develop our research model; therefore the selected theoretical concepts are aspects that are associated to the different processes related to direct container deliveries as well as the relevancy of our topic.

3.1 Delivery systems

Over the past decades there has been a significant increase in businesses sourcing their production to low-cost countries (Trent and Moncka 2003). As a consequence of the globalization, the distribution and delivery systems have become more complex (Mattsson 2003). In pace with this trend, the market for specialized logistics companies have experienced growth, and the logistics providers have become leading in managing global distribution (Berglund et al. 1999; Persson and Håkansson 2004). In our case, the process of handling and distributing the imported goods are performed by external logistics providers and not by the goods owners. The freight procedure from supplier to end-customers is often referred to as an outbound distribution strategy. The authors Simchi-Levi, Kaminsky, and Simchi-Levi (2004, 62), distinguish between three distinct outbound strategies that typically are used:

Distribution strategy	Description
Direct shipment	In this strategy, items are shipped directly from the supplier to the retail stores without going through distribution centers
Warehousing	This is the classic strategy in which warehouses keep stock and provide customers with items as required
Cross Docking	In this strategy, items are distributed continuously from suppliers through warehouses to customers. However, the warehouses rarely keep the items for more than 10 to 15 hours

Simchi-Levi, Kaminsky, and Simchi-Levi (2004, 62)

Figure 3.1 - Distribution strategies

Direct shipment strategies have the advantages that the retailer avoids the expenses of operating a distribution center and that lead times are reduced (Simchi-Levi, Kaminsky, and Simchi-Levi 2004). However there are also down-sides of using direct shipment. Risk-pooling effects are eliminated and transportation costs increase because it forces the manufacturer and distributor to send smaller trucks to more locations (Simchi-Levi, Kaminsky, and Simchi-Levi 2004; Bygballe, Bø, and Grønland 2012).

In the case of shopping malls, which often have relatively small stores, a direct delivery where the end-customer is a single store at the mall, is regarded as unrealistic due to the volumes. The definition from Liu, Li, and Chan (2003, 326) support this. They refer to a direct shipment system as a situation where "*(...) each supplier operates independently with its own fleet delivering goods to customers. Each vehicle visits only one customer per trip. This method should be utilized when the lead-time requirement is tight, the goods need to be isolated, or the shipment is large."* The term "large" in the sense of import of goods has to be measured in relation to the volume of the shipping units which in our case is 20' containers.

This consideration is shared by Bygballe, Bø, and Grønland (2012), who identifies direct shipment as one of four different configurations for managing international supply. The retailer in their study primarily apply the direct shipment configuration for situations with products that are high volume and of low value, typically in relation to promotional campaigns (Bygballe, Bø, and Grønland 2012). An illustration of the direct shipment configuration is shown in Figure 3.2. It illustrates that there are no intermediaries from the supplier to the customer.

Figure 3.2 - Shipment configuration 1

An alternative to such a "one-customer-delivery" solution can be a situation where volumes from one common supplier are delivered to several stores, often called "milk runs". According to Chopra and Meindl (2013, 419), a milk run is; *"a route on which a truck delivers product from a single supplier to multiple retailers or*

goes from multiple suppliers to a single buyer location." Hence, the milk run solution can be used in order to generate volumes. Figure 3.3 illustrates the milk run concept. The illustration on the left hand side is a situation where deliveries are made from one single supplier to multiple retailers, while the figure on the right is a situation where goods are delivered from multiple suppliers to a single buyer.

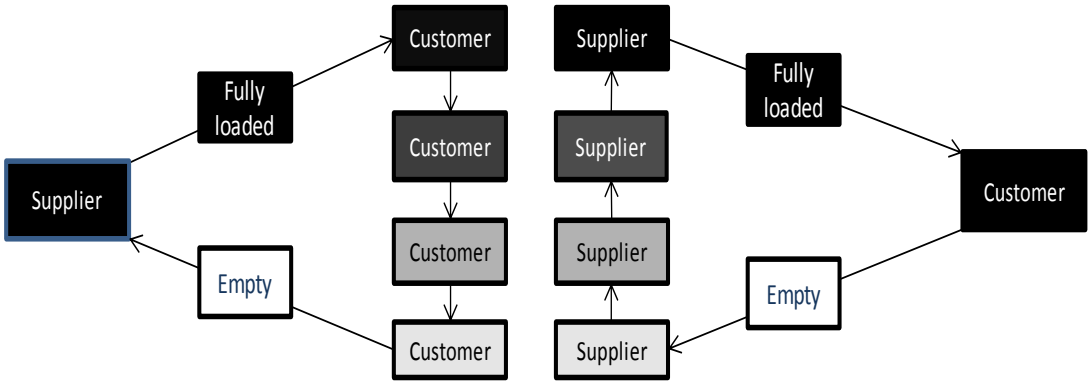

Figure 3.3 - Milk Runs

The alternative of milk runs can also be applied when goods are consolidated through a distribution center (Chopra and Meindl 2013). A distribution center is viewed as *"the competency that links the enterprise with its customers and suppliers"* (Chen 2001). One of the advantages of operating with a distribution center is the possibility of exploiting pooled interdependencies (Bygballe, Bø, and Grønland 2012). As mentioned, Bygballe, Bø, and Grønland (2012) discussed four different international supply chain configurations, and analyzed these configurations and their effects on total costs and customer service. The first of the configurations were the previously discussed direct shipment solution. The remaining three are configurations with different strategies for the use of distribution centers. The question of the location of the distribution center has been broadly elaborated in the literature (Hale and Moberg 2003; Hesse and Rodrigue 2004; Nozick and Turnquist 2001). In their configurations, Bygballe, Bø, and Grønland (2012) has various locations for the distribution centers. The configuration with the distribution center located in the country of the end-market is argued to be the most common solution for Norwegian retailers (Figure 3.4).

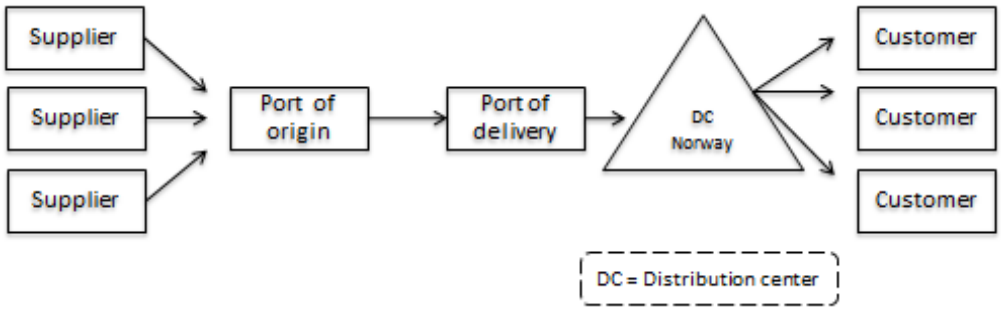

Figure 3.4 - Shipment configuration 2

Here, the items are shipped from several producers to the distribution center in Norway before it is consolidated with regard to the individual stores (Bygballe, Bø, and Grønland 2012). Each shipped container contains goods from one single supplier. Thus, this configuration requires large volumes from the supplier. The solution is argued to be beneficial in relation to responsiveness to the market.

Another configuration is the situation where the distribution center is located in the country of origin (Figure 3.5).

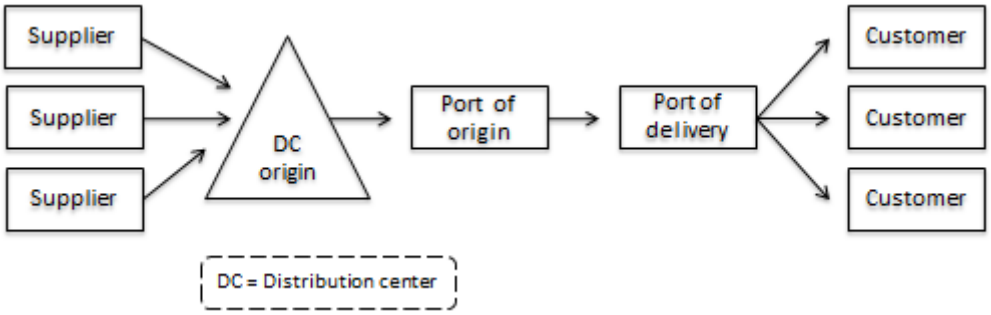

Figure 3.5 - Shipment configuration 3

When operating with a distribution center in the country of origin, the final consolidation takes place there. The authors argue that this is the most cost efficient solution. However, a disadvantage is that the ability to respond quickly to changes in demand is reduced compared to configuration number 2 (Bygballe, Bø, and Grønland 2012). When we are considering the possibility of delivering containers to shopping malls in Norway, this is the configuration (Figure 3.5) we want to look closer at. The situation where goods are consolidated in a container in country of origin and shipped directly to a mall in Norway will be compared with the mapped configurations that are used in practice today. In order to be able

to fill up a 20' container to the stores at a selected shopping mall, the location of the suppliers is of importance. If they are in geographical proximity, it might enable the concept of sending it directly to its end-destination, namely the mall.

The last of the four shipment methods is a combination of configuration number 2 and 3. This is a situation where the company operates with distribution centers in both the country of origin and the country of the end-customers (Figure 3.6).

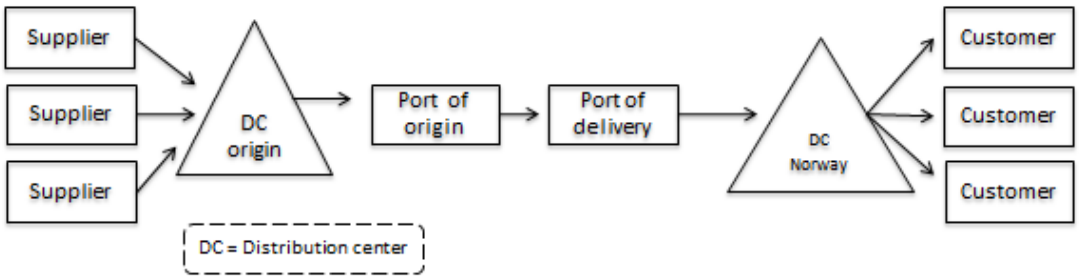

Figure 3.6 - Shipment configuration 4

Goods are being consolidated in a distribution center in country of origin before it is shipped to Norway. At the distribution center in Norway, the shipment is customized and prepared for the retail stores before the final distribution. The configuration is effective but expensive due to handling and inventory costs both in country of origin and in Norway (Bygballe, Bø, and Grønland 2012)

When considering the different configurations and its properties, it is important to account the different possibilities related to consolidation policies. A shipment consolidation is defined by Higginson and Bookbinder (1995) as *"a logistics strategy that combines two or more orders or shipments so that a larger quantity can be dispatched on the same vehicle*".

Previous research on the topic of freight consolidation can according to Qin et al. (2014) be categorized as either strategic or operational, depending of which level the decisions are made. When the research addresses the network design problems, the concern relates to the strategic level. The research categorized as operational has more of a short-term perspective with focus on how to operate the distribution when being dependent on the present network structure. In our case we are looking at a situation where we are limited by the resources and facilities

of the actors. We are not examining the network design, but rather the possibility of an alternative distribution configuration for deliveries to shopping malls. Hence, our research approach could be categorized as operational in respect to the classification in Qin et al. (2014).

Another research on consolidation policies has been conducted by Tyan, Wang, and Du (2003). They point at the benefits for the goods owners from collaborating with a third party logistics provider in achieving a well-functioning global supply chain. The scale of the logistics providers enables them to consolidate items in such a manner that it reduces the logistics costs for the goods owners, compared to a situation where they handle the distribution individually. The authors evaluate different consolidation policies and conclude that there is a potential for substantial cost saving and improvement in service levels through collaborative consolidation policies. However, there are coordination challenges for the logistics providers when using a consolidation center. Haiqing, Hsu, and Cheung (2008) developed a model to calculate the optimal solution with regard to different pickup and delivery times, latest arrival times, transportation and storage costs at their suppliers and customers. These are all elements that need attention in order to exploit the potential for mitigating the costs through efficient consolidation policies. Reduced costs are not the only positive effect of well managed consolidation solutions. The environmental effects of freight consolidation have also been studied (Ballot and Fontane 2010; Ulku 2012; Merrick and Bookbinder 2010), and the research shows that freight consolidation, in most cases, contributes to mitigate the carbon footprint of a supply chain. If these positive effects are to be obtained, the resources must be managed and exploited.

3.2 Resources

The resource-based theory has emerged within the field of strategic management as an alternative to Michael Porters approach of the firm. The focus lies on the utilization of the resources, capabilities and competencies of a firm rather than its positioning in the market when identifying the key success factors (Barney and Clark 2007; Walley 2007). In relation to goods deliveries to shopping malls, resources are both related to the suppliers, logistics providers, goods owners and

the facilities at the shopping mall. The goal from a resource-based perspective is to achieve value-creation through maximization of the resources and competencies of the actors: *"(...) it is about creating the most value out of one's existing resources by combining these with others' resources, provided, of course, that this combination results in optimal returns"*(Das and Teng 2000, 37). A critical question related to container deliveries to shopping malls is whether the malls, with its existing resources, are facilitated to handle a container delivery. Bjørnland, Bjerkelund, and Granquist (2001) analyzed ten different shopping malls in Norway with the intention to identify the general logistical system located at a shopping mall. Based on size, location, and year of construction, the ten shopping malls were divided into three different categories. Even though all of the malls were different and categorized differently, they had at least one similarity. Concerns regarding logistics and freight transport had come a long way down the list of considerations when planning the shopping mall (Bjørnland, Bjerkelund, and Granquist 2001). The most recent built shopping malls are no better than the older ones. One of the reasons for this low priority can be found at the owners of the different shopping malls. When a new mall is planned built, the architect has been given the task of designing a mall where each square feet of the area is utilized in order to maximize rental income from the different retail stores (Bjørnland, Bjerkelund, and Granquist 2001). This focus often leads to small and inefficient receiving areas, which again affect the deliverability capability.

Actual knowledge of how a receiving area should be designed in order to create a win-win solution for both suppliers and retail stores are well documented. We refer to two different documents; LUKS (2011a) and LUKS (2011b) developed and published by Leverandørenes Utviklings- og Kompetansesenter. These documents present sets of standards for how receiving areas should be designed. Hence, the problem is not how it should be constructed, but rather why the receiving areas should be a vital part when planning for a new or expanded shopping mall.

Solely, a well-designed receiving area is efficient in relation to the flow of goods at a shopping mall. Additionally, depending on the size of the mall, such a receiving area can be utilized even further if it is manned (Bjørnland, Bjerkelund, and Granquist 2001). Based on their study, which identified significant

inefficiencies at the receiving areas at the selected shopping malls as well as the distribution up to the retail stores, Bjørnland, Bjerkelund, and Granquist (2001) presented a model for organizing manned receiving areas. Their model built on the intention that the receptions- as well as the distribution of goods internally at shopping malls were professionalized by a third party. Through their case study, Bjørnland, Bjerkelund, and Granquist (2001) identified that the reception of goods at nine of the ten selected malls were handled by the individual stores. Only Oslo City had implemented a joint manned receiving area, and the authors argued that this was the model of the future. Individual retail stores would then be able to focus more on sales and customer service which is their core competence, instead of goods reception. An independent third party was suggested to handle the goods receipts in order to maintain the interests of all the stores at the mall. Hired personnel for the reception of goods will cost money, so is it cost efficient as well as logistically efficient for the retail stores to implement such a model? The question is important because the party paying for a manned receiving area will be the tenants at the mall. According to calculations done by Bjørnland, Bjerkelund, and Granquist (2001), the answer to this question is yes for the largest shopping malls. Naturally, such a solution will not necessarily gain small shopping malls, since the fewer tenants at the mall, the bigger the cost per renter for the hired personal at the receiving area.

Another factor concerning the shopping mall is their location and accessibility. The malls are often located in urban areas where the accessibility is limited by narrow roads and heavy traffic. The literature on transportation in urban areas has mainly been focused around people transport. However, goods transport has been more emphasized in recent years. Muñuzuri et al. (2005) present several solutions for how local governments can implement initiatives to improve goods transportation in urban areas. Among these initiatives are freight carrier cooperation, joint deliveries and joint reception which are all argued to be means contributing to reduce the number of carriers within the city. Ljungberg and Gebresenbet (2004) have mapped the potential for coordination of goods deliveries to four shopping centers in the city of Uppsala. They find that the deliveries are numerous and uncoordinated. The authors point at significant advantages of implementing a coordinated goods distribution system. They present an interesting view on how the retailers rather than the transporters may

initiate coordination: *"(...) through their orders, they influence all deliveries and could control them to be coordinated at a common terminal"* (Ljungberg and Gebresenbet 2004, 171).

When considering the potential for coordinating goods delivered to shopping malls without going through a distribution center in Norway, the supplying manufacturers' location is of importance. The manufacturers must be in geographical proximity in order to enable the goods to be consolidated at a common distribution center (Cheong, Bhatnagar, and Graves 2007).

3.3 Relations

The process of importing goods involves several different actors. The suppliers, goods owners, logistics companies and often also agents are all crucial contributors. Persson and Håkansson (2004, 11) state that there has been a trend towards an *"(...) increased integration of logistics activities across firm boundaries aimed at reducing cost items"*. This trend is identified in relation to the vertical integration of a supply chain, and is related to *"(...) the need for tighter coordination with suppliers and customers resulting in the need for closer cooperation"* (Persson and Håkansson 2004, 11). When examining the deliveries to shopping malls in Norway, we want to look at the possibility for collaboration between the goods owners as well. A situation where actors at the same level of supply chains collaborate is referred to in the literature as horizontal cooperation. While there has been numerous studies on the subject of vertical supply chain integration (Persson and Håkansson 2004), horizontal cooperation is a newer concept which has received increased attention in recent years (Cruijssen, Dullaert, and Fleuren 2007).

The subject is defined by Cruijssen, Dullaert, and Fleuren (2007, 23); *"Horizontal cooperation is about identifying and exploiting win-win situations among companies that are active at the same level of the supply chain in order to increase performance"*. The authors exemplify such companies to be suppliers, manufacturers, retailers, receivers (customers), or logistics service providers. A collaborative supply chain occur when two or more independent companies work jointly to plan and execute supply chain operations with greater success than

acting in isolation (Simatupang and Sridharan 2002). There are different structures on such cooperation, where horizontal cooperation is one of the youngest developed structures that are becoming more and more relevant in practice (Cruijssen, Dullaert, and Fleuren 2007).

In our study, we want to find out if the goods owners are willing to collaborate in exploiting efficient logistics through horizontal cooperation. Logistics service providers believe in potential benefits of horizontal cooperation in order to increase their profitability or to improve the quality of their service (Cruijssen, Cools, and Dullaert 2007). The companies may be competing in the same markets which, according to Bengtsson and Kock (2000), can increase the challenges related to this type of collaborative relationship. One impediment for horizontal cooperation concerns the choice of partner. This selection could be the difference between success and failure of cooperation. The problems related to finding suitable partners are less severe the more profitable the companies are (Cruijssen, Cools, and Dullaert 2007).

Horizontal cooperation may occur between competing companies that are active in the same supply chain as well as unrelated companies that operates in different supply chains (Cruijssen, Dullaert, and Fleuren 2007, 24). The primary, where competing companies are collaborating, is in the literature referred to as co-opetition. Co-opetition is defined by Zineldin (2004, 780) as *"(...) a business situation in which independent parties co-operate with one another and co-ordinate their activities, thereby collaborating to achieve mutual goals, but at the same time compete with each other as well as with other firms"*.

Two of the pioneers in the field of co-opetition is Nalebuff and Brandenburger (1996). Their book presents this new mindset, co-opetition, of how to perceive cooperation in business. They explain that business is both war and peace, and companies have to compete and cooperate at the same time, even though they are competitors.

The definition of co-opetition is also dependent on the definition of competitors. Two shops in a shopping center can be defined as competitors even though they are not selling the same type of products (Nalebuff and Brandenburger 1996).

Bengtsson and Kock (2000) on the other hand, chose to address it as competition between companies selling the same type of products. From this, they define co-opetition as a more complex relationship than what Nalebuff and Brandenburger (1996) do. The company is *"(...) simultaneously involved in both cooperative and competitive interactions with the same competitor at the same product area*." (Bengtsson and Kock 2000, 415). When we are looking at the malls we have chosen to use the definition by Bengtsson and Kock (2000). Hence, we consider the shops at the malls as competitors only if they sell the same types of products.

Collaboration between competitors is a forward-looking concept, and Zineldin (2004) predicts that co-opetition is the organizational structure of the future. He presents a framework for how to establish and maintain a co-opetitive relationship among organizations. Such a relationship is dependent on clearly defined terms and conditions in order to be sustainable and successful (Zineldin 2004).
If the relationship is successful, co-opetition provides positive effects beyond the companies involved. If the efficiency effect outweighs the cooperative effect it generates positive effects both through increased consumer welfare as well as improving social welfare (Zhang and Frazier 2011). Although it exists research conducted on the topic of co-opetition, Walley (2007) presents seven areas within the field of co-opetition that he considers interesting and under researched. The suggestions are based on a thorough literature review on the subject. One of the suggestions is to look at the connection between co-opetition and company performance which is related to the scope of this thesis.

3.4 Performance measurements

The literature suggests numerous factors and measurements for assessing the performance of a firm (Gunasekaran, Patel, and McGaughey 2004; Brewer and Speh 2000; Chan and QI 2003). We have chosen to use the definition of Neely, Gregory, and Platts (1995, 80) who state that performance measurement can be defined as *"(...) the process of quantifying the efficiency and effectiveness of action*". Further, the authors suggest that "(…) *effectiveness refers to the extent to which customer requirements are met, while efficiency is a measure of how economically the firm's resources are utilized when providing a given level of customer satisfaction*" (Neely, Gregory, and Platts 1995, 80). In an evaluation of

the performance of the shipment methods to shopping malls in Norway, these aspects must be taken into account. In general, there are four main aspects of performance measures with its underlying dimensions (Neely, Gregory, and Platts 1995). These four are: Quality, Time, Cost and Flexibility. In our thesis, we have chosen to evaluate the flexibility and cost aspects of the shipment configurations. In addition, we included delivery speed as a dimension of the flexibility variable. We did not have the insights and knowledge to assess the quality-aspect as a performance measurement, but we mention it later as a potential subject for further research.

3.4.1 Flexibility

The concept of supply chain flexibility has evolved from the literature related to manufacturing flexibility (Stevenson and Spring 2007). Supply chain flexibility is often considered as one of the dimensions of the concept supply chain performance (Hua 2013). Vickery, Calantone, and Dröge (1999) include five dimensions to their definition of supply chain flexibility. One of them is the ability to respond to the needs and wants of the firm's target market. This is a subject that Lee (2004) elaborates. He presents three key characteristics of a cost efficient and fast supply chain. Further, Lee (2004) state that in order to be successful and sustainable, the supply chain must be agile, adaptable and aligned, known as the Triple-A. The author suggests that the objective for developing a supply chain that is agile means that it is able to respond to short-term changes in demand or supply quickly and handle external disruptions smoothly (Lee 2004). The discussion is built upon examples from both PC manufacturers and large retail chains, illustrating the importance of agility in different segments of business. The second aspect of the Triple-A supply chain is adaptability. The meaning behind the concept is to be able to "(...) *adjust supply chain's design to meet structural shifts in markets; modify supply network to strategies, products, and technologies*" (Lee 2004, 4). The third concept is alignment, where the objective is to create incentives for better performance. The underlying aspects are addressed as the benefits of sharing risks, costs, information and gains among the different actors in the supply chain.

3.4.2 Logistics costs

Through the globalization of business, logistics costs have become a larger part of the total supply chain costs. Hence, it has also become one of the most essential measurements when assessing supply chain efficiency (Zeng and Rossetti 2003). The logistics costs discussed in the literature usually includes the dimensions: transportation, warehousing, order processing/customer service, administration and inventory holding (Zeng and Rossetti 2003). In our research we are assessing the cost differences related to the different shipment configurations. The cost aspect in relation to the choice of shipment configuration and consolidation policy have been thoroughly reviewed in literature (Masters 1980; Tyan, Wang, and Du 2003; Creazza, Dallari, and Melacini 2010; Bygballe, Bø, and Grønland 2012). Their findings suggest that the most cost-efficient solutions are the configurations with large volumes who are delivered as directly as possible. We want to investigate whether a solution with container deliveries to shopping malls support these findings. Due to limitations related to time and scope of the thesis, we have been forced to narrow the number of dimensions when estimating logistics costs in our project. The content and reasoning for the choices are discussed in subchapter 5.3.1.3.

4 Research model

The objective of our study is to investigate whether shopping malls in Norway are facilitated to accept container deliveries. Based on this objective we have reviewed literature on relations, resources, delivery systems and performance measurements. In this chapter we will describe our developed research model which is illustrated in Figure 4.1.

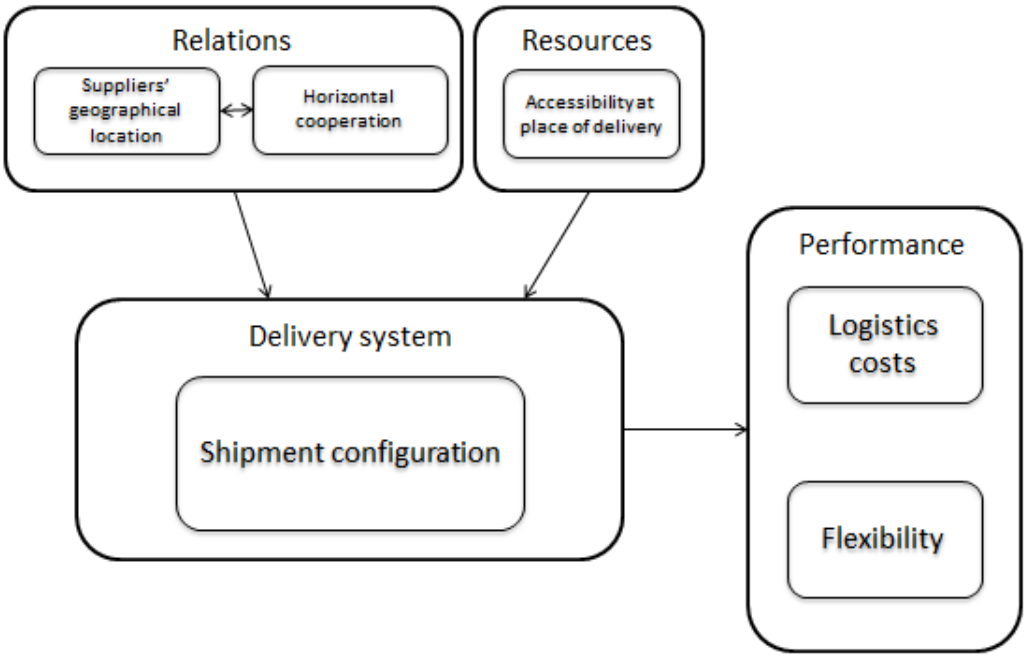

Figure 4.1 - Research model

The dependent variable in our research model is the applied delivery system. In the literature, a wide range of delivery systems are considered. Among them, Bygballe, Bø, and Grønland (2012) argue that there are four main shipment configurations (ref. chapter 3.1) when moving goods through the supply chain of a retail company. These configurations are the basis for our research model, where the considered goods are shipped in containers from port of origin. When considering what shipment configuration to apply, there are different factors that the retailers have to take into account. In our model these factors are connected to "Relations" and "Resources". Each of the four configurations is dependent upon certain relations and resources in order to be applicable.

