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Logistical Consequences of Rapid Deliveries in Omnichannel Retailing

Investigating the impact of 15-minute deliveries on the demand management and order fulfilment process

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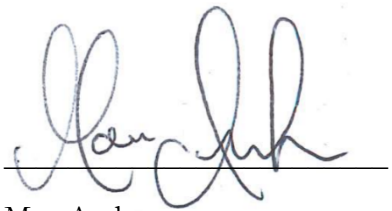
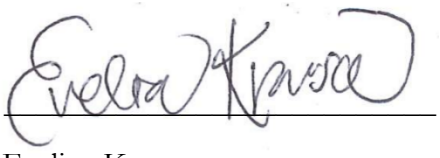
Sincerely,



Moa Andersson



Evelina Krassow

Abstract

The need for fast, flexible, and sustainable deliveries has become a key priority for companies as customers demand more convenience in their purchasing experience. Retailers have responded by developing their logistics into an omnichannel to meet these expectations, which has made the supply chain more complex. The following study has been conducted at The Company, a telecommunication company aiming to be competitive in the market with fast deliveries through its omnichannel. In 2015, The Company set the logistics vision of "*Availability as The Competitive Advantage"*, aiming for 15-minute deliveries of all physical products in Sweden. This study involved investigating the logistical consequences of realising 15-minute deliveries in an omnichannel company. Therefore, the purpose of this study was formulated: "*The purpose is to investigate the logistical consequences for The Company if the logistics vision of 15-minute deliveries is realised."*

Since The Company cannot provide 15-minute deliveries today, local inventory points must be added to the underlying warehouse structure, acting simultaneously as storage points and parcel boxes. Firstly, the study involved creating scenarios for The Company where the customer can reach any local inventory point within 15 minutes by bicycle. Four scenarios were designed realising 15-minute deliveries in Sweden, Östergötland County, Jönköping County, and Stockholm respectively. For all four scenarios the number of local inventory points, central- and satellite warehouses, stores, replenishment- and distribution flows were decided by semi-structured interviews with The Company. Furthermore, investigating the logistical consequences involved two supply chain business processes connected to demand and supply: the demand management- and order fulfilment process. The included activities in the demand management process were *Plan Forecast*, *Collect Data*, *Forecast*, *Synchronization and Communication of Forecast*, *Measure Performance*. In the order fulfilment process, activities included were *Defining Requirements*, *Evaluation of Logistics Network*, *Order Fulfilment Plan*, *Process Order*, *Pick and Pack Order*, and *Transport and Delivery*. 12 respondents from The Company were interviewed to analyse the current activities and the required activities in the four scenarios. The logistical consequences to bridge the gaps were found and investigated.

In the two processes investigated, 14 logistical consequences were found, seven in the demand management process and seven in the order fulfilment process. The study's result indicates that rapid deliveries imply the same logistical consequences regardless of geographical area and the number of local inventory points for The Company. Covering Sweden implies bigger gaps and consequences than solely covering a big city. Many of the logistical consequences address similar gaps and logistical consequences resulting in the two processes interfacing. Consequently, the logistical consequences were divided into three main categories: system, strategic, and operational. Despite the difference between the four scenarios, many of the respondents have expressed the challenging future ahead by offering 15-minute deliveries. To fulfil the logistics vision The Company must focus on the logistical consequences identified in this study. It will require major significant changes in The Company's logistics system adding stores. However, the focus of the study lied in understanding the requirements of the demand management and order fulfilment processes within the designed scenarios. Moreover, The Company is recommended to prioritize these consequences and then actively address them.

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1 Introduction

The following chapter presents the background relevant for this study which leads to the purpose being presented. Lastly, the limitations of the study are presented. The information regarding The Company is given from the logistics and supply chain department at The Company.

1.1 Background

Logistics is an essential factor for companies to be competitive and profitable (Oskarsson et al., 2013). The development of technology is driving the emergence of logistics in retail companies (Piotrowicz and Cuthbertson, 2014). Piotrowicz and Cuthbertson (2014) describe that customers are constantly connected via technology allowing customers to purchase goods anytime and anywhere. Thus, this has pushed retail companies to evolve their logistics from being single- or multichannel to being omnichannel companies, offering seamless integration of service to their customers (Piotrowicz and Cuthbertson, 2014). Customer expectations have resulted in retail companies now having to offer fully integrated channels in their logistics systems (Barbosa and Casais, 2022).

Today, customers require fast, flexible, and sustainable deliveries (Bring, 2021). As a result, rapid deliveries have become increasingly important to survive in a competitive market. For many companies, time has made a top priority for achieving high delivery service (Oskarsson et al., 2013). *The Company* is a company that is committed to being competitive by offering rapid deliveries with high delivery accuracy in its omnichannel. The Company operates in the telecommunications industry and offers digital services and products, such as mobile telephony, broadband, and television.

In 2015, The Company adopted a logistics vision called *"Availability as the competitive advantage"* which aims to offer all customers 15-minute deliveries of their physical products in the future. This logistics vision also recognizes the importance of key partners for success. By forming a strong partnership with a third-party logistics provider, The Company can provide customers with a wide range of delivery options through its omnichannel. Customers can order in-store to online, or have their purchase delivered to their door, by a postman, or a store.

It is yet unclear how The Company and its third-party logistics partner (TPL partner) will act to achieve deliveries of physical products within 15 minutes, and it requires a lot from The Company's logistics operations. To leverage short delivery times as a competitive advantage, companies must accelerate their processes to meet promised delivery times (Oskarsson et al., 2013). This approach also necessitates having inventory points in proximity to customers (Oskarsson et al., 2013). The logistical consequences that the logistics vision of 15-minute deliveries could have on The Company's logistics will thus be interesting to investigate. More specifically, what the logistics vision will do to The Company's supply chain processes connected to demand and supply: the demand management- and order fulfilment processes. This since The Company cannot provide 15-minute deliveries with their

current processes. Hence, it will be necessary to investigate these relevant supply chain processes to understand the requirements of the logistics vision and where The Company must potentially improve its processes. Furthermore, what consequences extremely short delivery lead times will have on supply chain processes in omnichannel companies are considered.

1.2 Purpose

Deducted from the background, the purpose of this study is as follows:

The purpose is to investigate the logistical consequences for The Company if the logistics vision of 15-minute deliveries is realised.

This study will focus on the logistics part of supply chain management, specifically the *Demand Management Process* and *Order Fulfilment Process* at The Company. These processes are highly relevant for The Company's implementation of 15-minute deliveries. Furthermore, the two processes are part of the eight supply chain business processes (Lambert and Cooper, 2000). The demand management process focuses on balancing demand and supply, which includes forecasting, synchronizing, and communicating demand throughout the supply chain (Croxton et al., 2001). Whereas the order fulfilment process focus is from when receiving an order from the customer to having it delivered to the customer (Croxton, 2003). By identifying gaps in the activities within these two processes, logistical consequences are defined as what needs to be addressed to reduce the found gaps.

1.3 Limitations

This study is limited to the business of The Company in Sweden, and their logistics operations related to the resale of physical products to private customers. As a result, the limitation is also applied to solely examining The Company's internal channels, which encompasses their warehouses and stores. External channels, such as sales through other companies, are not considered. In addition, logistics activities linked to The Company's low-cost brand alternative and its warehouses are excluded. Furthermore, The Company currently has several pilot projects that are partially implemented, for instance, providing home deliveries from stores, which no account is taken for in this study.

1.4 Disposition and Reading Reference

This thesis consists of ten chapters where chapter 1 and 2 introduces the study and The Company. Further the frame of reference is presented in chapter 3. The task specification is presented in chapter 4 followed by the methodology used in this study in chapter 5. In chapter 6, 7 and 8 are the findings of this study presented. To quickly access the study's findings and conclusion, the reader is recommended to go to chapter 9 Synthesis of Logistical Consequences. Lastly, a conclusion and discussion are presented in chapter 10 and 11.

2 Current Situation

The following chapter aims to provide an understanding of how The Company's logistics business in Sweden is operated and the situation The Company finds itself in today. The information in the following chapters is obtained from employees at the logistics and supply chain department at The Company and The Company's website.