Within “Relations”, the geographical location of suppliers is relevant if goods from more than one supplier are to be consolidated at country of origin. If a container should be loaded with goods from more than one supplier, it is essential that these suppliers are located within the same areas. If not, the transport distance from the supplier to the distribution center where the goods are consolidated would be unreasonably long which again results in increased distribution costs. This parameter is critical when considering configuration 3 and 4, while configuration 1 and 2 not are affected by the suppliers’ location due to the fact that each individual container are loaded with goods from one single supplier.

In close relation to the location of the suppliers, the willingness to exploit horizontal cooperation between retailers is essentials when considering relations. If the suppliers of the different retail companies are located in the same areas, the retailers can utilize this positioning by cooperating among the distribution of goods. In situations where the ordered quanta from one retailer do not fill a container, cooperation with other retailers can be applied in order to utilize the loading capacity. Two or more retail companies can then consolidate their individual orders into the same container at country of origin in order to reduce the distribution cost, but this requires cooperative willingness. Horizontal cooperation within distribution of goods is only relevant for shipment configuration 3 and 4.

Another factor that determines what shipment configuration to apply is resources that are embedded within the supply chain. In our research model these resources are connected to facilities. The accessibility at place of delivery is important to determine before selecting a certain shipment configuration. Shipping a container from country of origin with the purpose of unloading the goods directly at the customer (configuration 1 and 3) entails that the customer are able to accept such deliveries. If the facilities at place of delivery are designed in a way that prevents container deliveries, the configurations (1 and 3) that require such facilities have to be excluded. In these situations configuration 2 and 4 can be applied since the goods has to be moved through a distribution center which load the goods into a vehicle suitable for the facilities at place of delivery.

When the desired shipment configuration is selected and the prerequisites

"Relations" and "Resources" are mapped and found satisfactory, the system is considered feasible. Further, the performance of the selected configuration, in addition to getting the goods to the desired location, is measured by assessing logistics costs and flexibility. Evaluating logistics costs and flexibility of each configuration individually is interesting, but even more interesting is it to compare the performance measures across configurations. By comparison, an indication of pros and cons are identified.

5 Research methodology

In this chapter we will elaborate for our choices related to research strategy and design. We will also explain in detail how we have collected both our primary- and secondary data, and further elaborate for how this data was analyzed. The validity and reliability of our study will be discussed in the last subchapter.

5.1 Research strategy

Bryman and Bell (2011, 26), defines *research strategy* as "(...) a general orientation to the conduct of business research". The essence in selecting a research strategy is to decide which method to use when collecting and analyzing data. Bryman and Bell (2011) distinguish between two superior methods; qualitative and quantitative. The distinction is quite extreme, and it is often difficult to use one and completely excluding the other, a combination is often the appropriate practical solution. Thus, in our thesis we selected a combination of qualitative and quantitative methods. Grønmo (1983), cited in Gripsrud, Silkoset, and Olsson (2004), argues that the two methods are complementary.

5.1.1 Qualitative method

The first part of our research question address how shopping malls in Norway are facilitated in relation to handling container deliveries. We are aware that there exist a wide range of container types, so in order to limit the scope of this study we have decided to investigate how shopping malls in Norway are facilitated for handling delivery of 20 feet[1] containers. In order to answer this question we used a qualitative method which is appropriate when researchers are going out in the field making their own observations (Bryman and Bell 2011). We visited our designated shopping malls where we observed how deliveries were conducted. These observations could be explained exclusively by an external part, but we evaluated that it was important for us to make these observations ourselves in order to understand the full scope of a delivery. With the purpose of ensuring the

[1] Feet is denoted by (') in the rest of this paper. Example: 20 feet container = 20' container

quality of our observations, we also obtained information of how a delivery is conducted by interviewing representatives of the two designated shopping malls. Interviews are one of the most common methods to use when collecting qualitative data (Bryman and Bell 2011). Additionally, we took measures of the receiving areas at these malls with the purpose of investigating whether these receiving areas were facilitated for delivery of a 20' container.

In order to evaluate the performance measure flexibility, we applied theoretical concepts. Performance in supply chain management has been extensively covered in previous research. Findings in these studies were applied when evaluating this measure.

5.1.2 Quantitative method

The second part of our research question stresses how a direct delivery of a 20' container to shopping malls in Norway affects the performance measures logistics costs and flexibility. According to Bryman and Bell (2011), quantitative research differs from qualitative research through systematic empirical investigation of social life by using statistical or mathematical techniques. Calculating logistics costs in our study involve collection of numerical- and statistical input data and combining these data using Excel to derive outputs. We are aware that other software could have been used for the same calculations, but we chose to use Excel because of former experience with this software. Thus, time spent on learning new software was avoided.

5.2 Research design

Bryman and Bell (2011, 40), state that "*a research design provides a framework for the collection and analysis of data*". Further they presented five different types of research designs, where the alternative corresponding to our research is the case study design. According to Bryman and Bell (2011, 60); *"What distinguishes the case study from other research designs is the focus on a bounded situation or system, an entity with a purpose and functioning parts"*. In our research we were looking at a bounded situation (shopping malls) and we had an entity with a purpose (deliveries of 20' containers). Additionally, our study was a fairly new

phenomenon. Container deliveries to shopping malls are not widely covered in literature. Hence, an in-depth investigation was necessary in order to get the desired information for answering our research question. For situations where an extensive and in-debt exploration is needed when answering the established questions, case studies are appropriate (Yin 2014).

In our research we wanted to examine whether it was possible to utilize configuration 3 in Bygballe, Bø, and Grønland (2012) for deliveries to shopping malls in Norway. Additionally, we wanted to explore what delivery systems that currently are used by the retail companies, and categorize the system into one of the four configurations presented by the same authors. Thus, we were able to identify performance differences by comparing the current situation to our suggested solution (configuration 3).

5.2.1 The importance of investigating more than one shopping mall

Our objective for this research is to examine the possibility of delivering 20' containers at shopping malls in Norway. Based on our objective we decided to examine more than one site since shopping malls and their receiving areas are designed differently. In fact differences in the design of receiving areas were identified through the research of Bjørnland, Bjerkelund, and Granquist (2001). Thus, the more shopping malls we mapped the more general our findings would be in terms of all shopping malls in Norway. Exploring a large number of shopping malls in Norway would unquestionably been the best solution due to generalizability, but the time aspect for this research limited how extensive our research could be. Hence, we had to take this into consideration when deciding upon how many malls we were going to include in our thesis.

With basis in the amount of time we had to conduct this study, we chose to investigate two shopping malls. Therefore our research design developed to be a multiple case study, since each mall represents one case. According to Yin (2014), a multiple case study is when you have two or more cases included in the study. Further, Yin (2014) argue that single case designs are vulnerable because all eggs are put into one basket, while the chance of doing a good case study will be better

when using a multiple case design. Thus, we are confident that our decision of examine more than one shopping mall is appropriate for our research.

5.2.2 The selected cases

Our two shopping malls selected for assessing the variable "Accessibility at place of delivery" were AMFI Moss and Strømmen Storsenter. We chose these malls because they are different in size and resources. In size these malls are different in the sense of number of tenants. At AMFI Moss there are 78 stores while there are 203 stores at Strømmen Storsenter. Resources are different in the sense of how the receiving areas are operated. At Strømmen Storsenter the main receiving area is manned and operated by an external provider, while the main receiving area at AMFI Moss is unmanned. We considered that it would be exiting to identify whether a manned receiving area would be more suited for deliveries of 20' containers compared to an unmanned. Thus, our two selected shopping malls were different which gave us a more in-debt understanding regarding the possibility of container deliveries.

5.2.3 The selected retail companies

One important aspect when considering the possibility of delivering a 20' container to a shopping mall is the accessibility at the receiving area. Another relevant aspect is whether the goods owners (i.e. retailers) are willing and suited to cooperate within distribution of goods. Hence, in addition to the selection of shopping malls, we had to select which retail companies to use when investigating the variables "Suppliers' geographical location" and "Horizontal cooperation". This selection was made on basis of retail companies that were represented at both of our chosen shopping malls, AMFI Moss and Strømmen Storsenter. Both these shopping malls had an alphabetical list of the stores located at the respective malls. In order to get an overview of the stores they had in common, we went through the alphabetical lists and wrote down the stores that were represented at both malls. Our selected retail companies are presented in Table 5.1. The four selected retail companies are among the largest actors in the retail business in Norway. Therefore we are certain that our selected companies will provide us with data that is reliable for the industry as a whole.

Owner	Varner Group	Hennes & Mauritz	KappAhl	Lindex
Store	Bik Bok Carlings Dressmann Urban Vivikes Cubus	H&M	KappAhl	Lindex

Table 5.1 - An overview of the selected retail companies

5.3 Data collection

Bryman and Bell (2011) present the main aspects of data collection, and divides it into two groups: primary and secondary data. Secondary data is the information and documents the researcher collects from external sources (Bryman and Bell 2011). It consists of articles, previous research on the field or topic and relevant data that can contribute to assure the quality and relevance of the forthcoming study. Primary data is the data the researcher collects himself as part of his study. The process of gathering primary data is often time-consuming, and the decisions on where to acquire it are critical for the quality of the research (Gripsrud, Silkoset, and Olsson 2004). Our purpose when collecting primary data was to get first-hand information on the topic directly from the chosen actors. Typical qualitative methods for gathering primary data are participant observations and open-ended interviews, while document analysis is a common method for acquiring primary data in quantitative studies (Gripsrud, Silkoset, and Olsson 2004). We mainly used qualitative methods when gathering data, but quantitative methods were also applied. Through observations and semi-structured interviews, we got an insight on how the delivery of goods is carried out when delivered to shopping malls in Norway. Further, we used secondary data as supplement in order to get a deeper understanding and insight of the import process. We also needed to examine whether there exist willingness for cooperation among retail companies that are tenants at shopping malls in Norway. This information was collected through an email-interview and through information collected at the web sites of our selected retail companies.

We structured the data collection in accordance with our developed research

model. The variables "Accessibility at place of delivery" and "Horizontal cooperation" are collected and treated as primary data, while "Shipment configuration" and "Suppliers' geographical location" are presented as secondary data. Further, necessary data collected for measuring the variables "Logistics costs" and "Flexibility" are also presented as secondary data.

In addition to data directly connected to our variables, we had to obtain other supplementary data. These data are treated as secondary and they are presented under the heading "Supplementary data". The collection process resulted in a better understanding as well as knowledge of our developed variables in relation to shopping malls.

5.3.1 Secondary data

5.3.1.1 Suppliers' geographical location

Common knowledge in the retail and clothing business is that companies outsource their production to low-cost countries in Asia. With the purpose of identifying whether the suppliers of our selected retail companies were located in the same areas, we started searching for this information through the internet. We used google search in order to gather the desired information. Combining search words like "a specific retail company" and "supplier list" (i.e. Lindex + supplier list) led to a grate number of relevant hits. We observed that the frame "supplier list" was often called "factory list" by the retail companies, and therefore we used both these alternatives in combination with the specific retail company. Surprisingly for us, we got a lot of relevant hits on this search. Public access to supplier lists is a relatively new phenomenon. Through our general search we identified that the first supplier lists were made public in March 2013 by the big Norwegian retail companies, after pressure from customers and different organizations like "Fremtiden i våre hender". Most of the companies had a link on their web-page where it was easy to download their supplier list.

The supplier lists of Varner Group, Hennes & Mauritz and Lindex were downloaded directly from their homepages, while we had to contact KappAhl by mail. Their supplier list should be available on their homepage, but there was something wrong with the download link. After we confronted them, the access was established again within 24 hours, and we downloaded the list. Further we

started looking into the four different supplier lists in order to detect whether or not suppliers in the retail business are located in the same areas. Even though all of the lists sorted the suppliers under country as the main category, the different supplier lists had different designs. Varner Group had further categorized their suppliers into provinces, while the other three companies only listed the name and address of their different suppliers. We decided to follow the structure presented by the Varner Group. Hence, we manually categorized the Chinese suppliers of Hennes & Mauritz, Lindex and KappAhl into provinces as well. We found the location of the suppliers by using Google maps. We looked at each of the Chinese addresses and typed the name of the city where the factory was located in the search field in Google Maps. The method was time consuming but gave us the possibility to place all the Chinese suppliers relative to provinces. We were interested in finding out whether the main locations were in the same provinces as was the case for the Varner Group.

The main purpose of the data collection related to this variable was to get an indication of where the suppliers were located. We decided that this variable was adequately covered when we had an overview of the location of the suppliers in relation to country and Chinese provinces.

5.3.1.2 Shipment configuration

In order to identify what shipment configuration that is applied by retail companies today, we contacted the forwarding company Kuehne + Nagel which we knew performed logistics solutions for the retail industry in Norway. Without any complications, Kuehne + Nagel emailed us two documents describing the import process conducted on behalf of one of their retail customer. These documents were called standard operating procedures (SOP) and they were made for the purpose of explaining the operational process when importing goods for the specific retailer in detail. If, for instance, the employee at Kuehne + Nagel who were responsible for the given retail customer was away from work, anyone of his/her colleagues should be able to know exactly what to do by reading the SOP. Hence, the two SOP's were extremely detailed, and gave us a clear picture of the process when importing retail goods. The first document explained the process from placing an order at the supplier in Asia until the goods arrived at the port in Norway, while the second document explained the internal distribution

route in Norway. Hence, by combining these documents we were able to identify the applied shipment configuration of this company.

Both of the provided documents contained sensitive information which will not be illuminated in our thesis due to confidentiality. We only used these documents to get a general picture of how the imports and local distribution of retail goods are conducted. Therefore, the exact retail company related to these SOP's is not mentioned either.

We are aware that different retail companies may use different shipment configurations. Even though our collected data only explain the configuration of one single retail company, we are confident that this information gives us a reliable picture of what shipment configuration that are used by retail companies in Norway. According to Kuehne + Nagel, this configuration is commonly used by other retail companies in Norway as well as the one related to these SOP's.

In addition to understand what shipment configuration that is commonly applied by retail companies, we had to collect information of where the central warehouses of our selected retail companies were located. When we knew where the different warehouses were located, we used Google Maps as a tool for measuring the distribution distance when goods were transported from the warehouses to AMFI Moss and Strømmen Storsenter respectively. This information was important to possess in order to calculate the local distribution costs of the different retail companies when goods are delivered to our selected shopping malls by the current configuration. Other relevant distances were also collected by using Google Maps.

5.3.1.3 Logistics costs

The costs related to the deliveries to shopping malls are dependent on several aspects. It is difficult to estimate exact figures, as factors influencing these costs are fluctuating on a daily basis. We decided to base our calculations upon the numbers presented in Grønland (2011). This report and its cost figures were developed in order to be used as inputs in the logistic model in the Norwegian National Transport Plan 2014-2023 (Grønland 2011). The cost figures have been based on numbers from 2010. With basis in a statistic from "Statistics Norway"

(SSB 2014), we notice that the price trend for goods transport on road have increased with approximately 15% from 1st quarter 2010 to 1st quarter 2014 (Appendix 5.4) Therefore we adjusted for this in our calculations (Appendices 5.5-5.10)

Grønland (2011) present an equation for calculating the costs for a trip from A to B with X tons of goods which constitutes Y consignments. The equation is as follows:

*"(Loading costs per ton * X) + (Loading costs per consignment * Y) + (Distance costs per km * (Distance A-B)) + (Time costs per hour * ((Distance A-B)/(Speed for driving A-B)) + (Unloading costs per ton * X) + (Unloading costs per consignment * Y)"*

Grønland (2011, 9)

Equation 5.1 - Formula for estimating transportation costs

The parameters in the equation are described in the report. The report presented by Grønland (2011) is extensive, and we had to make some assumptions and adjustments when estimating the transportation costs. When it comes to costs related to loading and unloading the pallets we decided to make new variables with basis in our observations from the visits to Moss and Strømmen. Instead of using the "Loading costs per ton*X" parameter from Grønland (2011), we decided to implement our own observations in the variables for loading and unloading of goods. Hence, we used observed time spent on loading/unloading pallets rather than using the Grønland (2011) estimate which is using the weight of the pallet for estimating the loading/unloading costs. These new variables are named "Loading cost" and "Unloading cost". We have also added an estimate for the handling costs at the central warehouses. When it comes to the vehicles and their capacity (Appendix 5.5), we have interpreted "Heavy distribution, containers" to be the trucks carrying containers from the harbor to the warehouses, and that "Heavy distribution, closed unit" are the trucks transporting from the warehouses to the shopping malls. The calculations were conducted in Excel, and the formulas and figures are attached (Appendices 5.5-5.11). In Table 5.2 we present how we interpreted and modified these numbers before using them in our calculations:

1	***X***	Total tonnage. The report used an estimate of 600 kg per pallet. As we did not have any better estimate, we decided to use the same weight. As the capacity of the two vehicle types are 12 and 9 tons respectively, we estimated with 11 Euro pallets in the container (maximum in a 20' container) and 15 Euro pallets in the lorry.
2	***Y***	number of consignments. It is described in Grønland (2011, 13). The number is estimated as the mobilizing costs per consignment. We have set this to 1 for each time the truck arrives to a loading/unloading facility.
3	***Loading costs***	Estimated by using numbers obtain from own observations related to delivery time from receiving area to store inside the mall. These numbers have been calculated with the time cost per hour presented in Grønland (2011), (Appendix 5.8)
4	***Loading cost per consignment***	Obtained directly from the report, adjusted by the price trend in Norwegian road freight transport. (Appendix 5.9). The cost is the sum of estimated mobilization costs (Grønland 2011).
5	***Handling cost at central warehouse***	The variable has been developed in order to include the extra cost of building a pallet with goods at the central warehouses. The cost is solely the costs of the employee and does not include capital costs or warehouse related fixed costs. The purpose is to indicate the extra cost of going via the central warehouse. However, as there has been a lack of data for this variable, some assumptions had to be made. The calculations and assumptions for this variable can be found in Appendix 5.10
6	***Distance A-B***	The distance for the selected route. The distances were found using Google Maps. (Appendix 5.6)
7	***Distance cost per km***	Obtained directly from the report, adjusted by the price trend in Norwegian road freight transport (Appendix 5.7). Includes maintenance, fuel, wash, consumables and tires.
8	***Speed for driving A-B***	The estimated timescales suggested by Google Maps was used. From this we used the distances and timescales in order to calculate the average speed. This is a variable however, which does not take into account traffic and queues. As the maximum allowed speed for heavy distribution vehicles is 80 km/h (Lovdata 1986, § 13.4), we adjusted the numbers which exceeded this. An if-formula was used in Excel where the routes with estimated average speed exceeding 80 km/h were set to 75 km/h.
9	***Time costs per hour***	Obtained directly from the report, adjusted by the price trend in Norwegian road freight transport (Appendix 5.8). In order to estimate the yearly time costs to capital, taxes, insurances and administration, Grønland (2011) has used numbers based on historical data for the different vehicle types. The annual time cost has then been divided by the number of hours the vehicle has been used throughout the year.
10	***Unloading costs***	In the same manner as for the loading costs, we chose to make this as a time-dependent variable instead of using the variable based on the weight of the pallets. The definition of unloading here are dependent on the destination where the unloading takes place. The unloading at the warehouses is assumed to be the most efficient. The time spent on unloading at Strømmen Storsenter is based on our own observations. We have assumed that the goods are delivered to, and placed in, the centralized reception area managed by ColliCare. The number for AMFI Moss is higher as we here use the numbers observed for pallets delivered to the stores at the shopping centers.
11	***Unloading costs per consignment***	Same as: 4. Loading costs per consignment. For the container deliveries we have added an additional third cost as the containers are assumed to be brought back to the harbor after delivery.
12	***Total costs***	The sum of the calculated costs for each route.
13	***Cost per pallet***	The sum of the calculated costs divided by the number of pallets delivered by the vehicle.

Table 5.2 - Description of cost parameters

It is important to notice that these estimates do not include the costs for ColliCares' services at Strømmen Storsenter. Hence, the total cost aspect fails to give a complete picture. The comparison is therefore not directly valid, but serves as an indication of the cost-effect of the different transportation alternatives.

5.3.1.4 Flexibility

We did not have the capacity to do an experiment in order to identify the flexibility of the different shipment configurations, which would have been preferable. Thus, we decided to use previous research as a basis for evaluating this variable.

5.3.1.5 Supplementary data

The measures related to a container were important for us in relation to the "Accessibility at place of delivery" variable in our research model, but also in order to evaluate the amount of goods that could be loaded. A mail was sent to Kuehne + Nagel, where we questioned the dimensions of a 20' container. They provided us with a pdf-document that contained the questioned dimensions. The only thing missing in the pdf-document was the number of EUR-pallets that a 20' container could load. A search was made in Google where we found the dimension of a EUR-pallet, how many EUR-pallets that could be loaded into a 20' container, and how many EUR-pallets that could be loaded into a standard lorry/truck.

In order for us to evaluate whether it is possible to deliver goods at our selected shopping malls directly from a 20' container, we had to know the minimum and maximum unloading height of a container placed upon chassis[2] as well as the length of the truck. We contacted the company Bring by mail, and the mail was properly answered a couple of days after we sent our request. Adding the measures to the container size gave us the full measures of a container placed upon a chassis.

[2] Chassis is the underpart/frame of trucks where a container is placed upon when transported.

5.3.2 Primary data

5.3.2.1 Accessibility at place of delivery

This variable was covered through observations and interviews at Case Moss and Case Strømmen. In this subchapter we will present how the data was collected by describing each case individually.

Case Strømmen

When we arrived at Strømmen Storsenter, we were met by two representatives from ColliCare (responsible for the manned receiving area solution) and the operational manager of the mall. We started by presenting our project for all of them, and the conversation floated into a long discussion of logistical challenges with a manned receiving area, but also current and future challenges regarding deliveries to shopping malls in general. After this conversation, the operational manager went for another meeting while the two representatives of ColliCare showed us around the receiving area and explained how they operated it. This information was valuable for us in order to have solid foundation when comparing Case Strømmen and Case Moss. Notes were continuously written down so that we were able to retell our findings.

After the guided tour at the receiving area, we went to a café inside the shopping mall after recommendation from the representatives at ColliCare. We told them that we would like to see how a regular delivery was conducted internally at the mall. They recommended us to sit down at the café and observe since the café was located at the center of the internal distribution route at the mall. We sat there and observed until we had collected the desired information.

Further, we went back to the receiving area to measure its physical dimensions. As a basis for which measures to make, we used the standard provided in LUKS (2011b) which is discussed previously in this paper. The different measure points are visualized in Figure 5.1.

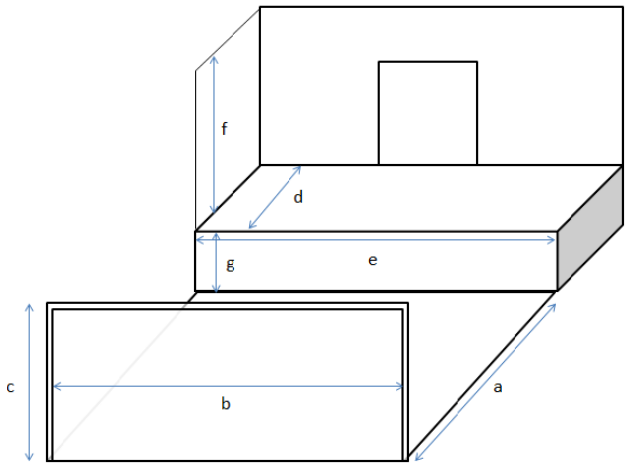

Figure 5.1 - The different measures conducted at the receiving areas

We measured the height (c) and width (b) of the entry gate as well as height (g) and width (e) of the ramp. Further we measured the height from the top of the ramp to the ceiling (f), and the depth of the ramp (d). Lastly, the length of the parking stand was measured: from the ramp to the entry gate (a).

Our presence at the receiving area helped us get in touch with actors in addition to the one working physically at the mall. These actors were different truck drivers, from different transport companies, that delivered goods at the mall. Based on the feedback we got from the drivers and the employees at the mall, we had to perform measurements that we found important. Hence, we had to be flexible in relation to the provided information we got. One of these measurements was the average time it took for transporters to deliver a pallet of goods directly to a store inside the mall, and compare this to the time it took delivering a pallet to the InStore warehouse that was operated by ColliCare. We started the clock at the time the transporter opened the hatch, and stopped it when the deliveries were finished and the hatch was closed. The time spent on the process was divided by number of pallets delivered in order to get an average estimate. This formula is illustrated in Equation 5.2.

$$\frac{\text{Total time spent on the delivery}}{\text{Number of pallets delivered}} = \text{Average delivery time per pallet}$$

Equation 5.2 - Average delivery time per pallet

After we had gathered the desired information through observations, we got in

touch with the operational manager in order to conduct the interview. The interview had been planned in advance of our visit, and our questions had been sent to the operational manager so he could prepare the answers. In addition we had assured that the interview could be recorded by the single purpose of making the answers easily accessible for us when working with the data. Because he had a lot to do, he asked us if he could give us a complementary answer to our questions (Appendix 5.1) by email, instead of doing the interview. This was not a problem for us, so we accepted his request. Shortly after the visit, we received a thoroughly written email from the operational manager where the questions were properly answered.

Case Moss

Before our arrival at AMFI Moss, we emailed the interview guide (Appendix 5.2) to the mall-director in order for him to prepare the answers. Also, we notified him that we would like to record the interview with a voice recorder. In this way we would have access to the interview when we started to work with the data.

When we arrived at AMFI Moss, we were met by the mall-director and the operational manager. They immediately started a guided tour to the different receiving areas that were located at the shopping mall, where they explained what kind of goods that were delivered to each area. Some general information connected to the mall was also presented through an open discussion at the guided tour. After the presentation of the final receiving area, the mall-director brought a printed version of our interview guide (Appendix 5.2), and started answering it question by question. This happened so quickly that we had no chance recording it, nor taking notes. Therefore we had to really focus on understanding as well as memorizing their answers. Some of the answers were written down on the printed sheet by the mall-director, which we got to keep after the conversation. When all of the questions in the interview guide were answered, the mall-director and operations manager had to rush to another meeting. Before they left us, we asked them for permission to measure the different receiving areas. This was accepted without any complications.

The different measures conducted at the receiving areas at AMFI Moss, were equal to the measures we made in the Strømmen Case (See Figure 5.1). After the

measurements were completed, we wrote down the answers that the mall-director had given. This had to be done quickly after the interview session, in order to retell the answers as precisely as possible (Yin 2014).

Further, we observed how the goods were distributed internally at the shopping mall. When a truck arrived at the main receiving area for unloading, we followed the driver through the internal distribution route up to the store that should have the goods. Additionally, we calculated the time spent on each delivery. This was done in the same manner as at Case Strømmen. We started the clock at the time the transporter opened the hatch, and stopped it when the deliveries were finished and the hatch was closed. For calculating the average time spent per pallet, we used the formula presented in Equation 5.2. Notes were continuously written down in order to access our findings when working with the data.