2.1 The Company in Sweden

The Company is a leading telecommunications company in Sweden, founded in 1853. Since its inception, it has expanded and currently operates in the Nordic and Baltic countries, including Sweden, Denmark, Norway, Finland, Estonia, Latvia, and Lithuania. In 2021, The Company Group had a turnover of approximately SEK 88 billion with approximately 20,000 employees. The Company in Sweden had a turnover of approximately SEK 32 billion.

Furthermore, The Company provides its customers with digital infrastructure and services, offering a variety of communication and entertainment services that connect individuals, businesses, and communities. Mobile subscriptions, broadband subscriptions, and TV services constitute the largest part of The Company's turnover. The Company also offers a range of products, such as mobile phones and accessories, by acting as a reseller. Sales can be made both online and through The Company's 59 stores in Sweden.

The Company aims to be a premium company in the telecom industry, with a strong focus on delivering products and services at a high speed. Additionally, The Company has been prioritizing the execution part of its logistics operations over planning.

2.2 The Logistics Vision at The Company

According to The Company, logistics and rapid deliveries are an important basis for operating as a premium company in the telecom industry. As customers' expectations of availability and flexibility increase, The Company wants to maximize the customers' experiences by offering high availability of their products with highly reliable delivery times. They believe this is best done by integrating logistics into its customer offerings and making logistics a strategic asset for the entire business. As a result, in 2015 The Company developed a logistics vision to increase its competitiveness in the market as a premium company. The aim of the logistics vision is that, by providing efficient and sustainable logistics services, customers in both urban and rural areas will be able to shop the products they need and have them delivered accordingly. The Company's logistics vision is as follows:

" Availability as the Competitive Advantage"

The logistics vision helps to ensure that the people working with logistics in the business know in which direction to work to achieve higher availability and customer satisfaction. The Company is working with the logistics vision through different focus areas over a period of two years. Since 2022, new focus areas have been introduced with a focus on being able to offer more and faster delivery options closer to the customers. The Company can provide 24-hour deliveries in some places in

Sweden, and they aim to offer that within the whole of Sweden soon. Today, The Company can provide *Same Day Deliveries* and *Next Day Deliveries* depending on where in Sweden the customers are located. As a result of the logistics vision, The Company claims to have high delivery accuracy and transparency towards the customers.

The 15-minute Vision

A concretization and an ambition with the logistic vision is that The Company in the future want to build a logistic system that can deliver all products, to all customer within the Swedish market, in 15 minutes regardless of where the customer is located. The idea of the 15-minute vision was founded within The Company's sales area of reparation, where the aim was to repair mobile phones within 15 minutes. This idea was later applied to the entire supply chain, and the goal of 15-minute deliveries of all physical products was set.

Although The Company mostly sells services in the form of different subscriptions, the sales of mobile phones, TV boxes, and accessories make up 10% of their annual sales. By inventing the logistics vision and the 15-minute vision, The Company can offer high-speed deliveries, which aligns with its strategy of being a premium company that offers safety, presence, and speed to its customers.

The Company aims to offer a value-based offer to its customers by providing excellent service and products with fast deliveries. With a stock availability of 98%, The Company already has a strong foundation for a competitive logistics system with high availability and fast deliveries. The 15-minute vision is based on utilizing bicycles as the mode of transportation, and The Company has found that customers can cover 4 kilometres within 15 minutes.

2.3 Logistics Operations at The Company

The logistics function at The Company includes 33 people in four different units across The Company Group in the Nordics and Baltics. During 2021, The Company delivered around 1 million physical products to their customers. Many orders were delivered within 24 hours. The product-related logistics at The Company are measured in purchase value and not turnover. In 2021, the purchase value of product-related logistics was approximately SEK 4,5 billion.

2.3.1 Warehouse Structure

In Sweden, The Company's warehouse structure consists of a central warehouse, six satellite warehouses and lastly, stock within their own 59 retail stores. Currently, the central warehouse supplies products to all satellite warehouses and retail stores. The flow of products between the different warehouse points can be seen in Figure 1 below. In necessary cases where shortages occur in the central warehouse, the satellite warehouses can supply the central warehouse with goods, which is why this flow is shown with dotted lines.