5.3.2.2 Horizontal cooperation

This variable was covered by both primary- and secondary sources. Our primary source was the Varner Group, which we contacted by mail. In the mail we inquired if they could answer our questions which are found in Appendix 5.3. These questions were adequately answered and gave us an understanding of how a retail company assesses horizontal cooperation. The rest of the collected data in relation to this variable are covered through secondary sources like web-sites and reports.

5.4 Data analysis

How data are analyzed in case studies has many different forms. While other research methods has clear guidelines in respect of how the data should be analyzed, case studies do not have any cookbook recipe for analyzing data (Yin 2014). In case studies, researchers have to analyze their data in a reasonable way that supports the objective of their research (Yin 2014). Thus, we had to analyze our data in a way that we believe suit our purpose. We decided to analyze each case individually before making a cross-case analysis of our findings. Even though there are no clear patterns of how such an analysis should be conducted, Yin (2014) present five different techniques which can be applied. The technique which best suits our objective is the *cross-case synthesis* technique. According to

Yin (2014), this technique suits studies where multiple cases are addressed. Hence, this technique suited our study.

The cross-case synthesis technique proposes that researchers first analyze each individual case before comparing the cases together. By doing this we were able to identify the findings at each shopping mall individually before comparing them. Comparing the findings at the different shopping malls lead to a higher possibility for generalizing our findings (Yin 2014).

In the following subchapters we will go through each variable presented in our research model, and describe how these variables are analyzed.

5.4.1 Suppliers' geographical location

When analyzing whether the suppliers of the different retail companies were located in the same areas, we compared our developed overviews to both country and provinces in China. If our analysis identified that the suppliers were located in the same areas, this variable were given the score "high". Oppositely, if our analysis proved that the suppliers were located in different areas, we gave the score "low".

5.4.2 Horizontal cooperation

We analyzed this variable by comparing the cooperative willingness of the different retail companies. If our analysis indicated that the retail companies showed willingness to cooperate across supply chains, this variable were given the score "willing", while we gave the score "unwilling" if our analysis revealed that the willingness for cooperation were absent.

5.4.3 Accessibility at place of delivery

This variable was analyzed by comparing our own measures of the receiving areas at AMFI Moss and Strømmen Storsenter to the standard measures provided in the report of LUKS (2011b). This report was developed with the purpose of setting an optimal standard of how receiving areas should be designed. Thus, if the measures of the receiving areas at AMFI Moss and Strømmen Storsenter were in line with

the standard measures presented by LUKS (2011b), we evaluated the general accessibility at these malls as "high". In addition we had to analyze the possibility of deliver a container at the receiving areas. Thus, we compared the physical measures at the receiving areas to the measures that Bring presented as necessary if a container should be delivered (both when a container were delivered upon chassis and when a container were placed at ground floor). The final aspect we analyzed was the importance of having a manned versus an unmanned receiving area when considering container deliveries.

First, we analyzed each shopping mall individually. If our analysis revealed that at least one of the receiving areas at the analyzed mall were facilitated for accepting a 20' container, we gave this shopping mall the score "high". If none of the receiving areas at each individual mall were facilitated in a way that made a container delivery possible, then we gave the score "low". In addition to these extremes ("high" & "low") we considered the accessibility somewhere in between if certain conditions made a container delivery inappropriate, even though it was possible in practice.

When the facilities at both our selected shopping malls were analyzed, we compared the results in order to draw a general conclusion.

5.4.4 Shipment configuration

We analyzed what operational steps goods had to go through before being ready for sale at the outlet stores located at shopping malls. We compared these steps with the shipment configurations presented in Bygballe, Bø, and Grønland (2012) in order to detect which of the shipment configurations that corresponded to the current situation. In addition we analyzed what operational steps garments had to go through if the retail companies used the best option (configuration 3) presented by Bygballe, Bø, and Grønland (2012) instead of the current configuration. Finally, we compared the current applied shipment configurations with configuration 3 in order to detect the differences between them.

5.4.5 Logistics costs

This variable was analyzed based on our calculations. The intention of our calculations was to get an indication of potential cost savings and a comparative basis for looking at the difference between the configurations. A complete cost analysis of the supply chains was considered too extensive for this study. Hence, we decided to focus on the costs that incurred in Norway. We compared the local distribution cost per pallet for each of the retail stores when using the current configuration with the cost per pallet related to shipment configuration 3. This comparison indicated whether or not each retail company could reduce their costs by using configuration 3 instead of the current configuration.

5.4.6 Flexibility

This performance variable was analyzed by comparing the current shipment configuration to shipment configuration 3. As presented in the literature review, flexibility differences in delivery systems have been widely discussed by researchers within the field of supply chain. Theoretical findings were applied in order to identify the weaknesses and advantages of the considered configurations in relation to flexibility.

5.5 Quality of the research

In order for our study to be credible and in a state of objectivity, the reliability and validity of the research is important. According to Bryman and Bell (2011, 41) "v*alidity is about whether the study is able to measure what is supposed to be measured, and reliability is about the trustworthiness of the study"*. In the next two subchapters we will evaluate these two criteria in more detail.

5.5.1 Reliability

Bryman and Bell (2011, 41) state that "r*eliability is concerned with the question of whether the results of a study is repeatable*". If a research is done once, the same results should be received if the exact same research is conducted a second time. In our study, reliability concerns whether our methods of collecting data are done in a trustworthy manner. Consistency is a keyword when talking about reliability of our study. In particular, reliability is concerned in quantitative

research when the researcher needs to know whether a measure is stable or not (Bryman and Bell 2011). In qualitative research LeCompte and Goetz (1982) cited in Bryman and Bell (2011) distinguish between two types of reliability: external and internal. External reliability relates to whether or not the study can be replicated (Bryman and Bell 2011). This is difficult in the qualitative part of our research since it is impossible to "freeze" a social setting and the circumstances related to it. The empirical approach of our study was new, thus we had to collect data by observations and through interviews. Even though we had developed certain guidelines through our interview guides, the participants were able to freely elaborate for their viewpoints of the different questions. When two or more researchers, Bryman and Bell (2011) explain internal validity by whether or not the researchers agree upon what they see and hear. This aspect has been important in this research since there have been two researchers. If our observations had been conflicting, the quality and reliability of the research would be weakened. We have dealt with this problem by making sure that both of us have been included in every part of the data collection and other processes. When we conducted observations, both of us were present. Additionally, the interpretation of the written email interviews was made by both of the researchers. Thus, we continuously discussed both the answers and observations in order obtain the same understanding. Further, we made sure that all the interviewers understood the purpose of the research. If not, our collected information could be irrelevant and not reliable.

According to Saunders, Lewis, and Thornhill (2009) there are four threats related to reliability. These threats are participant error, participant bias, observer error, and observer bias. Participant error can occur when external factors affect the participant's answer. Participant bias is related to the fact that interviewees might answer in the way their boss wants them to answer. It is related to holding back information and not answering the questions completely. In our study we have mainly interviewed managers, which cope with the problem related to interviewees answering on behalf of their boss. On the other hand, we are not able to correct for these interviewees holding back information. Hopefully, sending the interview guide to the participants in advance has coped with the problem of them not answering the questions properly. At least they should not be surprised with the different questions asked.

The last two errors, observation error and observation bias, is related to the fact that different observers may interpret replies from the interviewees or observations differently. According to Saunders, Lewis, and Thornhill (2009) the observers can perceive the answers in many ways or misunderstand them, which leads to observer bias. In order to reduce these errors, we had to be aware of these threats and take actions to reduce them. Hence, we were continuously discussing the different observations and answers.

5.5.2 Validity

Validity refers to whether we are measuring, observing or identifying what we actually say we are (Bryman and Bell 2011). Just like reliability in qualitative research, Bryman and Bell (2011) divide into external and internal validity. Internal validity relates to *"(...) whether or not there is a good match between researchers' observations and the theoretical ideas they develop"* (Bryman and Bell 2011, 395). We do believe that this thesis satisfies the internal validity. Throughout the whole process, what to be measured has been thoroughly linked up to the research question and the theoretical concepts related to this.

Further, (Bryman and Bell (2011)) state that external validity parallels with transferability, related to qualitative research. They argue that transferability often is used instead of external validity in such studies. Transferability asks the question; to what extent do the findings apply to other contexts? As we are looking at shopping malls, each case is unique regarding their location, design, and mix of stores. Thus, the direct transferability might arguably be weak. However, we believe that our findings could be of interest and can partly be used in other contexts. An example could be when looking at other locations than shopping malls which have the accessibility of receiving 20' containers. If direct container delivery to shopping malls proves to be cost efficient, such a shipment configuration should be cost efficient in other contexts as well. This is in line with the findings of Bygballe, Bø, and Grønland (2012). Our findings might also be interesting for business sectors other than the retailer segment, since characteristics or concepts will apply for other industries as well. By only examining this shipment configuration in relation to the retail companies at shopping malls in Norway, we exclude many shops and businesses that could

have contributed to a cooperative freight structure to the same malls. Hence, the potential for expanding the number of participating actors might be present.

6 Presenting data

In this chapter we will present the data found through our data collection process. We have structured this chapter by going through the findings corresponding to each individual variable in our research model. First we will go through the data connected to "Suppliers' geographical location" before moving on with the variables in the following order; "Horizontal cooperation", "Accessibility at place of delivery", "Shipment configuration", "Logistics costs". In addition we present the findings of supplementary data.

Since the variable "Flexibility" is analyzed on the basis of theory, there will not be presented data findings related to this variable in this chapter. The findings have already been made through the literature review.

6.1 Suppliers' geographical location

In 2012, the total value of clothes and clothing accessories imported to Norway was 15 528 million NOK (VIRKE 2013). The largest proportion of garments sold in Norwegian retail stores are bought from Asia. VIRKE (2013) estimate this share to be 80% for 2012. From this share, approximately 70% of the garments are bought from China. Many of the big actors in the Norwegian clothing industry are represented at a large portion of the shopping malls in the country. Stores like Cubus, H&M, Dressmann, KappAhl, Lindex and Carlings are typically represented at shopping malls of a certain size.

In the following subchapters 6.1.1 - 6.1.4 we will present the supplier lists of our selected retail companies; Varner Group, H&M, KappAhl and Lindex.

6.1.1 Varner Group

The Varner Group has a total of 477 different factories named in their published factory list (Varner 2013). Looking more detailed at the list we see that out of a total of 477 factories, 232 are located in China, 100 are located in Turkey, 34 in India and 29 in Bangladesh (Table 6.1). China has the biggest proportion of the

facilities from where the Varner Group has their products manufactured. Looking more detailed into the Chinese suppliers, 75% of the factories with address in China are located in the provinces Jiangsu, Zhejiang and Guangdong at the East coast of the country (Table 6.2).

China	232
Turkey	100
India	34
Bangladesh	29
Republic of Korea	8
Others	74

Table 6.1 - Location of Varner suppliers

China:	232
- Jiangsu	38
- Zhejiang	88
- Guangdong	48
- Total	174
- in %	75 %

Table 6.2 - Number of Varner suppliers in selected provinces

6.1.2 Hennes & Mauritz

The supplier factory list from Hennes & Mauritz categorizes the factories as either manufacturing or processing factories. We have only considered the "Manufacturing factories" as Hennes & Mauritz states in their supplier list that these normally are the factories where the final manufacturing takes place (H&M 2013). As of April 2014, there are a total of 1564 factories listed and classified as manufacturing factories in H&M's supplier factory list. The majority of the factories are in Eastern Asia, China being the country with most factories producing for Hennes & Mauritz. Of the total 1564 factories, 431 are located in China. Turkey (233), Bangladesh (230) and India (147) are the other countries with more than 100 factories listed (Table 6.4).

From the total 431 suppliers in China, 229 are located in the provinces Jiangsu (80), Zhejian (79) and Guangdong (70) (Table 6.3).

China	431
Turkey	233
Bangladesh	230
India	147
Indonesia	88
Cambodia	59
Pakistan	57
Italy	53
Others	266
Total	**1 564**

Table 6.4 - Location of H&M

China:	431
- Jiangsu	80
- Zhejian	79
- Guangdong	70
- Total	229
- in %	53 %

Table 6.3 - Number of H&M suppliers in selected provinces

6.1.3 KappAhl

KappAhls supplier list shows the production units they purchase their products from (KappAhl 2014b). The list consists of 213 units from 10 different countries. Most of the production takes place in Asia, with China by far being the country with most production units. There are 138 locations in China. Further on is Bangladesh with 25, followed by India (19) and Turkey (15) (Table 6.5).
The production units in China are quite spread along the Eastern coast of the country, but 73 of the total 138 units in China are located in the three provinces Jiangsu (18), Zhejian (34) and Guangdong (21) (Table 6.6).

China	138
Bangladesh	25
India	19
Turkey	15
Others	16
Total	213

Table 6.5 - Location of KappAhl suppliers

China:	138
- Jiangsu	18
- Zhejian	34
- Guangdong	21
Total	73
in %	53 %

Table 6.6 - Number of KappAhl suppliers in selected provinces

6.1.4 Lindex

The factory list from Lindex has 226 factories in 11 different countries listed (Lindex 2013). China has the majority of the locations with 122 of the 226, followed by Bangladesh (32), Turkey (29) and India (17) (Table 6.7).
The three provinces, Jiangsu (28), Guangdong (14) and Zhejian (40), account for 82 of the 122 factories in China (Table 6.8).

China	122
Bangladesh	32
Turkey	29
India	17
Others	26
Total	226

Table 6.7 - Location of Lindex suppliers

China:	122
- Jiangsu	28
- Guangdong	14
- Zhejian	40
Total	82
in %	67 %

Table 6.8 - Number of Lindex suppliers in selected provinces

6.2 Horizontal Cooperation

All of Varner's imported goods are distributed through a central warehouse in Norway. Goods which are new to their assortment are also distributed through their central warehouse, where they are cross docked. By cross docking in this manner, the goods of Varner are unloaded from the container at their central warehouse before they are loaded into a truck which transports the goods more or less directly to the stores. Varner do not cooperate directly with other retail companies among their import and distribution of goods as it is today, but they are not against such cooperation. Their answer to the question of whether they could be willing to cooperate with a competing retail company was:

"We have nothing against cooperation with competitors, but it should then be made by a single forwarder. This is done to some extent already, indirectly."

Further, on the question of whether a solution where a container is directly delivered to a shopping mall in Norway would be an interesting solution for them, the representative of Varner answered "no". The reasoning for this is as follows:

"Poor fill rate[3] of the container with small deliveries to many stores - which is expensive. This gives us a lower flexibility in controlling the flow of goods, since we have to decide much earlier - the requirement of the business control. Direct deliveries will probably mean more deliveries to our stores - which are expensive and laborious."

Finally, the answer to our question regarding whether it could be applicable, if profitable, to cooperate with competing- or non-competing companies in order to enable direct deliveries to shopping malls in Norway, was:

"I think that it's not about competition but about cost, flexibility, and what the needs for your business really are."

[3] Fill rate is the amount of utilized capacity. If a container holds a capacity of 100 items and only 65 items are loaded, the fill rate is 65%.

Another company that has commented on the subject of horizontal cooperation is KappAhl. Their web site is characterized by a strong focus on environmental friendly initiatives, where cooperation with other companies is among the alternatives. According to KappAhl (2014a):

"Combined loading and efficient planning of routes are also an important part of the work to ensure that environmental impact is kept as low as possible. KappAhl is in continuous discussions with the hauliers we employ, for instance, on new fuels and engines, the possibilities for combined loading with other companies and work to plan efficient routes."

Additionally, KappAhl initiated cooperation with two of their competing retail chains back in 2011. This cooperation was revealed at KappAhl (2011) through a Press Release:

"The Swedish fashion chains KappAhl, Lindex, and MQ have initiated a unique collaboration to accelerate the development of cotton farming that is better for the environment and for the people who grow it."

"The three fashion chains are members of the worldwide association Better Cotton Initiative (BCI), working for sustainable cotton cultivation."

This initiative does not involve combined loading of goods, but it is an example of competing companies that cooperate among parts of their supply chain. According to BCI (2014), H&M has also become a partner in this association, anno 2014.

6.3 Accessibility at place of delivery

In this subchapter we will present the data collected at our selected shopping malls. First, we will present the data corresponding to the accessibility at Case Moss before presenting the data of Case Strømmen.

6.3.1 Case Moss

AMFI Moss has 74 shops, and the mall is located in the city center of Moss. The mall consists of six buildings that have been developed over time. The mall is located on a slope which has been challenging when planning expansions.

6.3.1.1 Facilities

The mall has four receiving areas for goods. The largest and newest of the receiving facilities is the main receiving area (Appendix 6.1). In addition to this, there are three other areas for goods reception. One receiving area (Appendix 6.2) is located between two buildings with access from a road with local traffic. This area is directly connected to one of the mall's grocery stores which is the primary user of the area. The third receiving area (Appendix 6.3) is somewhat hidden behind another building, and the access to the receiving area is shared with a private parking space. This receiving area is mostly used by Vinmonopolet and the goods are unloaded from a truck directly into an elevator and into the shopping mall. The last and fourth receiving area (Appendix 6.4) is located in connection to a public parking space and has limitations related to the weight and size of the vehicles delivering goods. The four receiving areas were measured and the results are presented in the mentioned appendices (Appendix 6.1 – Appendix 6.4).

The receiving areas at AMFI Moss were not controlled or managed in any manner. The final deliveries of goods were conducted by the transporters. The trucks or cars were parked in the receiving areas, from where the drivers brought the goods to the stores inside the mall. The transporters were responsible for the goods until the recipients in the stores signed the delivery note. Our measures of the average delivery time per pallet are presented in Table 6.9.

Delivered to AMFI Moss	Number of observed pallets	Total minutes spent	Average time per pallet
Stores inside the mall	7	96 Min	13,71 Min

Table 6.9 - Average delivery time per pallet delivered to shops at AMFI Moss

Further, activity at the receiving areas peaked in the morning and was considerably lower later in the day. Shops located at the mall preferred to get their goods delivered early. This was also considered a problem as it often created lines of vehicles waiting by the receiving facilities.

6.3.1.2 Answers from the center director

The center director at AMFI Moss said they had briefly discussed the option of having a manned receiving facility, but they had decided it was not appropriate for

them. They regarded the challenges related to the cost aspect would rule out the option. He argued the following:

"Who should pay for the cost related to a manned receiving area? The goods owners pay for the items to be brought into the stores. Hence, paying for a managed solution at the receiving area would be considered as an additional cost"

The center director also stressed the general challenges of being a shopping mall located in the city with limitations to space and expansions. On the question of why AMFI Moss operates with unmanned receiving areas, the reasoning was:

"The solutions we have today are considered good enough, and the costs of having a manned receiving area was perceived as an extra cost."

Thus, their evaluation was that the cost of having a manned receiving area would exceed the value of it.

Further on, the questions of whether it is practically possible to accept a delivery of a full container, and if he knew of other shopping malls that could accept such a delivery, the center director answered:

"Yes, I do think it would be possible at our main receiving area. I don't know whether other shopping malls are able to accept a container delivery or not."

On the question of what challenges entails such a delivery, he concluded:

"In general, a big challenge is the limited amount of space. Additionally, a truck entering the receiving area with a container will occupy a lot of space when unloading, which most likely will result in other trucks waiting in line for their deliveries. Unloading a container is time consuming. Hence, queuing could be a problem."

6.3.2 Case Strømmen

Strømmen Storsenter is located outside Oslo. It is the largest shopping mall in Norway, measured in tenants, with 203 shops. The mall has one main receiving area which is used by most of its tenants. There is also a smaller receiving area which is used by a few of the shops. In addition to these two, the grocery stores Rema 1000 and Meny each have their own reception area for their deliveries. Lastly, Cubus has such an area as well, which is directly connected to their store. In total there are five different receiving areas at Strømmen Storsenter.

6.3.2.1 Manned receiving of goods

Since October 2013, the main receiving area at Strømmen Storsenter has been operated by ColliCare Logistics. The operational service includes temporary storage of received goods and also additional services such as unpacking and preparing the goods for the stores. The purpose of this controlled goods reception is to create a more efficient and better organized flow of goods at Strømmen Storsenter. However, some of the tenants at Strømmen Storsenter do not use the service available, but have their goods delivered directly from the transporters. Hence, the deliveries to these shops were done in the most common manner, where the transporter was responsible to deliver the goods into the designated store at the shopping mall. Many of the trucks arriving with deliveries were occupying space at the reception area while the driver brought the goods to the shops at the mall. The transporters who delivered their goods to the storage space operated by ColliCare used considerably less time. The difference is illustrated in Table 6.10. A main reason was because the staff from ColliCare signed the packing list from the transporter. When the goods were placed in the storage space, a message was sent electronically to the relevant stores with an overview of which goods that had arrived. The employees at the stores came down to pick up the goods when they had spare time. In some cases ColliCare even unpacked the goods from the pallet and boxes, and delivered the goods to the stores in customized trolleys. The policy was that goods placed in the temporary storage area had to be picked up within 24 hours.

Delivered to Strømmen Storsenter	Number of observed pallets	Total minutes spent	Average time per pallet
ColliCare	15	63 Min	4,20 Min
Stores inside the mall	8	98 Min	12,25 Min

Table 6.10 - Average delivery time per pallet when delivering to ColliCare and when delivering directly to the shops at Strømmen Storsenter.

6.3.2.2 Facilities

The main receiving area had capacity and parking stands for seven vehicles, and the area was split into three different parts. One part was built below ground level with a small slope towards two unloading ramps. Measures of this unloading area are shown in Appendix 6.5, while the profile of this area is presented in Appendix 6.6. The other two parts were flat, with space for 3 larger trucks or 4 smaller goods vehicles. These two parts of the main receiving area had individual entry gates, which is the only reason why they are divided into two parts. Both entry gates led to the same zone, and the distance between them was 0,50 meters (see Figure 6.1 for visualization). Here, trucks were dependent on automatic tail lifts in order to get the pallets to ground level. Measures and appearance of these two parts of the receiving facility are shown in Appendix 6.7 and Appendix 6.8.

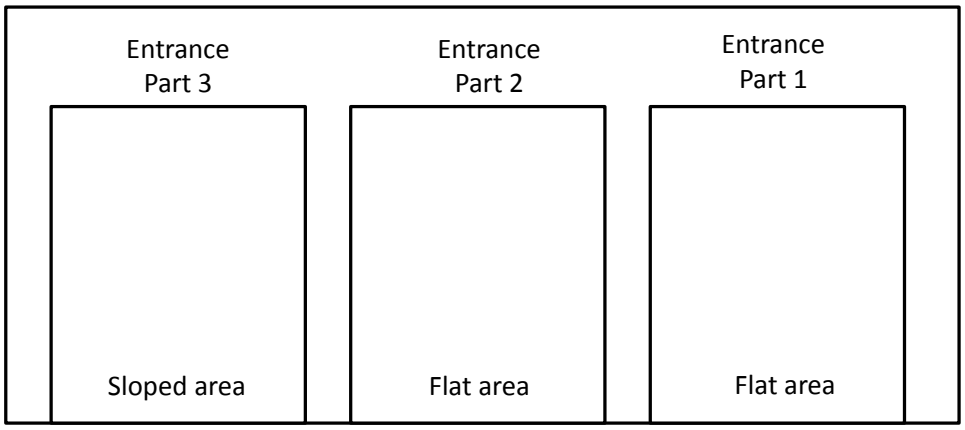

Figure 6.1 - The different entrances of the main receiving area at Strømmen

While we were taking measures, we observed that a truck with a 20' container entered the sloped part of the receiving area, where it was unloaded. This unloading was made possible because of the hydraulic lift platform that was embodied into the ramp. The driver said that such delivery would have been impossible without the lift platform.

The storage space by the receiving area measured 400 m^2. Waste and load carriers were also sorted and collected next to the receiving areas. Trucks that retrieved waste and load carriers used the same entry gate as the trucks delivering goods. We observed that some of the trucks in the receiving facility were parked there for several hours while the driver brought goods to the shops. The employees at ColliCare told us that this was not unusual and that drivers could be delivering at the mall for as much as four hours. When observing the drivers delivering goods

to the shops inside the mall, we noticed that several of them did not know the location of the store where they were supposed to deliver the goods. They even asked ColliCare for a map showing the locations of the different stores.

6.3.2.3 Answers from the operational manager

When we asked the operational manager why they have chosen to operate with a manned receiving area, he answered:

"We have through several years wished for a manned receiving area. This is partly because we wanted more control over the total flow of goods inside the mall, and we wanted to reduce the burden for our customers when many drivers deliver goods to the different stores throughout the day. For our customers such deliveries through the center's common areas are aligned with both risk and noise. Beyond this, an aim was to lessen the burden on the environment with many cars waiting to deliver. Both in order to get the trucks faster out of the city, and because many of the drivers let their trucks idle while waiting."

Further, he elaborated for their experience with this manned receiving area:

"Positive experiences with manned receipt of goods include several things: We get a faster turnover of carriers, i.e. low waiting time because of more rapid deliveries. We get an increased control when deliveries into the stores are done with equipment that is customized for our mall (right wheels on pallet trucks etc.). Delivery to the stores in the mall takes place to a greater extent when there are few customers at our mall (before opening). Deliveries to the stores can take place when they have the time / manpower to receive the goods. This avoids, to a greater extent, that the delivered goods obstruct the accessibility at the individual stores until it is put in stock. The shops do not have to go through inspection of packing list, as this is done by our staff and not in store.

Since the actual delivery into stores takes place in more controlled conditions, we assume (hard to calculate the cost) that abrasion on doors, elevators and floors decreases.

"Not much negative we've experienced so far, but in relation to the fact that all the shops don't take part in the present system, we obviously still have some drivers that deliver directly to shops. Some of the small shops could naturally be negative since they now have to go down to receiving area to collect their goods themselves, which they previously had delivered directly into the store."

Further we asked whether their solution with manned receiving area had proved to be cost efficient in addition to the other mentioned advantages.

"We cannot say that the current solution is cost-effective for all parties. The cost that previously was attached to drivers delivering goods directly into the stores is still present, and the stores are probably still paying for this. In addition they now must pay the cost of the manned receiving area as well. Therefore the current solution with the manned receiving area is currently only an additional cost."

Despite the fact that the manned receiving area is not cost efficient at this point of time, he argue that it could be effective in the long run.

"In the long-term, our goal is that the cost of delivery will be lower for the stores, since the distributors save a lot of time when delivering to a central receiving area. Hence, the hidden cost of delivering goods directly into the stores should disappear. In addition we hope that other expenses in relation to maintenances of doors, gates, elevators, floors, etc., as previously mentioned will be lower. The area where the stores can save most of the money today is tied to their workforce. Today, they do not need to have extra people standing at work in order to handle reception of goods, as one never knows when they will arrive. Now, the stores can plan their number of daily workforce without thinking about the reception of goods which is taken care of by ColliCare. After ColliCare has received and accepted a delivery, an SMS is sent to the relevant store telling that the goods have arrived. Then the store has 24hours to pick up their goods at the InStore warehouse. This process, in addition to the fact that the drivers are able to conduct deliveries in a more rapid way, is two of the factors that has proved to work particularly well at our manned receiving area. The greatest potential for improvement lies within getting all of the stores at the mall in on our cooperation with ColliCare.

When deliveries are accepted at our manned receiving area, it is possible for the stores to hand over portions of the unpacking to ColliCare. Unpacking directly at the receiving area means that the packaging can be sorted directly on waste ramp which is located at the same facilities. Unpacking at the stores results in workers going down to the same facility with the packaging later on which is inefficient."