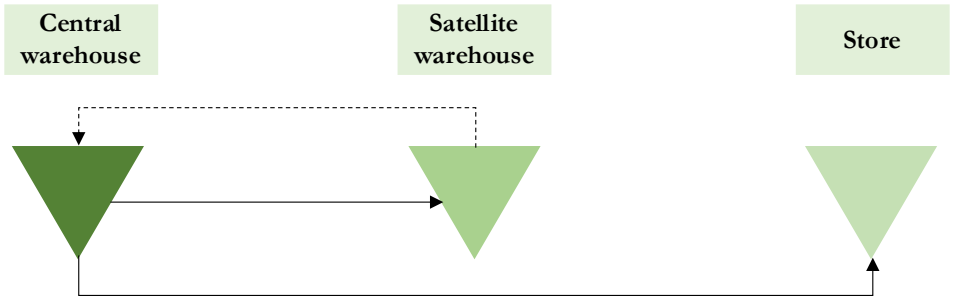

Figure 1: An overview of The Company's warehouse structure.

2.3.2 The TPL-Partner

The Company believes that an important part of realizing the logistics vision is through partnerships and ensuring important collaborative partners. Consequently, The Company has outsourced a big part of the operational logistics to a third-party logistics company. Their TPL partner is therefore responsible for the inventory management of The Company's physical products. Secondly, The Company also collaborates with the TPL partner regarding transportation, which can be seen as a separate partnership. However, The Company can utilize other transportation companies, which can subsequently cooperate with the partner to handle the transportation.

The TPL partner was chosen as The Company's partner due to two reasons. Firstly, The Company and the TPL partner have a common history of being one of the biggest actors in their industries way back when they had governmental missions. Therefore, the TPL partner's business is well-established in Sweden, and so is The Company. Secondly, due to the broad geographical reach of the TPL partner, The Company selected them as their partner. The TPL partner's extensive geographical coverage and previous status as one of the major actors in the industry have enabled them to retain their competitive advantage.

The partnership has grown stronger over the years. The TPL partner is involved in working with, developing, and progressively realizing the logistics vision. Through the strong relationship between The Company and the TPL partner, The Company can enable fast and reliable deliveries to customers. The Company and the TPL partner have, for example, continuous follow-ups about problematic customer errands and are working together on what went wrong and how to improve on a more general level. As a result, the TPL partner can fulfil most promised delivery times. Going forward, The Company believes that this partnership will enable scaling up of volumes and maintain the competitive logistics they have today.

2.3.3 Planning Systems

To support its logistics operations and planning, The Company currently uses the SAP business system. It plans all necessary supply chain processes and activities based on human decisions made about which items to stock in the various warehouses. In addition, The Company utilizes SO99+, an AI-based system designed to plan and optimize supply chain demand and stock levels. The demand indicated by the system is matched against the central assets available and suggests whether items need

to be moved between the different warehouses or not. This information is then transferred to SAP and the TPL partner's warehouse system, Astro.

2.4 Distribution Flows

The central warehouse is located in Ljungby and is operated by the TPL partner. Following the central warehouse in the warehouse structure are six satellite warehouses located in Stockholm (SE01), Luleå (SE02), Norrköping (SE03), Malmö (SE04), Göteborg (SE05), and Kalmar (SE06). At present, there are no designated sales areas for which the different satellite warehouses should supply products.

The central warehouse replenishes the satellite warehouses and the 59 retail stores in The Company's warehouse structure. The satellite warehouse, SE02 in Luleå, has the configuration of replenishment for the retails stores nearby. However, satellite warehouses cannot send products between each other due to a limitation in the business systems used by The Company. If necessary, the goods must always go through the central warehouse which are then sent out to another satellite warehouse. In addition, the satellite warehouses cannot replenish the stores.

The Company offers a range of delivery options to their customers since they are an omnichannel company. The delivery options offered are traditional buy in store, collect-in-store, partly ship from the store, home delivery, and packages sent either to the postal office or parcel box. The Company also allows customers to purchase products and services through customer service centres. This flow can be equalized with online purchasing. In Figure 2 below, the omnichannel structure at The Company is illustrated.

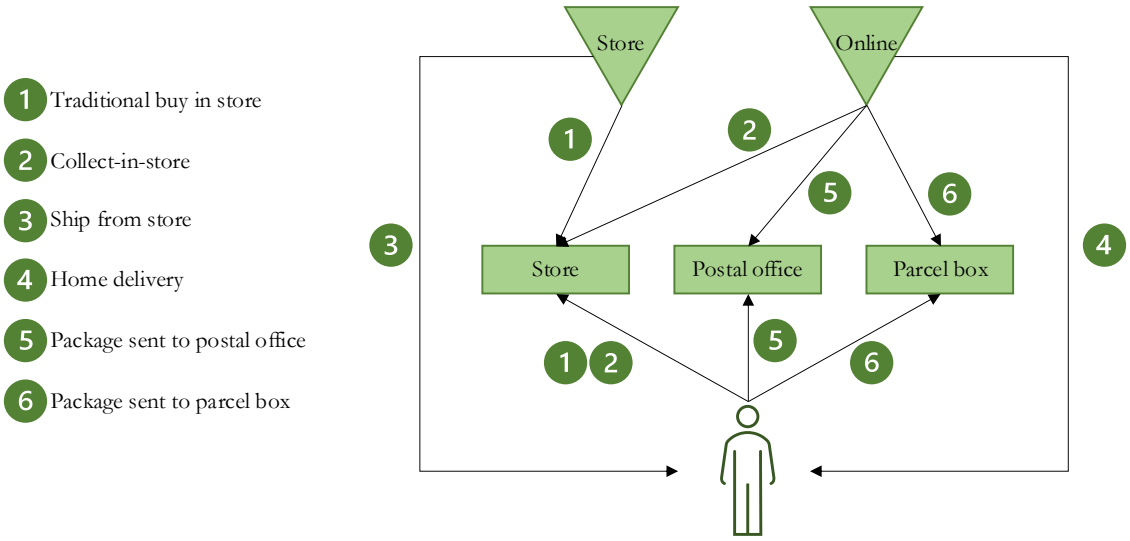

Figure 2: Omnichannel delivery options at The Company.

From The Company's perspective, the delivery of products in the omnichannel differs in distribution flows depending on the option. The omnichannel options are *traditional buy in store and collect-in-store, ship from store, home delivery* and *packages to a postal office or parcel box*. The distribution flows from The

Company's perspective for each option are illustrated in Figure 3 and described in the following sections below.