Our last questions was related to whether or not the operational manager thought it would be possible to accept deliveries of full containers at Strømmen Storsenter, and what challenges and advantages he thought entailed to such a delivery. We also asked if he knew about other shopping malls that were able to accept deliveries of containers.

"It will be possible to accept delivery of a container to the mall and discharging the container in the receiving area. One of the challenges is that the containers have to be removed from the receiving area as quickly as possible after the unloading is done, in order to free up space. A container that has been placed inside the receiving facilities will tie up space for other distributors until it is removed.

Benefits of such a solution would entail more controlled deliveries and unloading. Distribution will be done more efficiently with significantly less traffic in the receiving area. Additionally, such a solution will most likely be cost effective for the stores.

For other shopping malls and their ability to accept container deliveries, I do not know about any specific, but I assume there are several that would."

6.3.3 Brief summary of the two cases

Summing up, we have made a brief overview of the main differences at AMFI Moss and Strømmen Storsenter, presented in Table 6.11.

Mall	Number of stores	Total number of receiving areas	Managed receiving area	Capacity of trucks parked at the main receiving area
AMFI Moss	74	4 (2 "private")	No	3 Trucks
Strømmen Storsenter	200	5 (3 "private")	Yes	7 Trucks

Table 6.11 - The main differences at AMFI Moss & Strømmen Storsenter

6.4 Shipment configuration

The provided SOP's contained information regarding how goods in the clothing industry are distributed from China in Asia to Oslo in Norway. The shipment configuration that the retail company corresponding to the SOP's used, were two sided. The goods were either shipped as FCL[4] or BCN[5]. These two configurations and their operational steps are presented in Figure 6.2 and Figure 6.3. Notify that it is only one retail company in this supply chain, but this retail company has a wide range of both suppliers in China and retail stores in Norway.

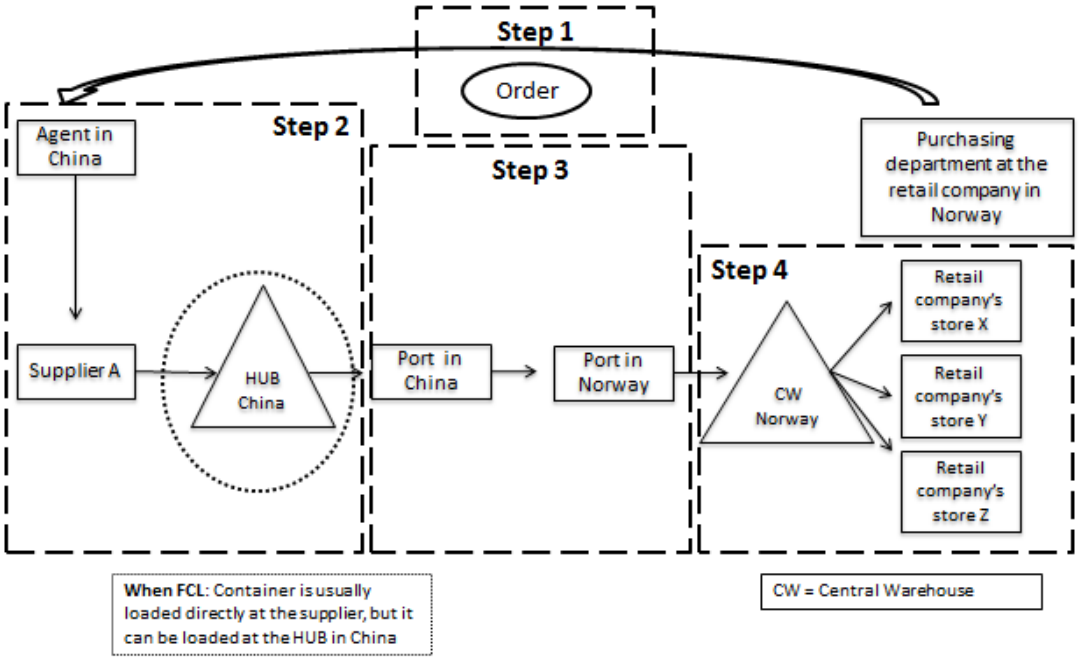

Figure 6.2 - The import process when goods are shipped as FCL

In this section we will present and explain the four operational steps that are conducted when the goods of the exemplified retail company are shipped from their supplier(s) in China to their stores in Norway. Note that the differences of shipping goods as FCL instead of BCN are located within Step 2. The other steps are the same across these configurations.

[4] Full container load (FCL) shipments are when a container is loaded with goods from one supplier at country of origin, where all the goods are to be delivered to the same consignee (buyer).

[5] Buyers consol (BCN) shipments are when goods from different suppliers (two or more) are consolidated in one container at a distribution center in country of origin, and shipped to one consignee (buyer) in Norway.

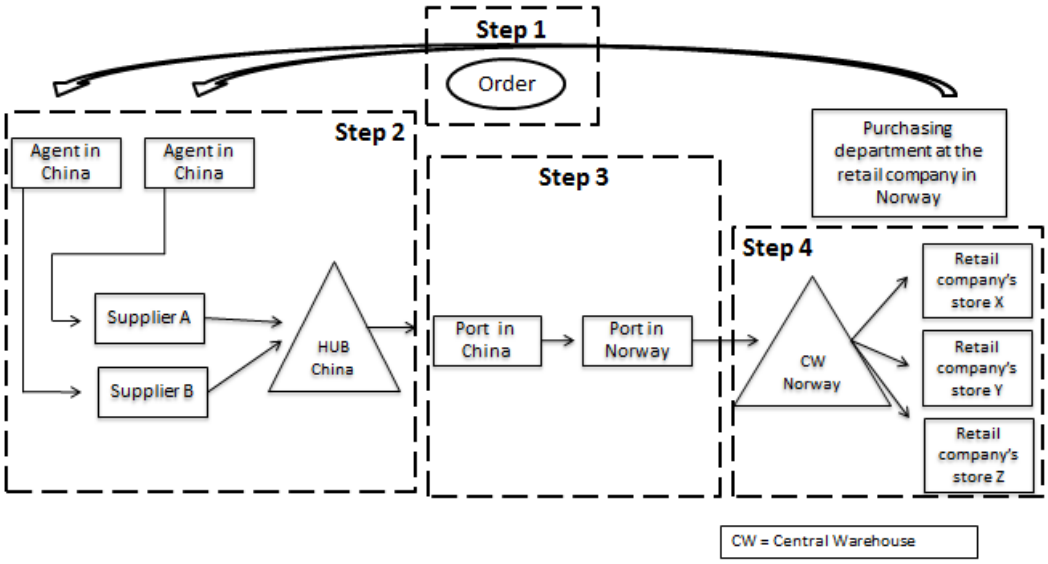

Figure 6.3 - The import process when goods are shipped as BCN[6]

6.4.1 Step 1 – Making an order

In the manufacturing business in China, the use of agents is widely applied. One of the main reasons why this is important is due to communication. Language repertoires at the manufacturing sites are often limited, so agents work as the intermediary between the manufacturer and the buying company. If the retail company has specific preferences on how the design of the clothes should be, they go to their agents who communicate the preferences directly to the manufacturer. When all the formalities are agreed upon, the retail company places an order at their agent in China, who communicates the order to the manufacturer.

6.4.2 Step 2 – Operations performed in country of origin (China)

When the ordered goods is produced and ready to be shipped to Norway, the manufacturer (supplier) book a shipping order at the forwarding company chosen by the retail company.

When the booking is received, the forwarder book the cargo with an operating

[6] Buyers consol (BCN) shipments are when goods from different suppliers are consolidated in one container at a distribution center, and shipped to one consignee/buyer.

carrier based on the agreed service levels and transit time, assigning a sailing schedule, and reconfirm the booking to shipper/supplier. The close cooperation between the forwarder and different shipping lines is important for both parties. Shipping lines provide discounted rates for the forwarder, and the forwarder provides volumes in return. This cooperation is not just on sailings between China and Norway, it is global. In the shipping industry the rates fluctuate frequently. Therefore, these rates are frequently negotiated in order to maintain the relationship. Another positive consequence of the cooperation is that the different shipping lines prioritize cargo from the forwarder when shortage of space. As a result, the services provided by the forwarder are both reliable and punctual, which is a security for their customers (i.e. the retail company).

6.4.2.1 Loading the goods on a container

Usually, FCL containers are loaded at the suppliers. FCL shipments contain goods from one supplier where all the goods are to be delivered at the same consignee. This type of shipment is selected when quanta ordered from one single supplier are enough to fill up a container. Nevertheless, the goods ordered from one single supplier are not always enough to utilize the loading space in a container. In these situations a BCN configuration is more appropriate in order to utilize the volume. Goods from different suppliers are collected at a HUB[7] where the container is loaded in accordance to given instructions. The largest freight forwarding companies run such HUB's close to the largest ports in China as well as the world in general, which is one of their main advantages. The cargo filling up the planned BCN container has to be delivered at the HUB in a given time perspective. Deadline for delivery is usually a given number of days (i.e. 7 days) before closing[8]. This deadline has been set in order to let the employees at the HUB load the cargo properly without stress, and to make sure that the container reaches the closing date without any problems. Missing this date may lead to serious delay which again will affect the service level of the forwarder. Therefore, it is the

[7] A HUB is a distribution center that is handling (consolidating) flow of goods between the point of origin and the point of consumption in order to meet the requirements of consumers.

[8] Closing date is the day the shipment, container, has to be at the port to clear customs and then board the next vessel.

suppliers that are responsible for moving either the goods to the HUB, or transport the already loaded FCL containers to the terminal. If they miss the given closing deadlines, the supplier is responsible for the delay and has to pay for any additional cost.

6.4.3 Step 3 – Sailing from China to Norway

The sailing route from China to Norway is divided into two stages. First stage is shipped by the main vessel from China to one of the large ports in Europe. The four main ports of transshipments in Europe are Bremerhaven, Hamburg, Rotterdam and Antwerp. From these ports the containers are unloaded from the main vessel, and transshipped to feeders. A feeder is a smaller vessel that collects containers in different ports and transports them to local terminals. Each individual shipping line has an individual agreement with different feeder lines. Most commonly, the different feeder vessels have a weekly sailing schedule. This means that a feeder which in week 1 sails from Bremerhaven on a Sunday, and arrives in Oslo on a Tuesday, sails the exact same route in week 2, etc. When the main vessel arrives in Bremerhaven, or one of the other main ports in Europe, the containers are either stored at the port until the feeder is ready for loading, or directly shipped on board. Then the feeder sails from Bremerhaven to the port of destination which in this example is the port of Oslo. In Oslo, the forwarder receives a notification, an arrival notice, telling what time the container is ready for pickup. Lastly, the container is unloaded from the feeder vessel and stored somewhere at the port, until pickup.

In this example, the feeder ships the container to the port of Oslo. It is important to notify that feeder lines have sailing routes which makes it possible to unload a container at all of the main ports in Norway in addition to Oslo. Thus, if the goods in a container are to be delivered in Trondheim, the container is transshipped on a feeder that has the port of Trondheim included in its sailing route.

6.4.4 Step 4 – Operations performed in country of delivery (Norway)

6.4.4.1 Customs declaration

Imported goods have to be customs declared before it can be sold in Norway. The declaration can be conducted by the forwarding company, or by another company

determined by the retail company. Although the goods are not for sale until they are declared, it can be transported to the place of delivery. The company responsible for the declaration has to declare the goods within ten days. If the goods are undeclared after ten days, the owner of the goods (consignee) has to be notified. As a rule of thumb the consignee can put the goods up for sale after ten days, if no notification is received. The declaration does not have to take ten days; it might take only an hour or two if the goods have to be put up for sale immediately.

6.4.4.2 Predictability and sealing

Predictability concerning estimated time of arrival (ETA) is important for the consignee in order to know when their ordered goods arrive. Every single container has a number, consists of four (4) alphabetical letters and seven (7) numbers (ABCD1234567), which is unique. The forwarder is frequently updating the ETA through the tracking devices of the shipping lines, and reports to their consignee if there are any delays, or if the container arrives before the planned date. Desired scenario is that the ETA calculated at port of origin equals actual time of arrival (ATA).

Another essential factor when shipping a container across the globe is that the goods arriving at destination is the same goods loaded into the container at the origin country. After the container is loaded it is sealed and given a number, seal number. As long as this sealing is unbroken upon arrival, the forwarder as well as the consignee is given the security that the container has not been opened since loading. Hence, the goods packed at origin are the same goods arriving Oslo.

6.4.4.3 Domestic distribution – From port of Oslo to the shopping mall

As described in the SOP, the container is delivered and unloaded at a central warehouse of the retailer. This is the final operation provided by the exemplified forwarding company. Such a warehouse could be owned by the consignee itself, or by an external part like a logistics provider. From the warehouse, the goods are repacked into smaller trucks and distributed out to the relevant retail stores where final customers are able to buy the products. The distribution from the warehouse of the exemplified retailer is handled by a second forwarding company, and not by the forwarder that imports the goods to Norway.

6.5 Logistics costs

The cost aspects of the different routes are presented in Figure 6.4. The costs are related to each of the routes relevant to our considered shipment configurations. The routes performed by a truck with a container are marked by red color, while the blue indicates a lorry route. The complete Excel sheet with calculations can be found in Appendix 5.12.

	From:	To:	Total costs		Cost per pallet	
Shopping malls	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Amfi Moss, Prinsens gate 2A, 1530 Moss	3236	NOK	294	NOK
	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Strømmen Storsenter, Støperiveien 5, 2010 Strømmen	1176	NOK	107	NOK
Varner	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Toveien 28, 1540 Vestby (Lager)	1635	NOK	149	NOK
	Toveien 28, 1540 Vestby (Lager)	Strømmen Storsenter, Støperiveien 5, 2010 Strømmen,	4243	NOK	283	NOK
	Toveien 28, 1540 Vestby (Lager)	Amfi Moss, Prinsens gate 2A, 1530 Moss	4697	NOK	313	NOK
H&M	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Alf Bjerckes vei 26, 0582 Oslo (Lager)	880	NOK	80	NOK
	Alf Bjerckes vei 26, 0582 Oslo (Lager)	Strømmen Storsenter, Støperiveien 5, 2010 Strømmen	3370	NOK	225	NOK
	Alf Bjerckes vei 26, 0582 Oslo (Lager)	Amfi Moss, Prinsens gate 2A, 1530 Moss	5650	NOK	377	NOK
KappAhl	Göteborg havn, Emigrantvägen 2B, 414 63 Göteborg, Sverige	KappAhl Mölndal AB, Idrottsvägen 14, 431 62 Mölndal, Sverige (Lager)	738	NOK	67	NOK
	KappAhl Mölndal AB, Idrottsvägen 14, 431 62 Mölndal, Sverige (Lager)	Strømmen Storsenter, Støperiveien 5, 2010 Strømmen	9175	NOK	612	NOK
	KappAhl Mölndal AB, Idrottsvägen 14, 431 62 Mölndal, Sverige (Lager)	Amfi Moss, Prinsens gate 2A, 1530 Moss	8867	NOK	591	NOK
Lindex	Göteborg havn, Emigrantvägen 2B, 414 63 Göteborg, Sverige	Laxfiskevägen 4B, 433 38 Partille, Sverige (Lager)	789	NOK	72	NOK
	Laxfiskevägen 4B, 433 38 Partille, Sverige (Lager)	Strømmen Storsenter, Støperiveien 5, 2010 Strømmen	9175	NOK	612	NOK
	Laxfiskevägen 4B, 433 38 Partille, Sverige (Lager)	Amfi Moss, Prinsens gate 2A, 1530 Moss	8844	NOK	590	NOK

Figure 6.4 - Calculations

The total transportation cost per pallet for the retailers is summed up in Table 6.12. The retailers' cost is the sum of the transportation costs for the route from the port of delivery to warehouse, the estimated handling costs plus the estimated cost for the route from warehouse to shopping mall. These numbers will be further reviewed and discussed in chapter 7.

	From:	Via:	To:	
			AMFI Moss	Strømmen Storsenter
Deliveries going by the central warehouses	Oslo Harbour	Varner Group CW	462	431
	Gothenburg Harbour	KappAhl CW	658	679
	Oslo Harbour	H&M CW	457	305
	Gothenborg Harbour	Lindex CW	661	683
Container delivery	Oslo Harbour	----------	289	105

Table 6.12 - The local transportation cost (per pallet) for the retailers at AMFI Moss and Strømmen Storsenter

6.6 Supplementary data

The dimension of a EUR-pallet is 1200×800×144 mm. Maximum number of EUR-pallets loaded into a 20’ container is 11, while a standard lorry/truck has capacity of loading 18 EUR-pallets. Further in this paper a EUR-pallet is addressed as a *pallet*.

The dimension of a 20’ container is presented in Table 6.13. Additional information with regard to the dimensions of the chassis is presented in Table 6.14. Unloading height from a chassis can be adjusted because of hydraulic functions. Even though it is possible to push the unloading height to a limit of 1,30 meters, it is not advisable. According to Bring, the container will sag down if the unloading height is pushed to its boundaries. This could lead to that both the container and the chassis might be damaged. Thus, the maximum unloading height, at ramps that do not contain a hydraulic lift platform (see Figure 7.5), is sat to be at 1,25 meters above ground level.

Standard 20 ' container							
INSIDE LENGTH	INSIDE WIDTH	INSIDE HEIGHT	DOOR WIDTH	DOOR HEIGHT	CAPACITY	TARE WEIGHT	MAXI CARGO
5,900 m	2,350 m	2,393 m	2,342 m	2,280 m	33,2 m3	2 230 Kgs	21 770 Kgs

Table 6.13 - Dimensions of a standard 20’ container

Dimensions of chassis for a standard 20' container (length are included the weelhouse)			
LENGTH	WIDTH	UNLOADING HEIGHT min	max
12,000 m	2,500 m	1,12 m	1,25 m

Table 6.14 - Dimensions of chassis for a standard 20’ container

7 Analysis and Discussion

In this chapter we will analyse and discuss our findings with regard to our research question. We will use the different variables presented in our research model as a frame for structuring this chapter. The variables that are equal in both Case Moss and Case Strømmen (suppliers' geographical location, horizontal cooperation, shipment configuration, and flexibility) will be analysed independently, while the variables that differ in these cases (accessibility at place of delivery, and logistics costs) will be categorized into subchapters Case Moss and Case Strømmen respectively.

7.1 Suppliers' geographical location

The purpose of this variable is to map the suppliers in order to assess the practical possibility for joint distribution and whether it enables direct deliveries to shopping malls in Norway. We have located a total of 2480 manufacturing suppliers. An overall summary of their location is shown in Table 7.1.

	China	Turkey	India	Bangladesh	Republic of Korea	Indonesia	Cambodia	Pakistan	Italy	Others	Total
Varner Group	232	100	34	29	8					74	477
H&M	431	233	147	230		88	59	57	53	266	1564
KappAhl	138	15	19	25						16	213
Lindex	122	29	17	32						26	226
Total	923	377	217	316	8	88	59	57	53	382	2480

Table 7.1 - Overview of suppliers by country

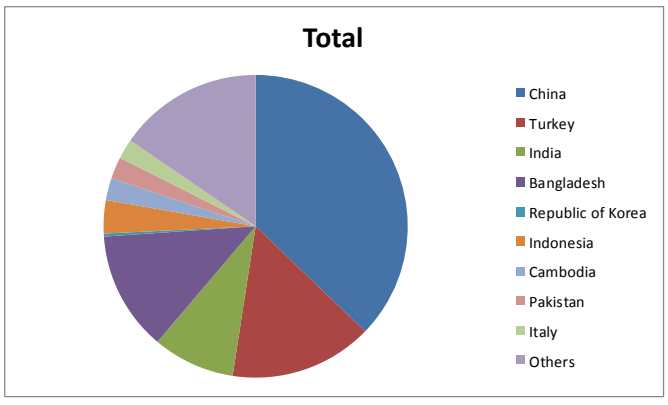

Figure 7.1 - Share of suppliers sorted by country

The most interesting countries here are China, Turkey, India and Bangladesh where all four retailers have a significant number of suppliers. H&M is the largest company and has also a large number of suppliers in Indonesia, Cambodia, Pakistan and Italy. We will focus on the location of the Chinese suppliers in the following analysis. The majority of the suppliers are located in China, more specifically 923 manufacturers, which corresponds to 37% of the total number of suppliers. In order to specify the location in China we selected three provinces on the eastern coast of China (Appendix 7.1). An overview of the number of suppliers in these provinces is presented in Table 7.2. Looking at the overview of the Chinese suppliers we conclude that they are in relatively close proximity. In total, 558 of the 923 suppliers in China are located in the three chosen provinces which have a total acreage similar to Norway.

	Jiangsu	Guangdong	Zhejian	Total
Varner Group	38	48	88	174
H&M	80	70	79	229
KappAhl	18	21	34	73
Lindex	28	14	40	82
Total	164	153	241	558

Table 7.2 - Overview of suppliers in China

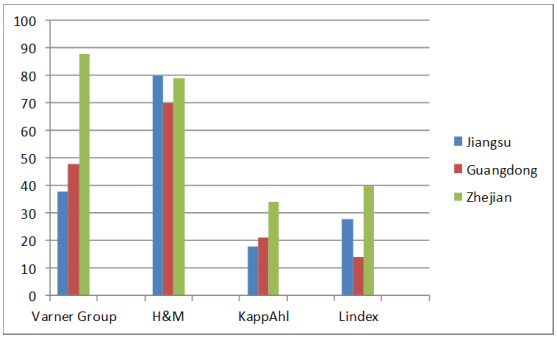

Figure 7.2 - Graphical presentation of suppliers in China

The provinces also have large ports from where goods from our chosen retailers are shipped today. Ningbo (Zhejiang), Shenzhen and Guangzhou (Guangdong) and Suzhou (Jiangsu) are large ports from where global freight companies operate. The ports of Hong Kong, Shanghai and Macau are located in the same areas but are considered as own provinces. It is likely that the products manufactured by suppliers located outside of the selected provinces are shipped from one of the mentioned ports.

There are several of the Chinese suppliers that are located within the same areas. And the goods produced in China are shipped from ports located in (or close to) the chosen provinces. If we were to solely classify the suppliers in China when assessing the variable “Suppliers’ geographical location”, we would have classified the variable as “high”. However, there are suppliers in other countries

than China in which production takes place. H&M has suppliers in many different countries while KappAhl, Varner and Lindex have their products manufactured in Turkey, India and Bangladesh in addition to China. Therefore the assessment of the variable is no longer a definite "high", the different countries contribute to reduce the strength of the classification. Hence, with basis in our findings and considerations, we classify the total of the variable "Suppliers' geographical location" as "medium/high".

China is the location with greatest potential, with a 37% share of the total number of suppliers. And with 60% of the Chinese suppliers located in Zhejiang, Guangdong or Jiangsu, it should be possible to create large enough volumes.

However, we do not have the knowledge to make a comprehensive assessment on the practical possibility for joint container arrangements solely based on the location of the suppliers. In order to do so, it would be necessary to go deeper into the properties of the goods and the demand for the products. This is a part of the problem which falls out of the scope of this paper. However, the fact that there are many suppliers in the same areas and that goods are shipped from the same ports should enable the retailers to utilize this for consolidating the containers in a way that makes direct deliveries to shopping malls in Norway possible. We settle on acknowledging that it is a complex question but find that many of the suppliers are located in such a way that enable consolidation for joint container deliveries.

7.2 Horizontal Cooperation

This variable is closely related to the variable Suppliers' geographical location, based on the importance of obtaining a satisfying fill rate. When shipping goods in a container, it is important that the fill rate of the container is as high as possible. The freight cost that the goods owners pay when shipping a container, is related to the freight unit as a whole (the container), and not for the goods inside. This implies that the more goods loaded into a container, the lower the distribution price per item. Hence, utilizing the loading space is important to make the distribution cost per item as low as possible. Linking this back to the shopping mall situation, the fill rate aspect is crucial for a situation where a full container is delivered directly at the mall instead of going through a central warehouse. Our

observations proved that each individual store received between 1 to 3 pallets per delivery. This is way below the capacity of a 20' container which is 11 pallets. Shipping only 1 to 3 pallets directly from the Supplier in Asia to one single store at a shopping mall will then result in unreasonably high costs, which would make such a solution inconvenient. Our findings related to the variable suppliers' geographical location proved that the suppliers of the retail companies are located within the same geographical areas. Hence, it will be possible to utilize the container capacity of 11 pallets by consolidating goods across supply chains. This is in line with prerequisite of horizontal cooperation discussed by Cruijssen, Dullaert, and Fleuren (2007). Horizontal cooperation may occur between competing companies that are active in the same supply chain, as well as unrelated companies that operate in different supply chains (Cruijssen, Dullaert, and Fleuren 2007). The location of the suppliers enables consolidation across company boundaries, but the question is whether the retailers are willing to cooperate with their competitors in order to exploit this potential.

Looking at our selected retail companies, Varner Group, H&M, Lindex, and KappAhl, we see that they in total have nine different stores represented at both AMFI Moss and at Strømmen Storsenter (ref: Table 5.1). This means that each store has to order 1,22 pallets in order to utilize a 20' container. Ordering and consolidating parts of a pallet (0,22) could be problematic in two ways: The question of how the cost of a shared pallet should be calculated is one issue, but even more challenging is the actual feasibility of packing and organizing a shared pallet. Therefore, a more realistic approach is that two of the nine shops order 2 pallets, while the remaining seven stores order 1 pallet each. This is in line with our observed amount delivered to each store at Strømmen Storsenter and AMFI Moss which is between 1-3 pallets per delivery. This is just an example of how cooperation among the different retail companies can utilize a container when consolidating the goods. It is not necessary to involve all of the nine mentioned stores in order to utilize the container, but our example explains the reasoning for consolidating the goods.

The Varner Group is a large actor in the retail industry in Norway, and at our selected shopping malls they are represented by six different stores. Therefore it could be possible for them to consolidate goods to their own stores internally if

they order 2 pallets to five of their stores, while the last store receives 1 pallet. How the container is packed, and how many pallets to each store are not necessarily relevant as long as the container is utilized by 11 pallets.

Another possibility when consolidating goods is to deliver the container by a round trip, a so called Milk Run. Even though Chopra and Meindl (2013) elaborate for this delivery system in relation to trucks, the same logic can be used in the sense of container deliveries. Instead of packing the container with only one place of delivery (i.e. one shopping mall), the container can be packed with goods that are to be delivered at two or more locations. As an example, six pallets are to be delivered to Strømmen Storsenter, and five to AMFI Moss. When the container arrives at the port of Oslo, the container is first transported to Strømmen Storsenter where the six pallets are unloaded. While unloading, the container is located upon chassis. When the unloading at Strømmen Storsenter is done, the truck drives to AMFI Moss for unloading the last five pallets before returning the empty container to the port. In order to visualize the provided example we refer to Figure 3.3. We have not calculated the cost of such a solution in this thesis, but it is important to note that such a solution may be applicable. Packing a container with the purpose of Milk Runs requires good labelling and classification of the goods in order to make the delivery process run smoothly.

The gain of cooperating among the import and distribution of goods depends upon one important factor. Are the retail companies willing to cooperate with their competitors? If not, positive ripple effects are uninteresting. The literature covers why horizontal cooperation and co-opetition are exciting approaches, but it does not thoroughly discuss whether companies are willing to cooperate or not. From a practical point of view, this is an essential question in order to gain from the developed theories. Hence, we contacted Varner Group in order to investigate whether or not they could be willing to cooperate with other companies within the import- and distribution of goods. Their answer to this question was:

> *"We have nothing against cooperation with competitors, but it should then be made by a single forwarder. This is done to some extent already, indirectly."*

This answer clearly indicates that the Varner Group does not have any objections

in relation to cooperation with competitors, as long as the cooperation is managed by a single forwarder. Additionally, they indicate that such cooperation already is done indirectly through their logistical partners. In relation to our research question, this statement is positive, since our configuration highly depends upon cooperation between retail actors. A negative aspect is that the Varner Group did not see the gain of our presented solution (Shipment Configuration 3). They felt that such a solution would be both expensive and reduce the flexibility of their business. Our questions to the Varner Group was highly related to whether or not they would be willing to use the concept of horizontal cooperation in order to make their supply chain more efficient. As a conclusion to our questions their representative stated:

"I think that it's not about competition but about cost, flexibility, and what the needs for your business really are."

Based on the answers provided by Varner Group we can spot a weakness in our provided questions. For us it seems like Varner Group has addressed the questions in a way that the presented cooperative configuration should replace the existing configuration. This was not our intention. The configuration examined in our research was intended to be a supplement to the current configuration, and this should have been more clearly communicated to our interviewee at the Varner Group.

It is not enough to look at one single retail actor in order to get an overview of the interest of cooperating among the distribution of goods. Thus, there has been a collection of such information through the last three selected retail companies as well. According to KappAhl, they are willing to cooperate with other parties in order to make their supply chain more efficient:

"Combined loading and efficient planning of routes are also an important part of the work to ensure that environmental impact is kept as low as possible. KappAhl is in continuous discussions with the hauliers we employ, for instance, on new fuels and engines, the possibilities for combined loading with other companies and work to plan efficient routes."

In addition, KappAhl cooperate with Lindex and H&M, among others, within cotton farming. The purpose of this cooperation is to accelerate the development of cotton farming that is good for the environment as well as for the people who grow it. This initiative does not involve combined loading of goods, but it is an example of competing companies that cooperate among parts of their supply chain.

While the Varner Group and KappAhl directly indicate that they do not mind horizontal cooperation with other retail companies in relation to joint distribution of goods, Lindex and H&M at least show an interest in cooperation through the cotton farming initiative. We cannot directly say that these two retailers are willing to accept horizontal cooperation through goods distribution, but the collaboration in the cotton farm industry proves that cooperation between competitors does exist today. Based on the reasoning in this subchapter we categorize this variable as "willing".

7.3 Accessibility at place of delivery

Through the investigation of AMFI Moss and Strømmen Storsenter we identified four receiving areas at AMFI Moss and five at Strømmen Storsenter. Based on practical considerations, we decided that not all of these receiving areas were relevant in terms of container deliveries. Receiving area 2 (Appendix 6.3) at AMFI Moss is directly associated with delivery of groceries and it is only used by REMA 1000. Thus, this receiving area is excluded as a possible location for deliveries to clothing stores. The same holds for receiving area 3 (Appendix 6.4) at AMFI Moss, which is solely used by Vinmonopolet. At Strømmen Storsenter two of the five receiving areas were solely applied by grocery stores and are therefore excluded from this analysis as well. These receiving areas were not even measured because they are irrelevant in relation to our thesis. Hence, we are left with two receiving areas at AMFI Moss and three at Strømmen Storsenter, that are relevant in relation to the possibility of container deliveries to the retail sector. When evaluating the accessibility at these receiving areas we compare the respective measures to the standard measures provided in LUKS (2011b). These measures are presented in Figure 7.3.

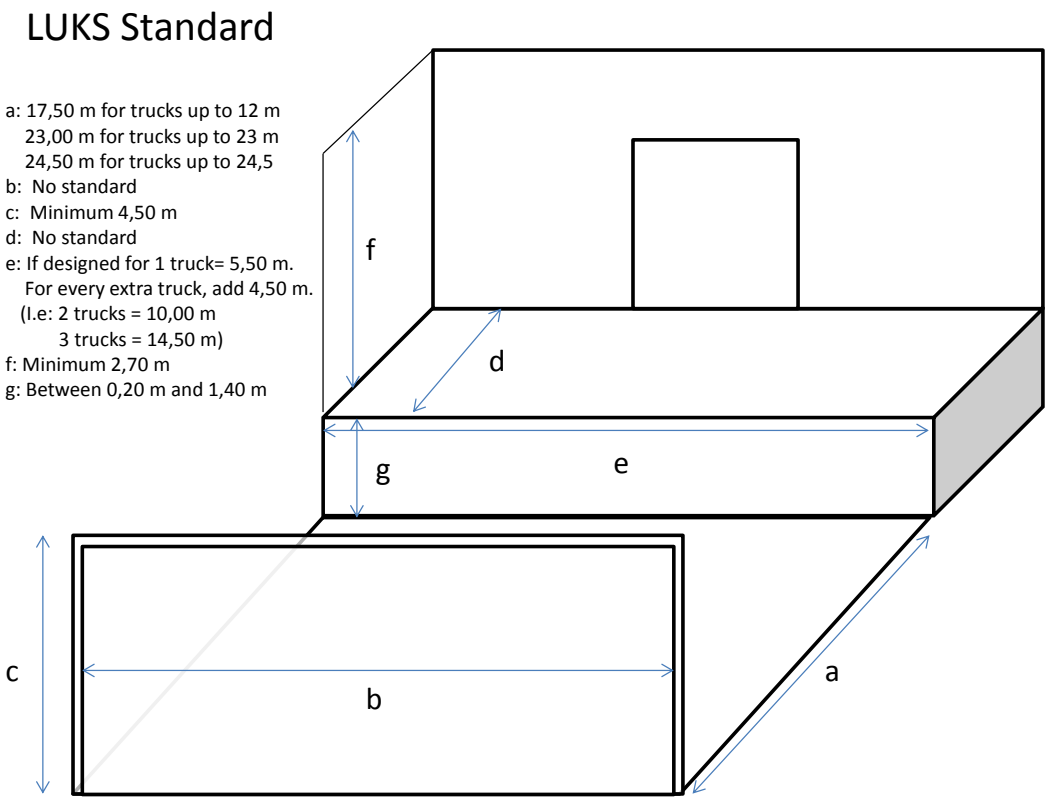

Figure 7.3 - The measures of LUKS Standard

Since the length of a truck with a 20' container upon chassis is 12,00 meters (see Table 6.14), we will compare the different receiving areas in the sense of trucks with the length up to 12,00 meters at measure (a). Hence, trucks up to 23,00 meters and trucks up to 24,50 meters are excluded in this analysis, even though they are part of the standard presented by LUKS (2011b).

Measure	*LUKS Standard*	*RA Moss (Main)*	*RA Moss (Eastern)*	*RA Strømmen (Main with slope)*	*RA Strømmen (Main flat 1 of 2)*	*RA Strømmen (Main flat 2 of 2)*	*RA Strømmen (G-sport and H&M)*	*RA Strømmen (Cubus and Vivikes)*
a	*17,50m*	14,60m	7,00m	13,25m	13,60m	13,60m	14,40m	5,00m
b	*No standard*	8,80m	10,00m	14,10m	7,10m	6,70m	5,35m	3,50m
c	*Minimum 4,50m*	4,30m	5,00m	4,80m	4,80m	4,80m	4,85m	4,20m
d	*No standard*	7,20m	2,00m	6,70m	6,70m	6,70m	0,00m	2,00m
e	*1 truck = 5,50m* *2 trucks = 10,00m* *3 trucks = 14,50m*	6,00m	10,00m	10,30m	14,00m	14,00m	12,50m	3,50m
f	*Minimum 2,70m*	3,12m	6,00m	3,00m	3,00m	3,00m	8,00m	3,30m
g	*Between 0,20m and 1,40m*	1,18m	0,15m	1,00m	0,00m	0,00m	0,00m	0,15m

Explanations
RA = Receiving area
Within LUKS Standard
Outside LUKS Standard

Figure 7.4 - The examined receiving areas compared to LUKS Standard

The accessibility at the remaining receiving areas at AMFI Moss and Strømmen Storsenter differs. Figure 7.4 both summarizes the measures of the five different receiving areas and compares each measure to the standard presented by LUKS

(2011b). Clearly, none of the receiving areas satisfy the standard of LUKS in regard to the length of the parking stand. Nevertheless we cannot categorically reject our suggested solution based on these measures. The reasoning is two-sided. First of all, a truck that transports a 20' container has the length of 12,00 meters. According to LUKS (2011b), the optimal length of the parking stand for such a truck is 17,50 meter. This does not mean that a truck with the length of 12,00 meters is prevented to deliver goods at a stand that is shorter. Through our own observations we have seen that it is possible to deliver a 20' container at the sloped receiving area at Strømmen Storsenter. Hence, we use the length of this stand (13,25m) as a reference point when deciding whether measure (a) is satisfied in relation to our suggested solution. Therefore, we can exclude the receiving areas Moss Eastern and Strømmen Cubus & Vivikes since the parking stand of both these areas are too short. Further, measure (g) is only satisfied by the main receiving area at AMFI Moss and at the sloped part of the receiving area at Strømmen Storsenter. The unloading height of a 20' container placed upon chassis is between 1,12 and 1,25meter (see Table 6.14) if the ramp does not include a hydraulic lift platform (see Figure 7.5). Thus, the receiving areas that do not have a ramp that satisfy these prerequisites are unable to unload a container that is placed upon chassis. None of the receiving areas that have (g) measured between ground level (0,00m) and 0,15 meters have access to a lift platform, which makes it impossible to unload the goods from the container while placed upon chassis. Hence, we are only left with two receiving areas that might be able to accept a delivery of a container placed upon chassis, namely the main receiving area at AMFI Moss and the sloped part of the main area at Strømmen Storsenter.

Figure 7.5 - Picture of a hydraulic lift platform

In addition to the delivery method presented above, it is possible to unload the container in two other ways. First, the container can be lifted off the chassis and placed at ground level (see Figure 7.6). Secondly, the container can be lifted of the chassis and standing on its feet (see Figure 7.7). In this way the truck can leave the receiving area after the container is delivered and come back to pick up the empty container after it is unloaded. The option where the container is standing on its feet is rejected because of the absence of lifting platforms, while the option where the container is placed at ground level can be applicable at the flat receiving area at Strømmen Storsenter since the internal distribution route starts at this level. At the main receiving area at AMFI Moss it is possible to leave the container at the ground level as well, but this is inappropriate because of its shape. All of the goods that are delivered at this receiving area have to be lifted above the ramp which has the height of 1,18 meters, in order to enter the internal distribution route. This could be possible by using a forklift, but it would be time consuming and require that the receiving area is closed for other deliveries in order to have the space of unloading the container. Hence, this option is rejected as well.

Figure 7.6 - Container placed at ground level

Figure 7.7 - Container placed on its feet

The only option we are left with at AMFI Moss in relation to if a container can be delivered, is where the container is delivered upon chassis. According to Bring, a container can be unloaded directly from chassis if the height of the ramp (without lift platform) is between 1,12 and 1,25 meters. Hence, unloading a container at AMFI Moss is possible at the main receiving area where the height is 1,18 meters.

At Strømmen Storsenter it is possible to deliver a container at the main receiving area. The sloped part of this area makes it possible to unload a container that is placed upon chassis because of the hydraulic lift that is embodied into the ramp. Since there are two hydraulic lifts embodied in this sloped receiving area, and since the width is 10,30 meters, it has the capacity to unload two containers simultaneously. At the flat part of the main receiving area at Strømmen Storsenter, it is possible to unload a container at ground level. This procedure requires that either part 1 or part 2 of the receiving area is available, without other trucks at the time when the container is delivered, by the purpose of making space for the side lift truck (Figure 7.6). This also applies when the empty container is picked up.

The director at AMFI Moss and the operational manager at Strømmen Storsenter both pointed out that unloading of containers at their mall would occupy space that is needed for other deliveries. Even though both of them questioned this problem, they had a different approach to it. The director at AMFI Moss only discussed the possible disadvantages of unloading a container directly at their mall:

"In general, a big challenge is the limited amount of space. Additionally, a truck entering the receiving area with a container will occupy a lot of space when unloading, which most likely will result in other trucks waiting in line for their deliveries. Unloading a container is time consuming. Hence, queuing could be a problem."

On the other hand, the operational manager at Strømmen Storsenter mentioned the challenges, but he could also see the advantage of our suggested solution:

"One of the challenges is that the containers have to be removed from the receiving area as quickly as possible after the unloading is done, in order to free

up space. A container that has been placed inside the receiving facilities will tie up space for other distributors until it is removed.

Benefits of such a solution would entail more controlled deliveries and unloading. Distribution will be done more efficiently with significantly less traffic in the receiving area. Additionally, such a solution will most likely be cost effective for the stores."

There is no doubt that a container which is placed on the ground floor for unloading will tie up space for other distributors until it is removed. Therefore it is important that the unloading is done quickly after arrival in order to free up the space again. Unloading a container that is placed upon chassis will also tie up space at a receiving area in relation to the amount of goods delivered. Our observations indicated that each truck that arrived at the different receiving areas on average delivered 1 to 3 pallets before they left the area. Thus, a container with 11 pallets would occupy space for a longer period compared to the "general" delivery. What is important to notice is that the goods delivered in the container are to be delivered to the respective malls whatever shipment configuration. By consolidating these goods at the origin country, only one truck is needed to deliver the 11 pallets. The opposite possibility is that each individual retail company orders these goods to their central warehouses and then distributes the goods out to the mall individually. As a result, the 11 pallets that could be delivered in one container are delivered in six different trucks (if five trucks deliver 2 pallets and one truck delivers the last pallet). Hence, a container placed upon chassis would occupy space for other deliveries and maybe result in queueing during the time of unloading, but it would also limit the number of trucks that enters the receiving area. This would also count for a container that is unloaded from the ground floor, but such a delivery requires more space and is not as flexible as if the goods are delivered upon chassis. Reducing the number of carriers by joint deliveries and joint reception of goods is supported by Muñuzuri et al. (2005).

The last factor that determines the accessibility at place of delivery is related to how the receiving area is operated. Strømmen Storsenter has a manned receiving area, while AMFI Moss does not. In our suggested configuration, this difference has a big impact in relation to the efficiency when delivering the goods. As shown

in Table 6.10, the time spent per pallet when delivering goods to the manned receiving area at Strømmen Storsenter is, naturally, much lower than when the drivers deliver each pallet directly into the stores. Unloading a 20' container by delivering each pallet directly to the different stores will result in a total time spent of 135 minutes (11*12,25 minutes), while unloading a 20' container by delivering the pallets into the warehouse of the manned receiving area will result in a total time spent of 46 minutes (11*4,20 minutes) based on our observations at Strømmen Storsenter. At AMFI Moss the time spent when unloading a 20' container would be 151 minutes (11*13,71 minutes). Comparing AMFI Moss to Strømmen Storsenter proves that unloading a 20' container to a mall that operates with a manned receiving area is conducted in an amount of time that is 105 minutes shorter than what is the case when such a container is unloaded at a receiving area that is unmanned. This corresponds to as much as 69,5% in time savings. Our estimated time savings are somewhat higher than the savings presented in Berg and Grønland (2008). They estimated the average time savings when unloading goods to a manned receiving area to be 40,0%. Even though these estimates differ in numbers, they both prove that a manned receiving area is more efficient than an unmanned in the sense of unloading time. This statement is also in line with the findings of Bjørnland, Bjerkelund, and Granquist (2001). Hence, unloading a 20' container at Strømmen Storsenter would be way more efficient than what is the case at AMFI Moss. This implies that the challenges related to queueing are more relevant at AMFI Moss than what is the case at Strømmen Storsenter. When the container is unloaded at the main receiving area at AMFI Moss, there is only one spot left at the ramp for other deliveries during the 151 minutes it takes to unload the goods. This supports the skepticism of the center director at AMFI Moss. At the main receiving area of Strømmen Storsenter, this situation is different due to its dimensions. When the container (either upon chassis or placed at ground level) is unloaded, there is space left for other distributors. Thus, delivering a container would not be critical in terms of the queueing problems, as long as the container is removed immediately after being unloaded.

Since a manned receiving area clearly has proved to be better in terms of delivering efficiency, it is interesting to look at the factors that prevent AMFI Moss from operating with such a service. The response of the center director

clearly pointed at the cost aspect of such a service. In addition he explains that the price that the retail companies pay for the transportation of goods includes the service of having the items delivered into the stores:

"Who should pay for the cost related to a manned receiving area? The goods owners pay for the items to be brought into the stores. Hence, paying for a managed solution at the receiving area would be considered as an additional cost.

The solutions we have today are considered good enough, and the costs of having a manned receiving area was perceived as an extra cost."

This argumentation is supported by the operational manager at Strømmen Storsenter. The cost aspect of their manned receiving area is identified as a challenge, and they are aware of the hidden cost related to delivering the goods into the stores:

"The cost that previously was attached to drivers delivering goods directly into the stores is still present, and the stores are probably still paying for this. In addition they now must pay the cost of the manned receiving area as well. Therefore the current solution with the manned receiving area is currently only an additional cost. In the long-term, our goal is that the cost of delivery will be lower for the stores, since the distributors save a lot of time when delivering to a central receiving area. Hence, the hidden cost of delivering goods directly into the stores should disappear."

Based on the argumentation of the representatives at both AMFI Moss and Strømmen Storsenter, we state that a manned receiving area currently is inefficient in relation to costs. This statement is in conflict with the conclusion made by Bjørnland, Bjerkelund, and Granquist (2001). They argued that a manned receiving area would be cost efficient. The difference is that Bjørnland, Bjerkelund, and Granquist (2001) removed the hidden cost of drivers delivering goods into the store when they conducted their calculations. Hence, the retail companies that have their goods delivered at the manned receiving area at Strømmen Storsenter should renegotiate the distribution prices with their

transporters. Our measures prove that the drivers spend significantly less time at Strømmen Storsenter when delivering goods to the manned receiving area instead of bringing the goods up to the stores. Since the operational manager at Strømmen Storsenter indicates that current distribution prices are equal regardless of whether the goods are delivered at the manned area or into the stores, the buyer of this transportation (the retailers) have a good foundation for renegotiating prices for deliveries to the manned receiving area. If these prices are renegotiated, similar to what the operational manager are hoping for, the price paid for having the goods brought into the stores should be transferred to the price paid for having a manned receiving area. In this way the price that the tenants at Strømmen Storsenter pay for having manned receiving area would not be an additional cost, but rather a cost that replaces the one paid for having the goods brought into the stores. Because of the desire to reduce the cost aspect of a manned receiving area, there has to be advantages related to such a solution as well. The operational manager at Strømmen Storsenter elaborates for these advantages:

"Positive experiences with manned receipt of goods include several things: We get a faster turnover of carriers, i.e. low waiting time because of more rapid deliveries. We get an increased control when deliveries into the stores are done with equipment that is customized for our mall (right wheels on pallet trucks etc.). Delivery to the stores in the mall takes place to a greater extent when there are few customers at our mall (before opening). Deliveries to the stores can take place when they have the time / manpower to receive the goods. This avoids, to a greater extent, that the delivered goods obstruct the accessibility at the individual stores until it is put in stock. The shops do not have to go through inspection of packing list, as this is done by our staff and not in store.

Since the actual delivery into stores takes place in more controlled conditions, we assume (hard to calculate the cost) that abrasion on doors, elevators and floors decreases.

The area where the stores can save most of the money today is tied to their workforce. Today, they do not need to have extra people standing at work in order to handle reception of goods, as one never knows when they will arrive. Now, the

stores can plan their number of daily workforce without thinking about the reception of goods which is taken care of by ColliCare."

Hence, Strømmen Storsenter emphasizes that the value of the manned service is higher than the cost related to it. Even though this service currently is inefficient in relation to costs, the operational manager perceives that the advantages exceed the disadvantages. If the problem connected to the hidden cost is mitigated through renegotiations with the transporters, the tenants will be able to exploit the manned receiving area without having it as an additional cost.

To sum up this variable we put a score "High" for the accessibility at Strømmen Storsenter. The reasoning for this score is that both the measures of the receiving area and the resources attached to it make it both possible and favorable to deliver a 20' container. Looking solely at the measures conducted at AMFI Moss, the accessibility score would have been "High" for this shopping mall as well. The facilities are designed in a way that make delivery of a container possible, but the fact that this mall does not have a manned receiving area makes a delivery of a 20' container less favorable than what is the case at Strømmen Storsenter. Unloading such a container would tie up space for other deliveries in a longer period of time because of the fact that each pallet has to be brought up to the stores. Thus, the score given at AMFI Moss is "medium high" which lies between the two extremes, but closer to "high" than "low".

Our scores indicate that the accessibility at Strømmen Storsenter is better than at AMFI Moss even though both malls are able to accept deliveries of 20' containers.

7.4 Shipment configuration

Through our data collection we identified that there are two main shipment configurations that are currently applied by retail companies in Norway. These are FCL-shipments (Figure 6.2) and BCN-shipments (Figure 6.3). Linking these shipments to the four configurations presented by Bygballe, Bø, and Grønland (2012), we clearly see that FCL-shipments correspond to shipment configuration 2 (Figure 3.4) when the container is loaded directly at the suppliers (which is the

most common practice). In addition, when shipping goods as FCL, the container is sometimes loaded at a distribution center in country of origin, even though the goods loaded are produced at one single supplier. When this practice is applied, the FCL-shipment corresponds to shipment configuration 4 (Figure 3.6). The second applied configuration is BCN-shipments which directly correspond to shipment configuration 4. Thus, our findings prove that the current applied shipment configurations of retail companies in Norway are a mixture of both shipment configuration 2 and 4 (Bygballe, Bø, and Grønland 2012). This confirms that our suggested solution of utilizing shipment configuration 3 to shopping malls in Norway is an innovative and exiting approach. Bygballe, Bø, and Grønland (2012) identified that shipment configuration 2 and 4 obtained the best score in relation to flexibility among the four, while they in addition resulted increased costs compared to shipment configuration 1 and 3. Hence, by utilizing shipment configuration 3, their theory indicates that retailers should be able to reduce their logistics costs.

When comparing the operational steps in configuration 4, which is applied in both FCL- and BCN-shipments, to configuration 3, we see that the differences are within the country of delivery (Norway). Processes in country of origin are the same for these two configurations. Looking more detailed into what operational steps the goods have to undergo with the current configuration, we see that these are:

1. Customs declaration
2. Transporting the container from the port to the unloading site
3. Unloading the container
4. Store the goods at warehouse (W) or distribution center (DC) until final delivery
5. Consolidating goods stored at W/DC into a lorry
6. Transporting the goods by a lorry to the receiving area at the shopping mall
7. Unloading the goods from the lorry
8. Delivering the goods to the final customer (retail store)

If retail companies apply configuration 3, where the container is unloaded directly at the receiving area of shopping malls, the eight operational steps above would be cut down to only four:

1. Customs declaration
2. Transporting the container from the port to the unloading site
3. Unloading the container
4. Delivering the goods to the final customer (retail store)

The differences in the operational steps performed in Norway are the main reason for why configuration 3 is interesting. For each operational step, additional costs occur. Hence, when applying shipment configuration 3 instead of configuration 2 or 4, the logistics costs should be reduced. Actual cost savings will be analyzed in the following subchapter. The operational processes for each of the considered configurations are summed up in Table 7.3.

Operational steps in country of delivery (Norway)	Shipment configuration 2 & 4	Shipment configuration 3
Customs declaration	x	x
Transporting the container from the port to the unloading site	x	x
Unloading the container	x	x
Store the goods at warehouse (W) or distribution center (DC) until final delivery	x	
Consolidating goods stored at W/DC into a lorry	x	
Transporting the goods by a lorry to the receiving area at the shopping mall	x	
Unloading the goods from the lorry	x	
Delivering the goods to the final customer (retail store)	x	x

Table 7.3 - Operational steps in Norway (Configuration 2 & 4 versus 3)

7.5 Logistics costs

The estimated costs for the transportation routes indicate that there is a potential for cost savings by using the direct delivery configuration. This is in line with what Bygballe, Bø, and Grønland (2012) claimed in their research of international supply to the Norwegian market. The costs per pallet for the different routes are shown in Figure 6.4. It is important to clarify that the costs only include the costs for the transportation in Norway. Costs related to the consolidation process in the country of origin are not included in this calculation. It is likely that these costs will be somewhat increased for the deliveries conducted in containers directly to shopping malls in Norway. The handling will arguably be more demanding and time consuming when the shipment has to be prepared in order to be delivered

directly to the stores. Also, potential differences in the shipping costs to Oslo versus the shipping costs to Gothenburg have not been taken into account here. This is a weakness in our calculations.

Figure 7.8 lists up the results from our cost calculations. The figures are the cost per pallet, from arriving to the port in Oslo to the delivery at the shopping malls.

	From:	Via:	To:	
			AMFI Moss	Strømmen Storsenter
Deliveries going via the central warehouses	Oslo Harbour	Varner Group CW	462	431
	Gothenburg Harbour	KappAhl CW	658	679
	Oslo Harbour	H&M CW	457	305
	Gothenborg Harbour	Lindex CW	661	683
Container delivery	Oslo Harbour	----------	289	105

Figure 7.8 - Local transportation costs per pallet (NOK)

From the numbers in Figure 7.8 we calculated the potential cost savings for the retailers (Figure 7.9). The costs are case specific and show potential savings for direct container deliveries to AMFI Moss and Strømmen Storsenter for containers arrived at the port of Oslo.

	AMFI Moss	Strømmen Storsenter
Varner Group	168	325
KappAhl	364	572
H&M	162	198
Lindex	367	577

Figure 7.9 - Savings per pallet (NOK)

For all four retailers there are cost saving potentials by using the direct delivery configuration. Especially for KappAhl and Lindex, who have warehouses located in Sweden, the cost savings are significant with savings of 572 NOK and 577 NOK respectively in potential savings per pallet for deliveries to Strømmen Storsenter. The figures for deliveries to AMFI Moss are 364 NOK (KappAhl) and 367 NOK (Lindex). The savings are mainly related to the lapsed handling costs at

the warehouses but also to the reduced distance and time costs for driving. Our estimates indicate that direct deliveries will reduce the costs at Varner and H&M as well.

It is important to notice that the estimates related to deliveries to Strømmen Storsenter do not include the cost for operating the manned receiving area. Figure 7.10 shows the unloading costs for AMFI Moss and Strømmen Storsenter. There are two estimates for Strømmen Storsenter: One delivering pallets to the manned receiving area operated by ColliCare, and the other is for the situation where the pallets are delivered to the stores by the drivers. The costs related to operating the receiving area are not included in our original calculation. Hence, it is interesting to discuss the differences here. If the cost for operating the receiving area does not exceed the cost difference between the two estimates, we would argue that the manned receiving area is cost efficient. However, due to confidentiality we did not get access to the cost figures related to the manned receiving area at Strømmen Storsenter. With basis in our observations and time measurements, we can claim that the difference in unloading cost per delivery is approximately 1000 NOK depending on whether it is manned or not. Hence, if ColliCare delivers the pallets to the stores at Strømmen to a cost which is lower than that amount, the manned receiving area is cost efficient.

Delivery of 15 pallets (lorry)

Place of delivery	Unloading cost
AMFI Moss	1797 NOK
Strømmen Storsenter Colli Care	551 NOK
Strømmen Storsenter driver to store	1606 NOK

Delivery of 11 pallets (20' container)

Place of delivery	Unloading cost
AMFI Moss	1324 NOK
Strømmen Storsenter ColliCare	406 NOK
Strømmen Storsenter driver to store	1183 NOK

Figure 7.10 - Unloading costs

The sensitivity of the estimates is important to comment on as well. The distance costs for driving with container on chassis are close to 1 NOK more expensive per kilometer compared to the regular lorries (Appendix 5.7). Hence, the benefits will be effaced when the driving distances increase. For deliveries to other parts of the

country it would be appropriate to ship the container to the local ports, and organize the deliveries on chassis from here. Such a solution would be in line with the desire in VelgSjøveien (2012), namely to move goods transportation from road to sea. However, this is a question of costs and facilitation. The aim of the VelgSjøveien (2012) initiative is to make sea transport more attractive and competitive. If it succeeds, the solution with container deliveries to shopping malls could exploit this, and create a win-win situation where the goods owners get reduction in distribution costs and the government reduces the number of goods vehicles on the Norwegian roads.

7.6 Flexibility

The flexibility of the shipment configuration is highly important and relevant in relation to the service level and performance of the company.
A distribution centre/warehouse in Norway enables the retailers to respond quickly to demand changes and the urgent needs of their retail-stores. This is what Lee (2004) defines as "Agility" and states as crucial for supply chains in order to succeed in today's business context. It all relates to sustaining the retailers service levels. If a store goes out of stock and needs new supplies of specific products, the warehouse serves as a feeder with quick response time. The requested items can be delivered to the stores within days, or even hours, with such a solution.
In a situation where the container is delivered directly to a shopping mall without going by a central warehouse in Norway, the final handling happens in the country of origin. The transit time from China to Norway is long, more or less 30 days (SeaRates 2014). Hence, the ability to respond quickly to demand changes and orders is considered low for this configuration. This configuration fails to be agile, and is therefore considered as not appropriate as a sole solution for the retailers. However, it can work as a supplement to the warehouse solution in situations where it is beneficial. An example is situations when the stores are changing assortment due to a new season. When the summer season starts, the stores are taking in many new products. This could typically be a situation where the date for the assortment change is more or less set and a direct delivery could be applicable. Another situation is the start of campaigns, where volumes are generated and planned in advance (Bygballe, Bø, and Grønland 2012). Instead of transporting these products via the warehouses, they could possibly go directly to

the relevant stores. With basis in these considerations, we have classified the flexibility of the direct container delivery configuration as low. This is also in line with what Bygballe, Bø, and Grønland (2012) concludes in their research, namely that the configuration is the most cost efficient but the least flexible.

8 Conclusion

Direct delivery of containers to shopping malls in Norway is a possibility that can be utilized by retailers in Norwegian business. Our case study of the conditions at Strømmen Storsenter and AMFI Moss shows that both malls can receive container deliveries. However, we evaluate that Strømmen Storsenter, due to their manned receiving area, is better facilitated to handle container deliveries in practice compared to AMFI Moss. The business context of today is characterized by specialization and professionalization of tasks. In line with Bjørnland, Bjerkelund, and Granquist (2001), we consider the possibility of letting staff at the receiving area handle the final distribution at the mall as an efficient solution. Our observations showed that there is a potential for improved efficiency of the final-distribution at shopping malls through manned receiving areas. However, there are challenges related to the cost aspect of such a solution which is in need of further examination.

Our calculations support the conclusion in Bygballe, Bø, and Grønland (2012), namely that the configuration without warehouse/distribution centre in Norway is the most cost efficient solution. However, the flexibility of such a solution is limited. Hence, the shipment method should not be seen as a replacement of the warehouse configuration, but rather as a supplement. The findings in our research indicate that the shipment configuration with direct container deliveries to shopping malls in Norway could be attractive for certain types of deliveries. In situations where the products are intended to go directly to the stores, a container solution would be cost efficient, skipping the extra cost of going by a warehouse/distribution centre in Norway. Such a solution is dependent on close cooperation with the distribution centre in the country of origin, ensuring that the packaging and labelling is done in accordance to specifications from the retailer. It is also dependent on large enough volumes in order to be attractive.

We consider it to be most appropriate if a logistics provider organizes and manages the consolidation and distribution of the containers. Lastly, we propose that hydraulic lifting platforms should be standard equipment at receiving areas of shopping malls in order to improve the flexibility related to deliveries.

9 Limitations and further research

This research has focused on examining the possibility of delivering goods in 20' containers to shopping malls in Norway. Due to limitations related to the time aspect, we had to settle with looking at two shopping malls. It is impossible to generalize the findings of the accessibility at the shopping malls with basis in observations at two malls. Each shopping mall has its unique receiving areas which have to be measured in order to conclude on the question of whether it is facilitated to handle 20' container deliveries. We are aware that there is a wide range of different container types. This research only investigated the possibility of unloading a 20' container at shopping malls in Norway. Exploring the conditions related to other container sizes (i.e. 40' container) could be a supplement to this study. Calculating the costs per pallet when handling larger volumes might prove to be even more cost efficient. Similar to containers, it exist a wide range of pallet types. The dimension of the EUR-pallet is optimized for utilizing the capacity of trucks, not containers. There are alternative pallet types which are designed for utilizing the container space. We have not considered other pallet types in our thesis, but it could be interesting to investigate how these pallet types could improve the fill rate and cost effectiveness of our presented solution.

In our case selection, we intended to display differences between a shopping mall operating with a manned receiving area versus the traditional and most common practice where the transporters deliver the goods to the stores inside the shopping mall. It would have been interesting to look at other shopping malls in the area as well and look deeper into the possibility of setting up a "Milk Run"-route between these shopping malls.

Another aspect that would have been interesting to look at is deliveries to shopping malls that are located further from the central warehouses. The intention is that a potential container delivery to another part of Norway would be shipped directly to the local port. This would move some of the goods transportation from road to sea, which is the aim of the government in the pursuit for creating more sustainable transport in Norway (Samferdselsdepartement 2013). The related cost aspects and environmental effects of this would be of interest.

We had to restrict the cost calculations due to the fact that collection of information and data about the costs and routines outside of Norway would have been too time consuming considering the scope of the thesis. This is a weakness of our study. We consider a total cost analysis, which includes the accruing costs in Asia, as a potentially valuable supplement to this research.

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Appendices

Appendix 5.1 – The interview guide for Strømmen Storsenter

Spørsmål til senterleder/driftssjef ved **Strømmen Storsenter**

1) Hvor mange ramper/mottak finnes tilknyttet senteret?
2) Finnes det oversikt over hvor mange leveranser som skjer pr dag?
   a) Hvis ja på spørsmålet over: Hva er disse tallene ved Strømmen Storsenter?
3) Hvorfor har dere valgt å operere med et betjent varemottak og ikke et tradisjonelt ubetjent mottak?
4) Hvilke erfaringer har blitt gjort vedrørende betjent varemottak på Strømmen Storsenter?
   a) Positive erfaringer?
   b) Negative erfaringer?
   c) Effektivt kostnadsmessig?
      i) Hvorfor?
      ii) Hvorfor ikke?
5) Hvordan skjer en typisk vareleveranse til retail-kunde på deres senter?
   a) Rutiner?
   b) Hvem har ansvar hvor?
   c) Er det sjåføren som leverer inn i butikk?
6) Hva fungerer spesielt godt og hva kan forbedres ved deres varemottak?
7) Finnes det i dag leietakere ved Strømmen Storsenter som samarbeider om vareleveranser?
8) Er det fysisk/praktisk mulig å få levert en container til Strømmen Storsenter?
9) Hva er utfordringene med (eventuelle) container-leveranser ved Strømmen Storsenter?
10) Har direkte containerleveranser vært etterspurt av deres leietakere?
11) Kjenner du til sentre hvor det er mulig å ta imot container-leveranser?
12) Vil en slik type løsning være interessant fra en senterleders/driftssjefs perspektiv?
   a) Hvorfor?
   b) Hvorfor ikke?
13) Er det andre relevante punkter knyttet til levering av varer til deres senter som vi ikke har klart å avdekke med spørsmålene over?

Appendix 5.2 – The interview guide for AMFI Moss

Spørsmål til senterleder/driftssjef ved **AMFI Moss**

1) Hvor mange ramper/mottak finnes tilknyttet senteret?
2) Finnes det oversikt over hvor mange leveranser som skjer pr dag?
   a) Hvis ja på spørsmålet over: Hva er disse tallene hos AMFI Moss?
3) Hvordan skjer en typisk vareleveranse til retail-kunde på deres senter?
   a) Rutiner?
   b) Hvem har ansvar hvor?
   c) Er det sjåføren som leverer inn i butikk?
4) Hvorfor opererer AMFI Moss med ubetjent varemottak?
   a) Hvilke tanker har blitt gjort vedrørende betjent varemottak på AMFI Moss?
5) Hva fungerer spesielt godt og hva kan forbedres ved deres varemottak?
6) Finnes det i dag leietakere ved AMFI Moss som samarbeider om vareleveranser? Får levert varer samtidig?
7) Er det fysisk/praktisk mulig å få levert en container til AMFI Moss?
8) Hva er utfordringene med (eventuelle) container-leveranser ved AMFI Moss?
9) Har direkte containerleveranser vært etterspurt av deres leietakere?
10) Kjenner du til sentre hvor det er mulig med container-leveranser?
11) Vil en slik type løsning være interessant fra en senterleders/driftssjefs perspektiv?
   a) Hvorfor?
   b) Hvorfor ikke?
12) Er det andre relevante punkter knyttet til levering av varer til deres senter som vi ikke har klart å avdekke med spørsmålene over?

Appendix 5.3 – The interview guide for the "Horizontal Cooperation" variable

Logistikk-samarbeid med konkurrerende aktører

1) Går alle deres importerte varer via et sentrallager og/eller en fordelingsterminal før det distribueres ut i butikk?
   a) Eller opererer dere også med leveranser som går direkte fra ankomsthavn i Norge til butikk?
2) Foregår det noen form for samarbeid mellom dere og deres *konkurrenter* når det kommer til transport av importerte varer fra Asia?
3) Foregår det noen form for samarbeid mellom dere og andre retail-kjeder, *ikke konkurrenter*, når det kommer til transport av importerte varer fra Asia?
4) Hvilke tanker har dere gjort rundt det å (eventuelt) samarbeide med konkurrerende retail-kjeder når det gjelder logistikken knyttet til import av varer?
5) Vil en mulig direkteleveranse av containere til kjøpesentre være en interessant løsning for dere?
   a) Hvorfor?
   b) Hvorfor ikke?
6) Dersom det skulle vise seg å være lønnsomt, kan det være aktuelt å samarbeide direkte med konkurrerende retail-kjeder for å muliggjøre direkteleveranser til kjøpesentre?
   a) Hvorfor?
   b) Hvorfor ikke?
7) Vil spørsmålet over få et annet svar dersom dette samarbeidet ble operert gjennom et uavhenging tredjeparts logistikk firma?
   a) Hvorfor?
   b) Hvorfor ikke?

Appendix 5.4 – Price trend Norwegian road freight transport 2010-2014 (Statistics Norway)

tid	Stykkgods/containergods	Stykkgods/containergods, endring fra samme periode året før (prosent)
2010K1	99.7	0.2
2010K2	99.7	1.1
2010K3	99.8	0.7
2010K4	100.8	1.7
2011K1	102.1	2.4
2011K2	104.5	4.9
2011K3	104.8	5.0
2011K4	105.4	4.5
2012K1	108.4	6.2
2012K2	109.3	4.6
2012K3	110.0	5.0
2012K4	110.7	5.1
2013K1	111.9	3.2
2013K2	112.7	3.1
2013K3	114.0	3.7
2013K4	114.2	3.1
2014K1	115.2	2.9

Appendix 5.5 – Vehicle capacity

CAPACITY

Vehcile type	Capacity (in tons per vehicle)
LGV	2,2
Light distribution	5,7
Heavy distribution, closed unit	9
Heavy distribution, containers	12
Articulated semi closed	33
Articulated semi, containers	33
Tank truck distance	33
Dry bulk truck	37
Timber truck with hanger	34
Termo truck	33

Appendix 5.6. Distances

Distances

	From:	To:	Distance
Shopping malls	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Amfi Moss, Prinsens gate 2A, 1530 Moss	61,3 km
	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Strømmen Storsenter, Støperiveien 5, 2010 Strømmen	18,8 km
Varner	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Toveien 28, 1540 Vestby (Lager)	44,8 km
	Toveien 28, 1540 Vestby (Lager)	Strømmen Storsenter, Støperiveien 5, 2010 Strømmen,	56,7 km
	Toveien 28, 1540 Vestby (Lager)	Amfi Moss, Prinsens gate 2A, 1530 Moss	19,5 km
H&M	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Alf Bjerckes vei 26, 0582 Oslo (Lager)	10 km
	Alf Bjerckes vei 26, 0582 Oslo (Lager)	Strømmen Storsenter, Støperiveien 5, 2010 Strømmen	15,3 km
	Alf Bjerckes vei 26, 0582 Oslo (Lager)	Amfi Moss, Prinsens gate 2A, 1530 Moss	63,6 km
KappAhl	Göteborg havn, Emigrantvägen 2B, 414 63 Göteborg, Sverige	KappAhl Mölndal AB, Idrottsvägen 14, 431 62 Mölndal, Sverige (Lager)	12,8 km
	KappAhl Mölndal AB, Idrottsvägen 14, 431 62 Mölndal, Sverige (Lager)	Strømmen Storsenter, Støperiveien 5, 2010 Strømmen	312 km
	KappAhl Mölndal AB, Idrottsvägen 14, 431 62 Mölndal, Sverige (Lager)	Amfi Moss, Prinsens gate 2A, 1530 Moss	245 km
Lindex	Göteborg havn, Emigrantvägen 2B, 414 63 Göteborg, Sverige	Laxfiskevägen 4B, 433 38 Partille, Sverige (Lager)	14,2 km
	Laxfiskevägen 4B, 433 38 Partille, Sverige (Lager)	Strømmen Storsenter, Støperiveien 5, 2010 Strømmen	312 km
	Laxfiskevägen 4B, 433 38 Partille, Sverige (Lager)	Amfi Moss, Prinsens gate 2A, 1530 Moss	244 km

Appendix 5.7 - Distance costs

Distance costs

Vehicle type	Cost in NOK per km - vehicle	Adjusted, 2014
LGV	2,62	3,01
Light distribution	3,17	3,65
Heavy distribution, closed unit	4,01	4,61
Heavy distribution, containers	4,86	5,59
Articulated semi closed	5,86	6,74
Articulated semi, containers	5,94	6,83
Tank truck distance	5,55	6,38
Dry bulk truck	5,55	6,38
Timber truck with hanger	5,61	6,45
Termo truck	6,04	6,95

Appendix 5.8 – Time costs

Time costs

Vehicle type	Cost in NOK per hour (2010)	Adjusted, 2014
LGV	409	470
Light distribution	420	483
Heavy distribution, closed unit	456	524
Heavy distribution, containers	458	527
Articulated semi closed	471	542
Articulated semi, containers	500	575
Tank truck distance	505	581
Dry bulk truck	516	593
Timber truck with hanger	512	589
Termo truck	467	537

Appendix 5.9 – Terminal costs

Terminal costs

Vehcile type	Cost per ton, incl the vehicles timecost in terminal	Cost per consignment	Adjusted cost per ton, 2014	Adjusted cost per consignment, 2014
LGV	315	51	362	59
Light distribution	215	54	247	62
Heavy distribution, closed unit	174	95	200	109
Heavy distribution, containers	128	106	147	122
Articulated semi closed	161	91	185	105
Articulated semi, containers	129	100	148	115
Tank truck distance	9	85	10	98
Dry bulk truck	15	56	17	64
Timber truck with hanger	26	235	30	270
Termo truck	161	58	185	67

Appendix 5.10 – Calculations for estimating handling costs

Average monthly salary 1)	31 400	NOK
Number of months	12	
Yearly salary	376 800	NOK
Social costs 2)	35 %	
Total cots warehouse employee	508 680	NOK
Working hrs per week	37,5	hrs
Working weeks per year	47	weeks
Time spent building one pallet 3)	25	min
	0,42	hrs
Timecost handling per hr		
Norway	**289**	NOK
Sweden 4)	**156**	NOK
Timecost handling per pallet		
Norway	**120**	NOK
Sweden	**65**	NOK

1) http://www.virke.no/talloganalyse/Documents/L%C3%B8nnsstatistikk_varehandel_2012.pdf
2) http://kunnskapssenteret.com/beregning-sosiale-kostnader/
3) Own assumption
4) http://sverige-norge.se/arbeidsgiver/informasjon/loner-i-sverige/

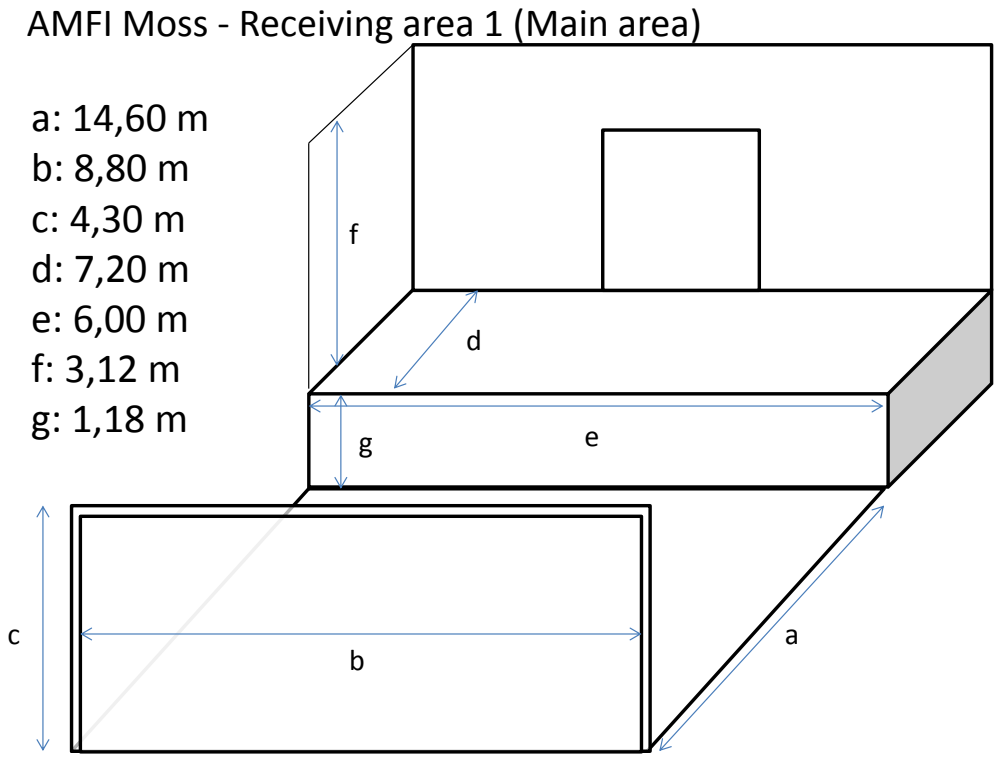
Appendix 5.11 – Overview of the calculations

Loading/Unloading cost:	Time cost*(time spent to deliver one pallet*number of pallets)
Loading/Unloading cost per consignment:	Terminal cost*1
Distance cost per km:	Distance cost*driving distance
Time cost per hour:	Time cost per hour*((Distance A-B)/(Driving speed A-B))
Handling cost at CW	See Appendix 5.10
Total cost:	Sum of the above variables.
Cost per pallet:	Total costs/number of pallets (11 for container, 15 for lorry)

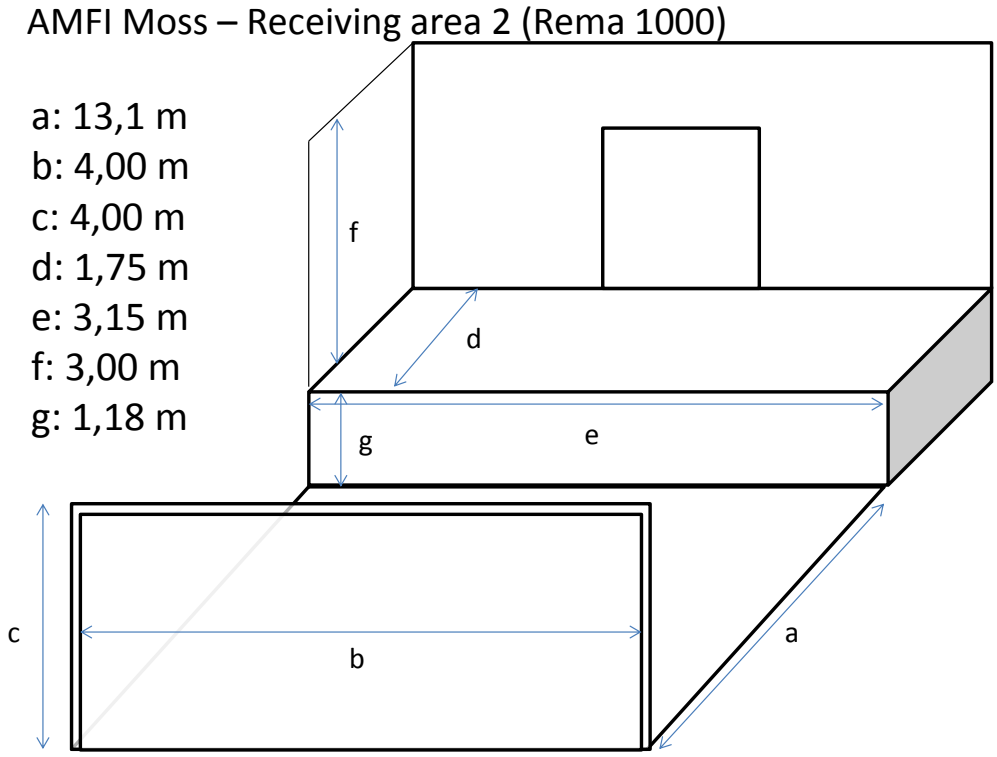
Appendix 5.12 – Complete Excel calculations

	From:		Distance	a) Estimated time (in minutes)	b) Estimated average speed	c)	d) Estimated speed adjusted for max speed	e) Loading cost	f) Loading cost per consignment*Y	g) Handling cost at CW	h) Distance cost per km*(Distance A-B)	i) Timecost per hour*((Distance A-B)/(Driving speed A-B)	j) Unloading cost	k) Unloading cost per consignment*Y	l) Unloading cost per consignment*Y	m) Total costs		n) Cost per pallet	
Shopping malls	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Amfi Moss, Prinsens gate 2A, 1530 Moss	61,3 km	45	81,7	km/h	75,0		122		685	861	1324	122	122	3236	NOK	294	NOK
	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Strømmen Storsenter, Støperiveien 5, 2010	18,8 km	18	62,7	km/h	62,7		122		210	316	406	122	122	1176	NOK	107	NOK
Varner	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Toveien 28, 1540 Vestby (Warehouse)	44,8 km	35	76,8	km/h	75,0		122		501	629	261	122	122	1635	NOK	149	NOK
	Toveien 28, 1540 Vestby (Warehouse)	Strømmen Storsenter, Støperiveien 5, 2010	56,7 km	45	75,6	km/h	75,0	354	109	1804	0	793	551	109		3720	NOK	248	NOK
	Toveien 28, 1540 Vestby (Warehouse)	Amfi Moss, Prinsens gate 2A, 1530 Moss	19,5 km	19	61,6	km/h	61,6	354	109	1804	0	343	1797	109		4517	NOK	301	NOK
H&M	Oslo Havn KF, Akershusstranda 19, 0102 Oslo	Alf Bjerckes vei 26, 0582 Oslo (Warehouse)	10 km	15	40,0	km/h	40,0		122		112	263	261	122	122	880	NOK	80	NOK
	Alf Bjerckes vei 26, 0582 Oslo (Warehouse)	Strømmen Storsenter, Støperiveien 5, 2010	13,9 km	18	46,3	km/h	46,3	354	109	1804	128	315	551	109		3370	NOK	225	NOK
	Alf Bjerckes vei 26, 0582 Oslo (Warehouse)	Amfi Moss, Prinsens gate 2A, 1530 Moss	63,6 km	50	76,3	km/h	75,0	354	109	1804	587	889	1797	109		5650	NOK	377	NOK
KappAhl	Göteborg havn, Emigrantvägen 2B, 414 63 Göteborg, Sverige	KappAhl Mölndal AB, Idrottsvägen 14, 431 62	12,8 km	12	64,0	km/h	64,0		122		143	211	141	122	122	738	NOK	67	NOK
	KappAhl Mölndal AB, Idrottsvägen 14, 431 62 Mölndal, Sverige	Strømmen Storsenter, Støperiveien 5, 2010	312 km	203	92,2	km/h	75,0	191	109	974	2878	4363	551	109		9175	NOK	612	NOK
	KappAhl Mölndal AB, Idrottsvägen 14, 431 62 Mölndal, Sverige	Amfi Moss, Prinsens gate 2A, 1530 Moss	245 km	160	91,9	km/h	75,0	191	109	974	2260	3426	1797	109		8867	NOK	591	NOK
Lindex	Göteborg havn, Emigrantvägen 2B, 414 63 Göteborg, Sverige	Laxfiskevägen 4B, 433 38 Partille, Sverige	14,2 km	14	60,9	km/h	60,9		122		159	246	141	122	122	789	NOK	72	NOK
	Laxfiskevägen 4B, 433 38 Partille, Sverige (Warehouse)	Strømmen Storsenter, Støperiveien 5, 2010	312 km	198	94,5	km/h	75,0	191	109	974	2878	4363	551	109		9175	NOK	612	NOK
	Laxfiskevägen 4B, 433 38 Partille, Sverige (Warehouse)	Amfi Moss, Prinsens gate 2A, 1530 Moss	244 km	154	95,1	km/h	75,0	191	109	974	2250	3412	1797	109		8844	NOK	590	NOK

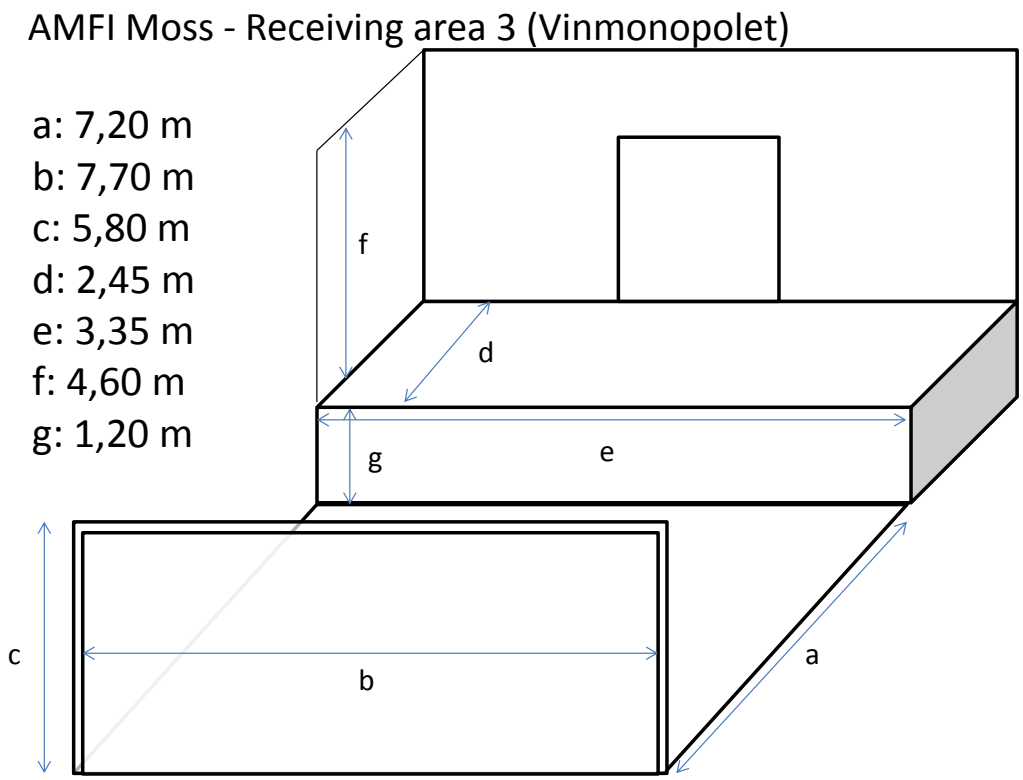
Appendix 6.1 – Measures of the main receiving at AMFI Moss



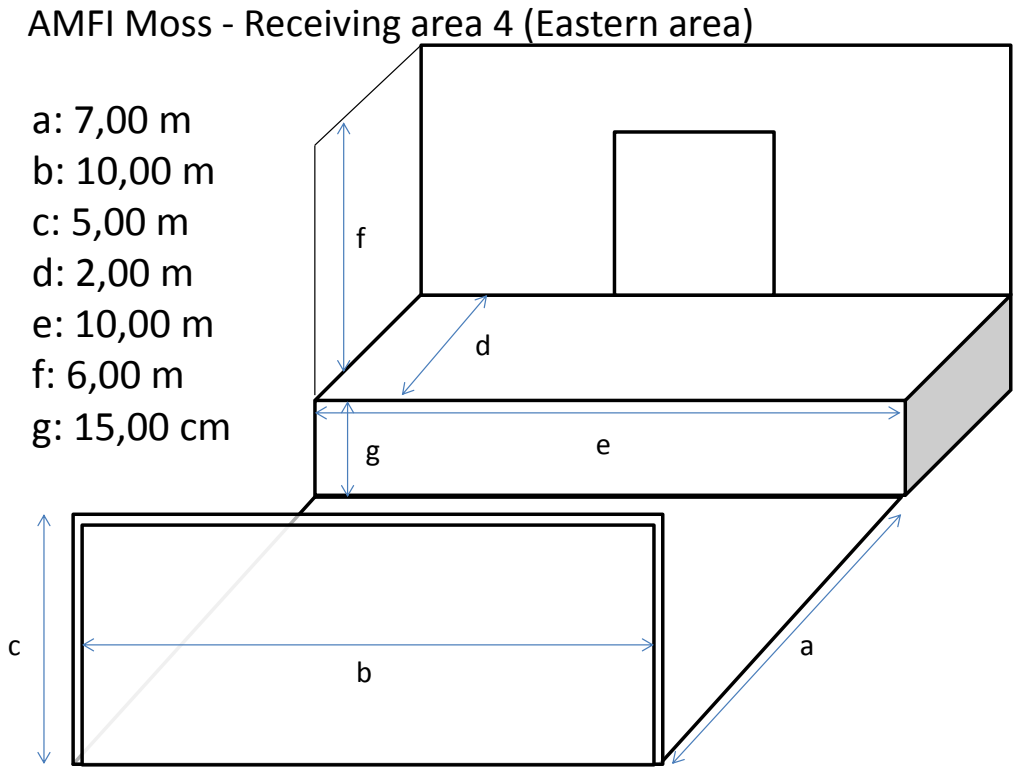
Appendix 6.2 – Measures of receiving area for Rema 1000 at AMFI Moss



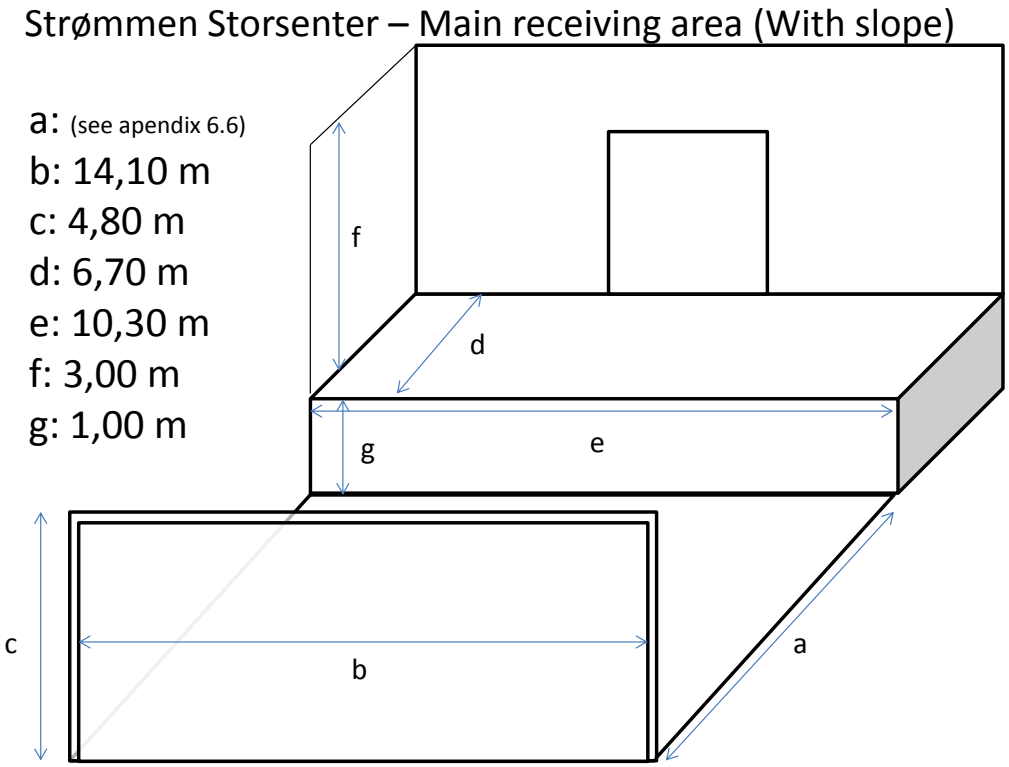
Appendix 6.3 – Measures of receiving area for Vinmonopolet at AMFI Moss



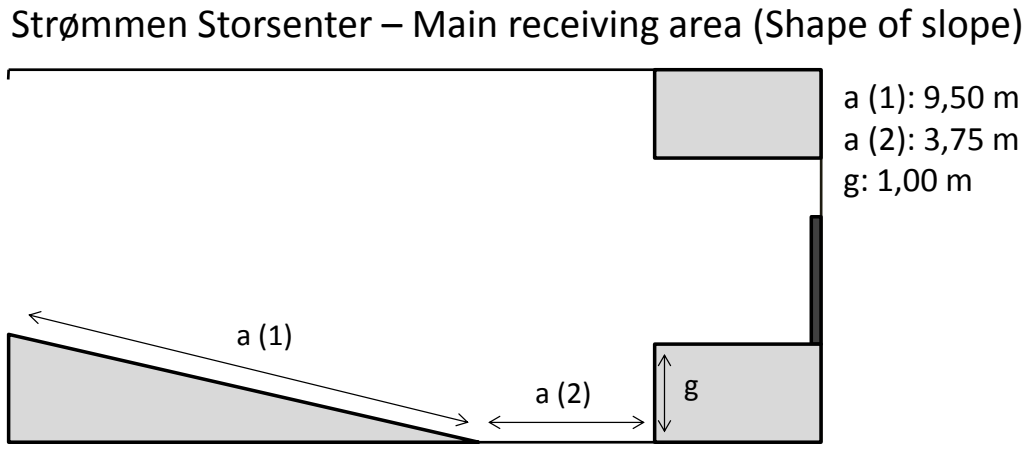
Appendix 6.4 – Measures of the eastern receiving area at AMFI Moss



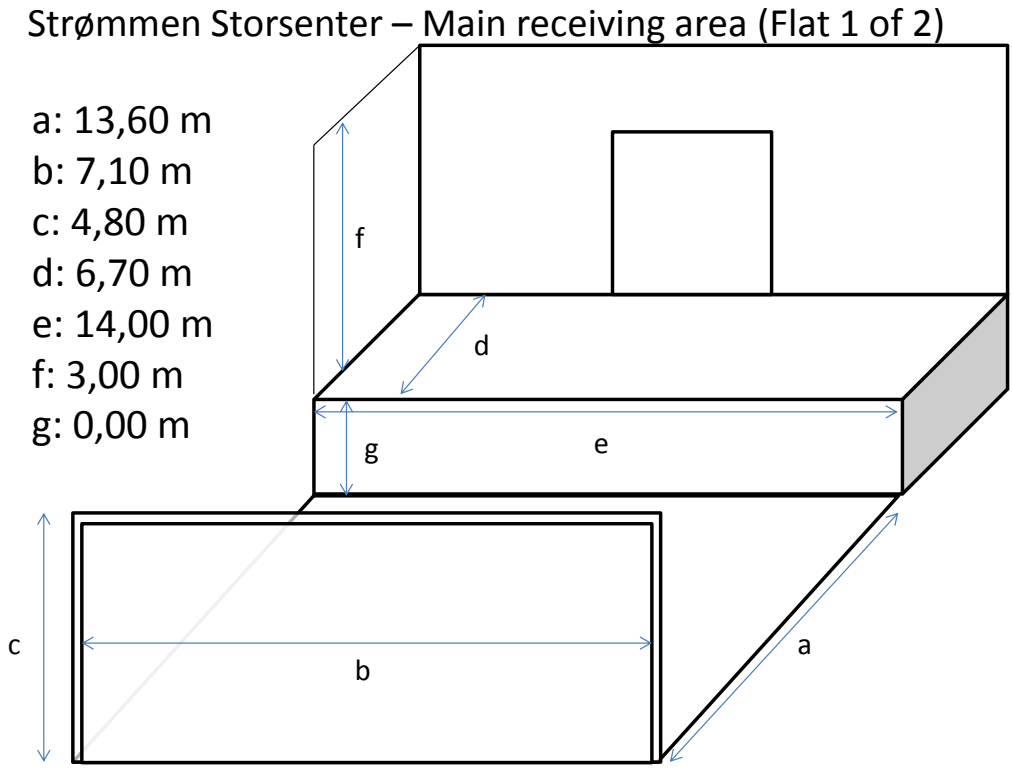
Appendix 6.5 – Measures of main receiving area (with slope) at Strømmen



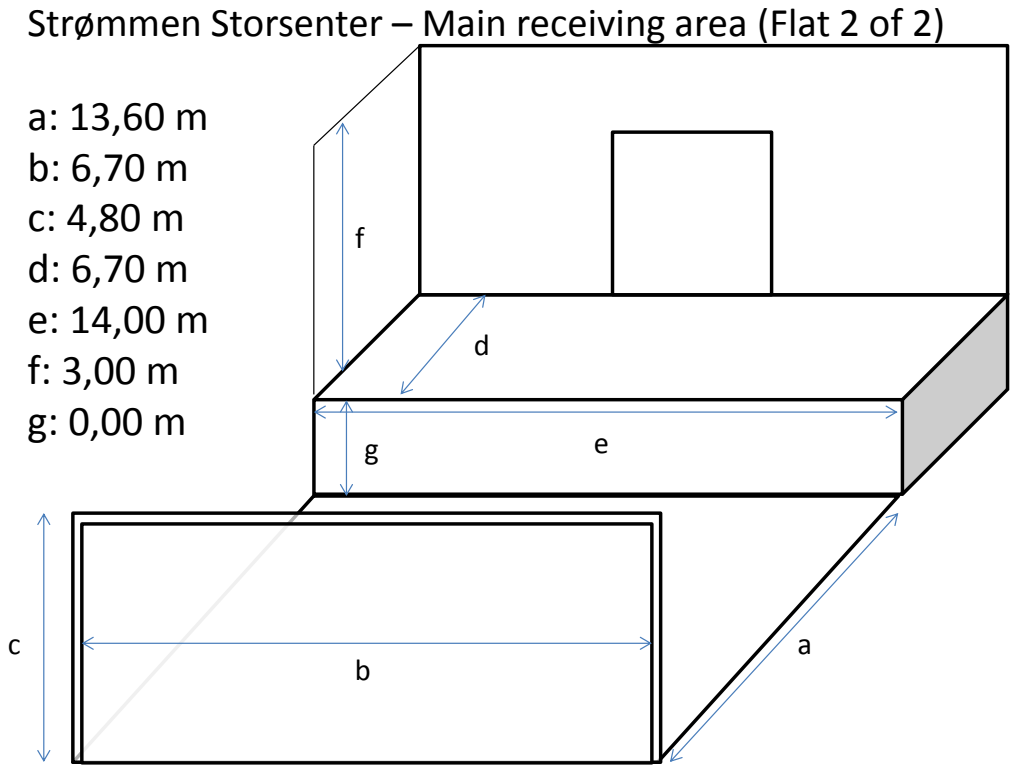
Appendix 6.6 – Profile of the sloped receiving area at Strømmen



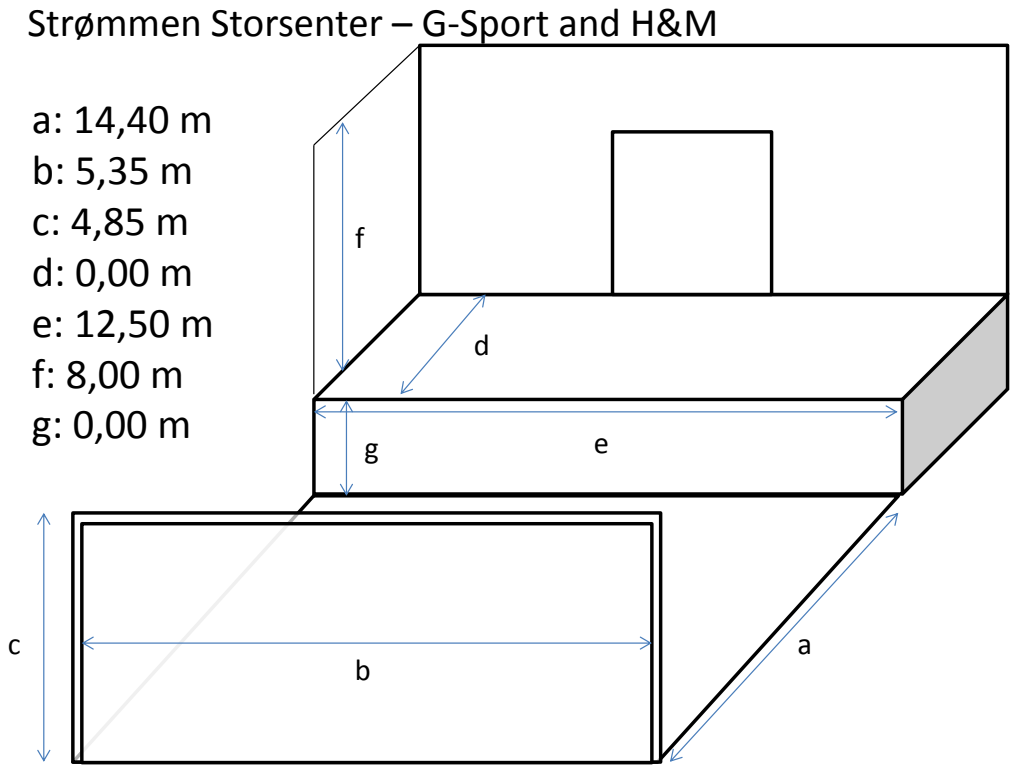
Appendix 6.7 – Measures of main receiving area (Flat 1 of 2) at Strømmen



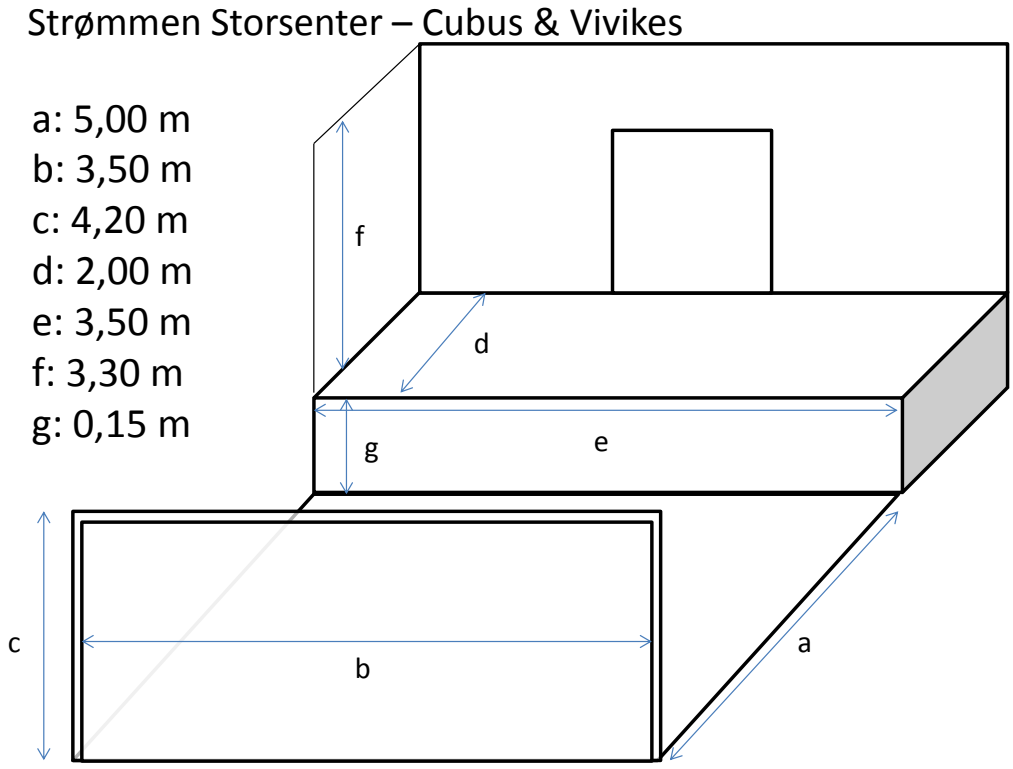
Appendix 6.8 – Measures of main receiving area (Flat 2 of 2) at Strømmen



Appendix 6.9 – Measures of receiving area G-Sport and H&M at Strømmen



Appendix 6.10 – Measures of receiving area Cubus and Vivikes at Strømmen



Appendix 7.1 – Geographical location of the selected provinces

Preliminary Thesis Report

Student numbers: **0873783**
: **0876941**

Preliminary Thesis Report
BI Norwegian Business School

"Is it possible for third party logistics providers to perform FCL-deliveries directly to shopping malls in Norway, and how will such a solution affect total costs, lead-times and agility?"

Hand-in date:
15.01.2014

Campus:
BI Oslo

Examination code and name:
GRA 19003 – Preliminary Thesis Report

Supervisor:

Bente Flygansvær

Programme:
Master of Science in Business
Logistics – Supply Chains and Networks

Content

1 Summary

In this paper we will present the research proposal of our master thesis. Our thesis will focus on a third party logistics (3PL) provider where a new type of service is considered.

During recent years Norwegian retail companies have increased their amount of imported goods/products. The reason is related to the constant focus on cost savings. More and more products are produced in the eastern part of the world, i.e. China, where labour costs are significantly lower than in Norway. For the retail companies this implies more complex, international supply chains.

The importance of managing international supply chains and networks has been discovered in both research and in the business environment. Some companies have built their core competence around managing international supply, known as 3PL. Third party logistics providers offer solutions where they handle the physical distribution, from the suppliers to the place of delivery, for their customers.

Horizontal collaboration is a relatively new field in the sense of logistics, where companies cooperate on the physical distribution, even when they are competitors, in order to minimize costs. In the sense of 3PL providers, such cooperation can contribute to expand the services provided for their customers.

The objective of this study is to look at the possibility for a 3PL provider of implementing a service where a full container load (FCL) can be delivered directly to a shopping mall in Norway, and measure the efficiency in terms of total costs, lead time and agility in this respect. We will also map how the deliveries are done today, and compare the two situations through the given efficiency measures. Given the objective, we have created the following research question: *"Is it possible for third party logistics providers to perform FCL-deliveries directly to shopping malls in Norway, and how will such a solution affect total costs, lead-times and agility?"*

Through this research proposal we will present our developed research model, the research methodology, as well as a literature review on previous studies that we find relevant for our study. At the end of this paper, we present our tentative project plan.

1 Introduction

1.1 Background

This thesis proposal is intended to give an overview and an initial understanding of the purpose and scope of our master thesis.

The scope of our thesis was firstly introduced to us during a meeting with a representative for Kuehne + Nagel AS in May 2013. He mentioned that they in the future would like to offer a new service to their customers in Norway: Door-to-door deliveries of full container load (FCL), from port of loading and all the way directly to shopping centres in Norway, without unpacking the cargo. However, he mentioned that this could be difficult to execute, and that the idea needed to be examined further. We wanted to write a thesis with practical relevance that could be useful for the company we were going to write for. The idea proposed by Kuehne + Nagel AS caught our attention as a case that seemed interesting to look into.

1.2 About Kuehne + Nagel

In this paper we distinguish between Kuehne + Nagel and Kuehne + Nagel AS. We refer to Kuehne + Nagel as the global company, while Kuehne + Nagel AS is the company stationed in Norway.

"Kuehne + Nagel was founded in Bremen, Germany, by August Kuehne and Friedrich Nagel in 1890. Since this date, Kuehne + Nagel has grown into one of the world's leading logistic providers, and they provide innovative and fully integrated supply chain solutions to their customers. Today, Kuehne + Nagel Group have more than 1000 offices in over 100 countries, with over 63.000 employees. Their key business is built on, as they call it, their world class capabilities in different freight segments:

- Seafreight
- Airfreight
- Contract Logistics
- Road & Rail Logistics"

(Kuehne + Nagel 2014)

In the freight segments, sea and air, Kuehne + Nagel acts as a forwarder. A freight forwarder facilitates the flow of goods on behalf of their customers in cooperation with brokers and agents (Coyle et al. 2011, 261), and this is the role of Kuehne + Nagel in our thesis. It is important for Kuehne + Nagel to maintain a good relationship with their partners (brokers and agents) in order to keep their position as a global leading freight forwarder. Without partners, the company are unable to offer their customer this service. Mainly because the equipment used in a freight forwarder operation is owned by their partners and not by Kuehne + Nagel themselves. Its contract logistics offers warehousing to their customers, while its road & rail logistics offers physical distribution of goods.

1.2.1 Example of a service offered by Kuehne + Nagel AS

One of the customers of Kuehne + Nagel AS is a retail company, which will not be addressed in this paper due to the duty of confidentiality. The retail company has most of their clothing production done in China by selected manufacturers. The service performed by Kuehne + Nagel AS is mainly to arrange the transport of finished clothing from port of loading to the place of delivery. In this respect Kuehne + Nagel acts as a forwarder. When the retail company need goods shipped from China to Norway, they place an order at Kuehne + Nagel AS with a description of the cargo. After the order is placed, Kuehne + Nagel AS take control of the transportation on behalf of the retail company. They book a container and space on a suitable container vessel, based on their agreements with different ocean carriers. When the booking is confirmed the container(s) can be loaded according to the load-plan received. Then the fully loaded container(s) are placed on the vessel and shipped to Norway. The last operation in the agreement is that Kuehne + Nagel AS transports the container(s) to the central warehouse of the retail company where the cargo is unloaded. From their own warehouse, the retail company distributes the goods out to the final stores themselves.

The agreement description above is just an example of a solution offered by Kuehne + Nagel AS. A wide range of other solutions are offered, and each agreement are tailored the needs for each and every customer. According to their homepage, Kuehne + Nagel describe themselves as:

"Kuehne + Nagel is financially strong, stable and independent. Our global logistics network, cutting-edge IT systems, in-house expertise and excellent customer service is proof of our dedication to be the market leader. These attributes have placed us at the forefront of our industry, and positioned us to continue increasing the scope of our customer solutions and services."

(Kuehne + Nagel 2014)

2 Objectives and research question

This thesis will focus on imported goods for the retail segment where the transport is conducted in a combination of sea and road. In order to understand the objective of this thesis, it is important to understand what a supply chain is, and how the supply chain appears in relation to a third party logistics company (3PL).

According to Simchi-Levi, Kaminsky, and Simchi-Levi (2004), the supply chain consists of suppliers, manufacturing centres, warehouses, distribution centres, retail outlets, raw materials, work-in-process inventory, and finished products that flow between the facilities. These are examples of the different processes that a product goes through from the point of being made until being ready for sale in a store. What position do a third-party logistics firm have in the respect of the delivery of retail goods? Simchi-Levi, Kaminsky, and Simchi-Levi (2004) define third-party logistics as "the use of an outside company to perform all or part of a firm's materials management and product distribution functions". Kuehne + Nagel AS is an example of such an outside company and perform a wide range of services for their customers.

2.1 Objectives

The objective for this research is built up on two articles (Bygballe, Bø, and Grønland 2012; Huemer 2012). Bygballe, Bø, and Grønland (2012) identifies four different configurations for managing international supply, and discuss these configurations and their effects on total costs and customer service. The paper uses a Norwegian retail and wholesale company which source from China as an

example, and the company uses all four configurations based on different considerations. In the given example, the retail and wholesale company has both the control and ownership of their supply chain. In our study such ownership and control are managed by a 3PL company. For logistics service providers, supply management is their core business, and their own strategies, structures, and resource perceptions create value and interact with the structure and strategies of their clients (Huemer 2012). Hence, it is reasonable to assume that the position and network that a 3PL company possess can be applied in order to take advantage of interdependencies among their clients.

As mentioned earlier, Bygballe, Bø, and Grønland (2012) discussed four different international supply chain configurations. Table 1 summarizes these configurations.

2.1.1 Table 1

Configuration	Actors	Activities	Resources	Interdependencies
Alternative 1	One producer, transport companies, wholesaler and one retail store	Ordering and handling of shipments from individual suppliers to individual stores	The actors' physical resources and competencies	Primarily sequential
Alternative 2	Several producers, transport companies, DCN and several retail stores	Consolidation of shipments from several producers to individual stores at the DCN	The actors' physical resources and competencies, particularly the DCC's	Both sequential and pooled
Alternative 3	Several producers, transport companies, the DCC and several retail stores	Consolidation of shipments from several producers to individual stores at the DCC	The actors' physical resources and competencies, particularly the DCC's	Both sequential and pooled
Alternative 4	Several producers, transport companies, DCC, DCN and several retail stores	Consolidation of shipments from several producers at the DCC to the DCN, which further consolidates shipments to individual stores	The actors' physical resources and competencies, particularly the DCC's	Both sequential and pooled

Bygballe, Bø, and Grønland (2012, 399)

Based on their research, Bygballe, Bø, and Grønland (2012) found that configuration 2 was the most commonly applied solution regardless of the type of product, while configuration 3, initially, appeared to be the most beneficial in terms of reducing total costs. These findings are the fundament for our study. We would like to test whether the best practice, in relation to cost savings, presented by Bygballe, Bø, and Grønland (2012) are transferable to a specific situation in a 3PL perspective. The clients in our study will also be Norwegian retail and wholesale companies, while these companies use an external actor (3PL), instead of managing the supply chain independently.

Our study will examine the possibility of using configuration 3 from Bygballe, Bø, and Grønland (2012) for shipments to shopping malls in Norway. At a shopping mall there, most commonly, exist a numerous of different retail stores. Representatives in the 3PL sector have indicated that these retail stores use suppliers from the same geographical areas. According to Bygballe, Bø, and Grønland (2012) pooling the different supply chains has the potential to generate economic benefits. Further, they explain that "(…) the entrance of new types of actors, such as third- and forth-party logistics providers, with their competence in planning and coordination using advanced technology and systems, offer new possibilities to utilize the specific resources and competencies of these actors" (Bygballe, Bø, and Grønland 2012, 400). This is also mentioned by Huemer (2012, 263): "Logistics service providers are in the business of competitively detecting and exploiting supply chain interdependencies. The structures that become activated through relationships, in order to facilitate client interdependencies, are integral to the logistics product." Both statements confirm that our research is relevant from a 3PL's point of view.

2.2 Research question

Based on the reasoning in 2.1, we have developed the following research question:

"Is it possible for third party logistics providers to perform FCL-deliveries directly to shopping malls in Norway, and how will such a solution affect total costs, lead-times and agility?"

3 Literature review

3.1 Delivery systems

According to Liu, Li, and Chan (2003, 326) a direct shipment system is defined when "(…) each supplier operates independently with its own fleet delivering goods to customers. Each vehicle visits only one customer in a trip. This method should be utilized when the lead-time requirement is tight, the goods need to be isolated, or the shipment is large." Direct shipment is known as an outbound distribution strategy. Simchi-Levi, Kaminsky, and Simchi-Levi (2004, 62), distinguish between three distinct outbound strategies that typically are used:

1. *Direct shipment*. "In this strategy, items are shipped directly from the supplier to the retail stores without going through distribution centers."
2. *Warehousing*. "This is the classic strategy in which warehouses keep stock and provide customers with items as required".
3. *Cross Docking*. "In this strategy, items are distributed continuously from suppliers through warehouses to customers. However, the warehouses rarely keep the items for more than 10 to 15 hours."

According to Simchi-Levi, Kaminsky, and Simchi-Levi (2004, 62) , direct shipment strategies exist to bypass warehouses and distribution centers, which mean that the goods are shipped directly from the manufacturer to the retail stores. The same authors list up two advantages with this type of strategy:

- The retailer avoids the expenses of operating a distribution center
- Lead times are reduced

Also, two disadvantages are mentioned:

- Risk-pooling effects are negated because there is no central warehouse.
- The manufacturer and distributor transportation costs increase because it must send smaller trucks to more locations

A hub-and-spoke system is defined as a system where "(…) each vehicle visits only one supplier or customer in a collection or redistribution trip. This system can be beneficial when there are multiple suppliers in the delivery region, especially when customers have common suppliers" (Liu, Li, and Chan 2003, 326). The article of Liu, Li, and Chan (2003) studies a mixed truck delivery system where both hub-and-spoke and direct shipment are allowed, and compare this system to a pure hub-and-spoke as well as a pure direct shipment system.

Their findings show that it is possible to save on average 10% in total travelling distance if a mixed structure is applied in comparison to a pure system.

3.2 Horizontal cooperation

Horizontal cooperation is a subject that has been covered by researchers during recent years. The subject is defined by Cruijssen, Dullaert, and Fleuren (2007); "Horizontal cooperation is about identifying and exploiting win-win situations among companies that are active at the same level of the supply chain in order to increase performance". The authors exemplify such companies to be suppliers, manufacturers, retailers, receivers (customers), or logistics service providers. Horizontal cooperation may occur between competing companies that are active in the same supply chain as well as unrelated companies that operates in different supply chains (Cruijssen, Dullaert, and Fleuren 2007, 24).

A collaborative supply chain occur when two or more independent companies work jointly to plan and execute supply chain operations with greater success than acting in isolation (Simatupang and Sridharan 2002). There exist different structures on such cooperation, where horizontal cooperation is one of the youngest developed structures that are becoming more and more relevant in practice.

Cruijssen, Dullaert, and Fleuren (2007), present a broad study of horizontal cooperation in transport and logistics. According to the authors this topic has quickly received the attention in the logistics sector, and is thus highly relevant from a practical point of view. The purpose of this article was to provide a foundation for future research on the topic of horizontal cooperation through an extensive review of closely related literature.

Another study of horizontal cooperation are conducted by Cruijssen, Cools, and Dullaert (2007). The purpose of their study is to identify opportunities and impediments for horizontal cooperation in the region of Flanders in Netherlands and Belgium. In order to assess potential benefits of this subject, 1537 logistics service providers were contacted in Flanders, Belgium. The main findings on opportunities are that general logistics service providers believe in potential benefits of horizontal cooperation in order to increase their profitability or to improve the quality of their service (Cruijssen, Cools, and Dullaert 2007). On the other hand, the impediments for horizontal cooperation concerned the

choice of partner selection. This selection could be the difference between success and failure of cooperation. According to Cruijssen, Cools, and Dullaert (2007), the problems of finding suitable partners was less severe the more profitable their respondents were.

3.3 Co-opetition

Co-opetition is closely related to horizontal cooperation. Co-opetition is defined by Zineldin (2004, 780) as "(...) a business situation in which independent parties co-operate with one another and co-ordinate their activities, thereby collaborating to achieve mutual goals, but at the same time compete with each other as well as with other firms." Two of the pioneers in the field of co-opetition is Nalebuff and Brandenburger (1996). Their book presents this new mindset, co-opetition, of how to perceive cooperation in business. They explain that business is both war and peace, and firms have to compete and cooperate at the same time, even though they are competitors. Through the book Nalebuff and Brandenburger (1996) gives their interpretation on how to implement co-opetition as a business strategy.

Zineldin (2004), predicts that co-opetition is the organizational structure of the future, and he presents a framework for how to establish and maintain a co-opetitive relationship among organizations. According to Zineldin (2004, 787) this process has close parallels with marriage, and he describe stepwise process as follows: "There is a courtship period, when both parties get to know each other. Then there is a ceremony, the signing of the business contract, which binds both parties to certain terms and conditions. Conflicts may arise in due course. They can be resolved if the mechanism is clear and agreed. If not, there is the constant spectre of divorce, initiated by one party or the other."

Another article concerning strategic alliance via co-opetition is written by Zhang and Frazier (2011). This article describes why two competing companies form an alliance and still compete with each other for customers. The authors formulate the economic incentives as well as the costs of cooperation, and they propose an optimal contract for the two companies in co-opetition. Economic reasons for co-opetition are exposed through a game theoretic model. According to Zhang and Frazier (2011, 861), "the co-opetition increases consumer welfare and social welfare when the efficiency effect outweighs the cooperative effect. "

Hence, both the consumer and the society will gain from co-opetition as well as the involved companies.

3.4 Consolidation

A theoretical concept that underlies both horizontal cooperation and co-opetition, is consolidation. Higginson and Bookbinder (1995) defines shipment consolidation as "a logistics strategy that combines two or more orders or shipments so that a larger quantity can be dispatched on the same vehicle". Several studies have been conducted on the topic over the past decades. Tyan, Wang, and Du (2003) points at the benefits of collaboration with a 3PL provider in achieving a well-functioning global supply chain. The authors evaluates different consolidation policies and concludes that there exists a potential for substantial cost saving and improvement in service levels through collaborative consolidation policies.

Previous research on the topic of freight consolidation can according to Qin et al. (2014) be categorized as either strategic or operational, depending on which level the decisions are made. When the research addresses the network design problems, the concern relates to the strategic level. The research categorized as operational has more of a short-term perspective with focus on how to operate the distribution when being dependent on the present network structure.

A study conducted by Haiqing, Hsu, and Cheung (2008) examines the challenges for a 3PL regarding transport coordination when using a consolidation center. The authors develops a model to calculate the optimal solution with regard to different pickup and delivery times, latest arrival times, transportation and storage costs at their suppliers and customers. They find that their algorithms are able to calculate close to the optimal solutions in the experimental cases tested.

The environmental effects of freight consolidation have also been studied (Ballot and Fontane 2010; Ulku 2012; Merrick and Bookbinder 2010), and the research shows that freight consolidation, in most cases, contributes to mitigate the carbon footprint of a supply chain.

3.5 Agility, Adaptability and Alignment

Lee (2004) presents three key characteristics of a cost efficient and fast supply chain. He states that in order to be successful and sustainable, the supply chain

must be agile, adaptable and aligned, known as the Triple-A. The author suggests that the objective for developing a supply chain that are agile means that it is able to "Respond to short-term changes in demand or supply quickly" and " handle external disruptions smoothly". The discussion is built upon examples from both PC manufacturers and large retail chains, illustrating the importance of agility in different segments of business. The second aspect of the Triple-A supply chain is adaptability. The meaning behind the concept is to be able to "adjust supply chain's design to meet structural shifts in markets; modify supply network to strategies, products, and technologies" (Lee 2004). The third concept is alignment, where the objective is to "create incentives for better performance." The underlying aspects are addressed as the benefits of sharing risks, costs, information and gains among the different actors in the supply chain.

4 Research model

The model, shown in Figure 1, has been developed with inspiration from the research conducted by Bygballe, Bø, and Grønland (2012).

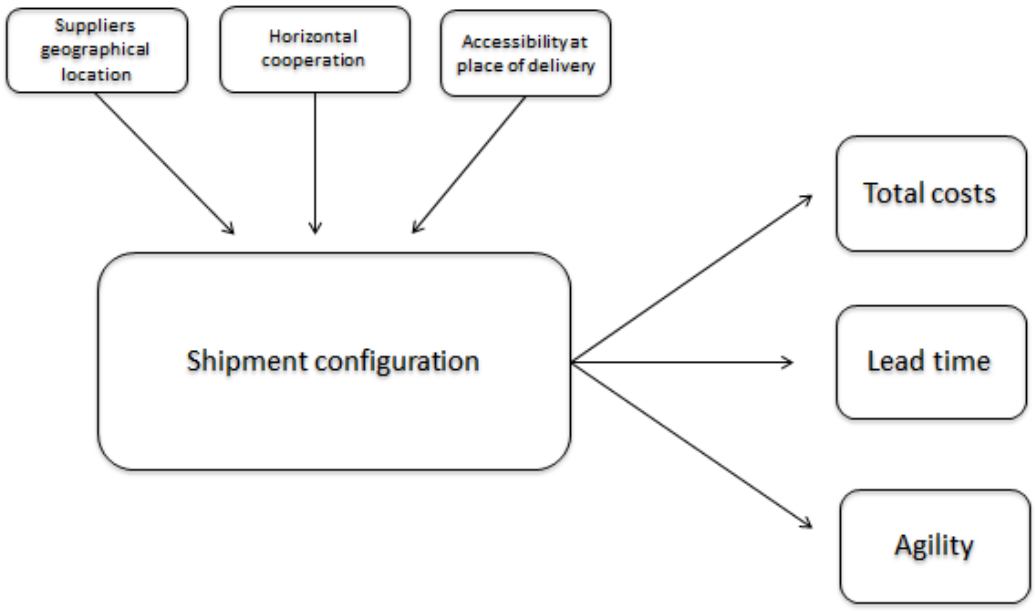


Figure 1: Research Model

The model aims at investigating the effect of the selected shipment configurations on the performance measurements; total costs, lead time and agility. The

configurations that are going to be tested are defined in the study of Bygballe, Bø, and Grønland (2012). This model is looking at the configurations and their potentials from a 3 PLs perspective, not directly from the view of the owner of the goods (the retailer). In addition, the model includes three factors that to a varying degree (depending on the case) contribute to determine whether or not the chosen supply management configuration is possible to conduct; 1) the suppliers geographical location, 2) Horizontal collaboration and 3) Accessibility for delivery at end-customer.

Shipment configuration: The chosen distribution strategy from the suppliers to the end-customer. In this model, it is defined as the activities conducted by a third party logistics provider.

Suppliers' geographical location: In order to be able to consolidate the freight at a distribution centre in the origin country, this factor is relevant. The relevance and efficiency of the configurations may be depending on the location of the suppliers.

Horizontal collaboration: The collaboration between the actors influence the efficiency of the supply network (Bygballe, Bø, and Grønland 2012). The considered horizontal collaboration in this model is between the end-customers, the suppliers and also between third party logistics providers.

Accessibility at place of delivery: This aspect considers the facilities for delivery of goods at the end-customer. This factor is included in the model because it determines how the 3 PL must adapt its deliveries to the conditions at their end-customer.

Total costs: The total cost perspective in this model includes purchasing costs and logistics costs such as inventory, transportation and management costs. The perspective addresses the total costs for the 3 PL's customers as well as the total costs for the logistics provider.

Lead-times: The lead times are important factors for the actors to secure and predict the desired service levels. Stability and minimization are keywords here.

Lack of predictability are likely to create concerns for the customers (Simchi-Levi, Kaminsky, and Simchi-Levi 2004).

Agility: Lee (2004) states the importance for a supply chain to be agile. The concept is important for every supply chain and it addresses both collaboration and information sharing.

5 Research methodology

5.1 Research strategy

"Bryman and Bell (2011, 26) defines research strategy as "...a general orientation to the conduct of business research". The essence in selecting a research strategy is to decide which method to use when collecting and analysing data. The literature in Bryman and Bell (2011, 26) distinguishes between two superior methods; qualitative and quantitative. The distinction is quite extreme, and it is often difficult to use one and completely excluding the other, a combination is often the appropriate practical solution. Grønmo (1983), cited in Gripsrud, Silkoset, and Olsson (2004, 97), argues that the two methods are complementary, and that they in reality are two extremes of a scale.

Within the qualitative research strategy, an inductive approach to the theory-research relationship is often present. When having an inductive approach, the researcher aims at generating theory from the project by going out in the field collecting data and generate theory on the basis of the observations and interviews Bryman and Bell (2011, 27).

The quantitative research strategy has been the dominant strategy for conducting business research. However, its influence has faded since the 1980´s, as a consequence of the rise of qualitative research strategy Bryman and Bell (2011, 150). Quantitative research wants their findings to be generalizable to other relevant population, while qualitative research tries to find values, beliefs, behaviour and perceptions. Quantitative research differs from qualitative research

through systematic empirical investigation of social life by using statistical or mathematical techniques Bryman and Bell (2011, 150).

In our thesis, the case is quite complex, and requires that we use principles from both the qualitative and quantitative research when conducting our data collection. Hence, it is arguably a mix of the two that is the best approach for us when examining the case of Kuehne + Nagel AS. The choice will be further argued in the section on data collection where the need for both qualitative and quantitative methods will be exemplified.

5.2 Research design

Bryman and Bell (2011, 40) states that "a research design provides a framework for the collection and analysis of data", before presenting five different types of research design.

The alternative corresponding to our thesis proposal is the case study design. Cited in Bryman and Bell (2011, 60) "what distinguishes the case study from other research designs is the focus on a bounded situation or system, an entity with a purpose and functioning parts". We have decided to examine the case of Kuehne + Nagel AS in our thesis, with focus on the deliveries to shopping malls in Norway. Hence, the focus lies on a specific actor, with its customers, partners and competitors. The case will exmine Kuehne + Nagel AS's possibility of utilizing configuration 3 (Bygballe, Bø, and Grønland 2012) for deliveries to shopping malls. More precisely, the possibility of delivering full container loads directly to shopping malls in Norway. The focus will be moved from looking at the end-customers as individual retailers, but rather look at a shopping mall, with its different shops, as the end-customer. Hence, the idea of the consolidation policies must be adapted in order to fit with the new focus. The first part will be to examine whether it is practically possible to conduct the suggested configuration policy in Norway. Secondly, the comparison between the present practices and the new configuration will be analysed, uncovering whether or not it is beneficial for Kuehne + Nagel AS to offer such a service to its customers.
There are a few factors limiting how extensive our research can be. The deadline for handing in our thesis is the 1st of September 2014, so the time aspect is

obviously one of them. Hence, we have to take this into consideration when deciding upon how many actors we are going to include in our thesis. The number of shopping malls will be determined in a meeting with Kuehne + Nagel AS in February. Factors such as geographical location, size of the shopping centres, and availability and accessibility of data will influence the decision. Furthermore, this study is limited by the fact that we have planned to only look at the retailer sector, this is also due to the time aspect.

5.3 Data collection

Bryman and Bell (2011) presents the main aspects of data collection, and divides it into two groups: primary and secondary data. Secondary data is the information and documents the researcher collects from external sources. It consists of articles, previous research on the field or topic and relevant data that can contribute to assure the quality and relevance of the forthcoming study. Primary data is the data the researcher collects himself as part of his study. In our case study we are dependent on gathering both secondary and primary data in order to be able to conduct the research with the desired quality and relevance.

5.3.1 Secondary data

The researcher gets the data from other sources such as articles and written literature which interprets phenomenon's related to the case by describing what has been done before (Walliman 2011)
In order to acquire knowledge and insight on the field of the study, the importance of the search for secondary data cannot be underestimated. In our approach we have used academic journals, books and web pages to obtain background information for our study.

In continuation of the research, the collection of secondary data will be conducted in collaboration with Kuehne + Nagel AS. Potential sources of secondary data could be actors in their supply chain such as wholesalers, the shipping companies and management of shopping malls in Norway, as well as internal data possessed by Kuehne + Nagel AS.

When examining the possibility of delivering FCLs directly to shopping malls, we are dependent on numeric data such as fill-rates, order quantities, lead-times and cost aspects of the deliveries. So a substantial share of the secondary data is likely to be numeric.

5.3.2 Primary data

The process of gathering primary data is often time-consuming, and the decisions on where to acquire it are critical for the quality of the research. The advantages of gathering primary data are that the researcher gets first-hand information on the topic directly from the chosen population. The original data can be very valuable for the researcher as it is new information that has yet to be analysed and interpreted. Typical qualitative methods for gathering primary data are through participant observations and open-ended interviews, while document analysis is a common method for acquiring primary data in quantitative studies (Gripsrud, Silkoset, and Olsson 2004, 97).

In our study we will mainly use qualitative methods when gathering primary data. Through participant observations on how the delivery of goods is carried out today, we will be able to supplement the secondary data and get a deeper understanding and insight of the process. We might also detect aspects of the process with implications on the possibility of FCL-deliveries, when keeping in mind the objective of the thesis. We also need to examine whether it exists a willingness to cooperate on the FCL-containers among the actors at the shopping malls. Questions on the topic will be asked to selected representatives from the actors. This information will be collected through semi-structured interviews.

5.4 Data analysis

The collected information needs different analysing methods depending on whether it is characterized as qualitative or quantitative data. A challenge with qualitative studies is that the data tends to be quite extensive. When analysing the data, it is important that the researcher keep focus on the essentials of the information with regard to the aim of the research. Analysing the case study data is probably the most troublesome with a research study. Most of the problems are

associated with false expectations. Parts of the data will in some way ”speak for themselves” (Yin 2012, 15).

Our observations and interviews will be handled as qualitative data. We will not range/categorize the information with regard to a scale in order to get numerical data, but analyse it by interpreting the written answers we have gathered. The numerical data collected will be used in calculations if necessary. Our data on whether it is practically possible to deliver FCL-containers at shopping malls in Norway will mainly be qualitative, written data that needs interpretation. These data concerns the aspects illustrated as inputs/drivers/prerequisites in our research model.
The quantitative, numerical data will be used when calculating the performance measurements, illustrated as output in the research model. Calculations will be made for the different supply management configurations that are going to be tested, creating a basis for comparison between the different alternatives.

5.5 Quality of the research

In order for our study to be credible and in a state of objectivity, the reliability and validity of the research is important. Bryman and Bell (2011, 41-42)

5.5.1 Reliability

“Reliability is concerned with the question of whether the results of a study is repeatable” Bryman and Bell (2011, 41). If a research is done once, the same results should be received if the exact same research is done a second time. In our case, reliability concerns whether our methods of collecting data are done in a proper manner. Consistency is a keyword when talking about reliability of a study. In particular, reliability is concerned in quantitative research when the researcher need to know whether a measure is stable or not (Bryman and Bell 2011, 41). LeCompte and Goetz (1982) cited in Bryman and Bell (2011, 395) distinguish between two types of reliability in qualitative research: external and internal. External reliability relates to whether or not the study can be replicated. This is difficult in qualitative research since it is impossible to “freeze” a social setting and the circumstances of an initial study. In qualitative research, the use of

interviews is central. In order to demonstrate the problem regarding reliability we provide an example: How is it possible to make sure that the interviewees are in the same state of mind both in the first and the second time? This is not in the control of the researchers, so it is difficult to conduct a qualitative study that is externally reliable. Internal reliability is connected to whether or not, when two or more observers, the researchers agree upon what they hear and see. If their observations are conflicting, the quality of the research, and hence reliability, is weak. In our case we have to make sure that all the interviewers understands the purpose of the research. If not, our collected information could be irrelevant and not reliable.

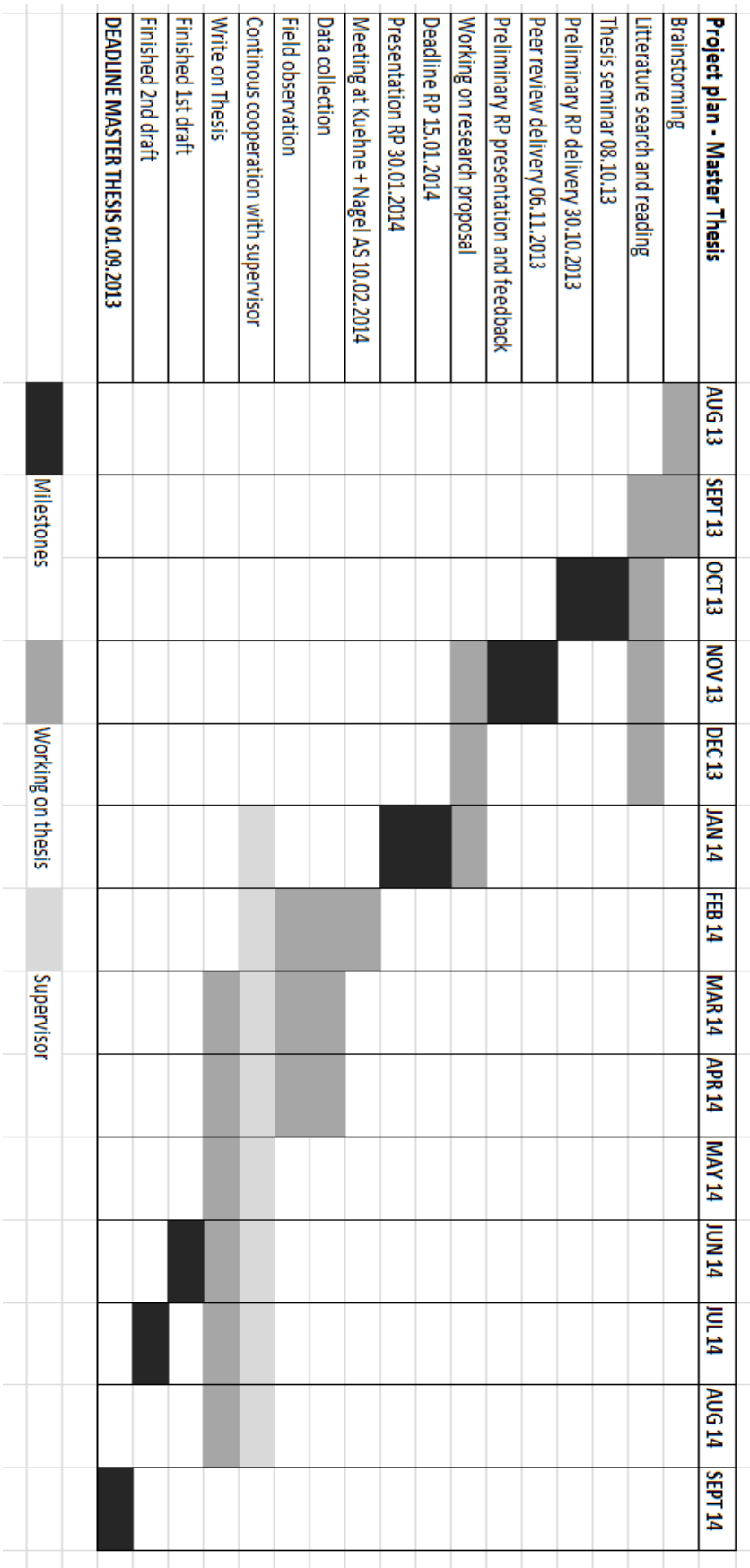
According to Saunders, Lewis, and Thornhill (2009, 156-157) there are four threats related to reliability. These threats are participant error, participant bias, observer error and observer bias. Participant error can occur when external factors affect the participant's answer. Participant bias is related to that interviewees might answer in the way their boss wants them to answer. It is related to holding back information and not answering the questions completely. Observer error can happen if the observer is tired, do not pay attention etc. The last error is related to different ways of interpreting the replies from the interviewees. The observers can perceive the answers in many ways or misunderstand them, this leads to observer bias. In order to reduce these errors, we need to be aware of these threats and take actions to reduce them. Linked to our study, we think it is wise to plan and schedule all the interviews in advance to reduce the participant errors. By doing this, we are ensuring that all participants have enough time to answer each question properly without interruptions. We think it is important to send the questions to the participants in advance, in order to mitigate uncertainties and at the same time give the interviewees' time to prepare. In order to reduce the participant bias we think it is wise to give the participants a chance of being anonymous. We also think it would be a good idea to send the participant the answer text by e-mail for approval, this to reduce the observer bias. To further reduce the two last threats, it will in our study be wise to record the interviews. To have the opportunity to re-listen the answers and be 100% sure about the answers significance.

5.5.2 Validity

Just like reliability in qualitative research, LeCompte and Goetz (1982), cited in Bryman and Bell (2011, 395) divide into external and internal validity. With internal validity they mean, "whether or not there is a good match between researchers' observations and the theoretical ideas they develop" Bryman and Bell (2011, 395). Argued by LeCompte and Goetz (1982) "internal validity tends to be a strength of qualitative research(...)" Bryman and Bell (2011, 395).

Bryman and Bell (2011, 395) states that external validity parallels with transferability, related to qualitative research. Transferability is often used instead of external validity in such studies. Transferability asks the question; to what extent do the findings apply to other contexts? As we are looking at shopping malls, each case is unique with regard to their location and volume and mix of stores. So the direct transferability might arguably be weak. However, we believe that our findings relating to the possibility of FCL-deliveries could be of interest and can partly be used in other contexts. An example could be when looking at other shopping malls availability for receiving FCL-containers as they may have similarities in setup-structure for delivery of goods. The findings might also be interesting for business sectors other than the retailer segment. There might be characteristics or concepts that will apply for other industries as well. When looking at the retail-segment in the shopping malls we exclude many shops and businesses that could have contributed to a cooperative freight structure, so the potential for expanding the number of participating actors might be present.

6 Project plan



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