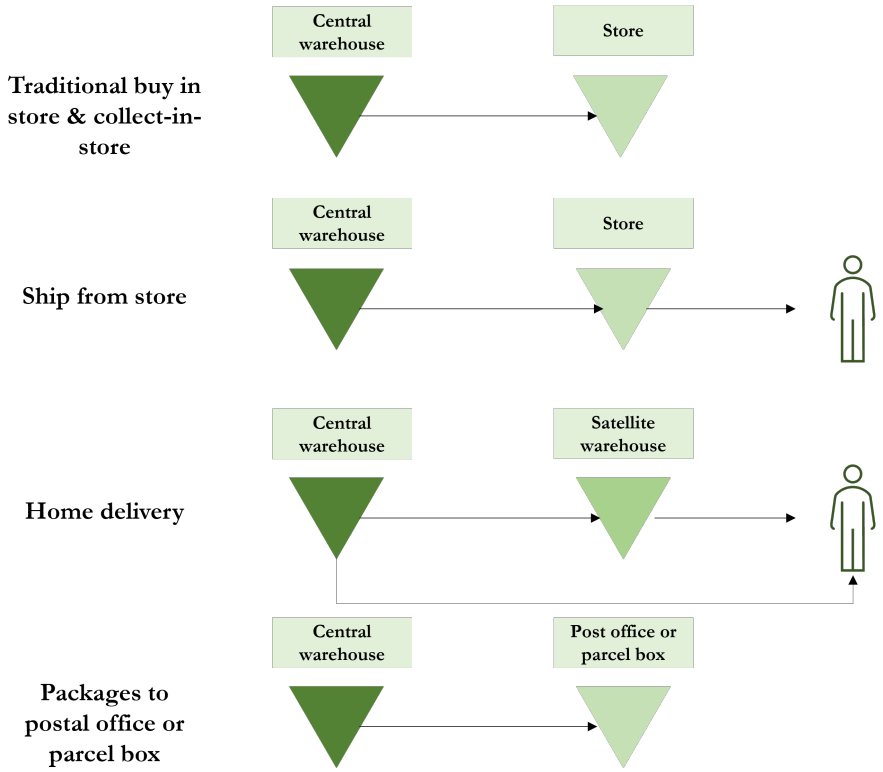

Figure 3: Distribution flow of different delivery options at The Company.

Traditional Buy in Store and Collect-In-Store

Traditional buy-in-store and collect-in-store both have the same distributional flow. The stores are replenished by the central warehouse in The Company's network.

Collect in store means that the customer goes to the store to pick up their item. When a customer places an order, it is sent from the central warehouse to the store. A future aspiration is that The Company will be able to start utilizing the store's stocks to fulfil collect in store-orders. With collect-in-store, The Company hopes to decrease the delivery time to about 1 hour.

Ship From Store

Ship from store is something that The Company doesn't have in full scale today. They operate ship from store as a pilot project in Östersund, Marieberg, Stockholm, and Göteborg. The stores are replenished by the warehouse, and then the package is shipped from the store as a home delivery.

Home Delivery

Home deliveries are arranged either from the central warehouse or satellite warehouses. Delivering from satellite warehouses is most common in the areas belonging to SE02, SE03, and SE05. The delivery time that The Company offers for home delivery is same day deliveries from all flow routes

except SE02, to Gotland, and postal numbers with rural mail delivery. These exceptions have next day delivery instead. For the most part, it is the TPL partner that is responsible for the home deliveries, except for SE01, where another transportation company is the distributor.

In general, home deliveries from the central warehouse are most common in The Company's logistical network. This is because the satellite warehouses have a limited range of products and were recently implemented. Therefore, the central warehouse accounts for most of this distribution flow.

Packages Sent to Post Office or Parcel Box

Delivery to a post office or parcel box looks very similar. Both options offer next day delivery and are sent from central warehouses under the supervision of the TPL partner. Currently, The Company only uses the parcel boxes belonging to the TPL partner. In the future, The Company also plans to use Instabox to complement the TPL partner's parcel boxes.

2.5 Overview of the Warehouse Structure, Replenishment- and Distribution Flows at The Company

Based on what has been presented above in section 2.3 Logistics Operations at The Company and section 2.4 Distribution Flows, a summarization of the warehouse structure, replenishment- and distribution flows at The Company is presented in Figure 4 below.

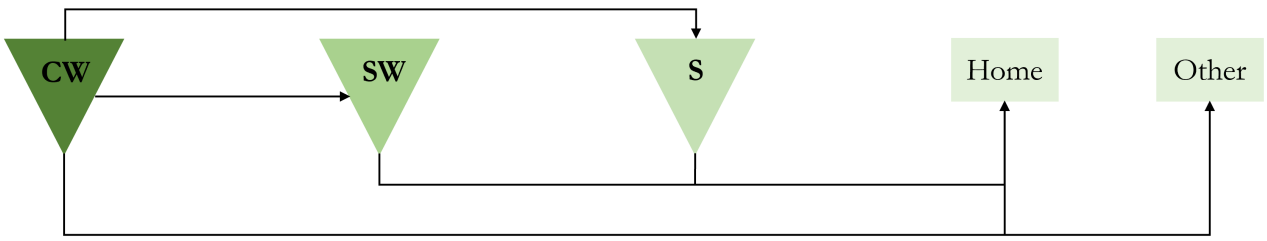

Figure 4: A summarization of the current warehouse structure, replenishment-, and distribution flows at The Company.

3 Frame of Reference

In the following chapter relevant literature areas to answer the study's purpose is presented. These areas are divided into the three sections: basics in logistics management, supply chain processes, and omnichannel. The areas are illustrated in Figure 5 *below.*

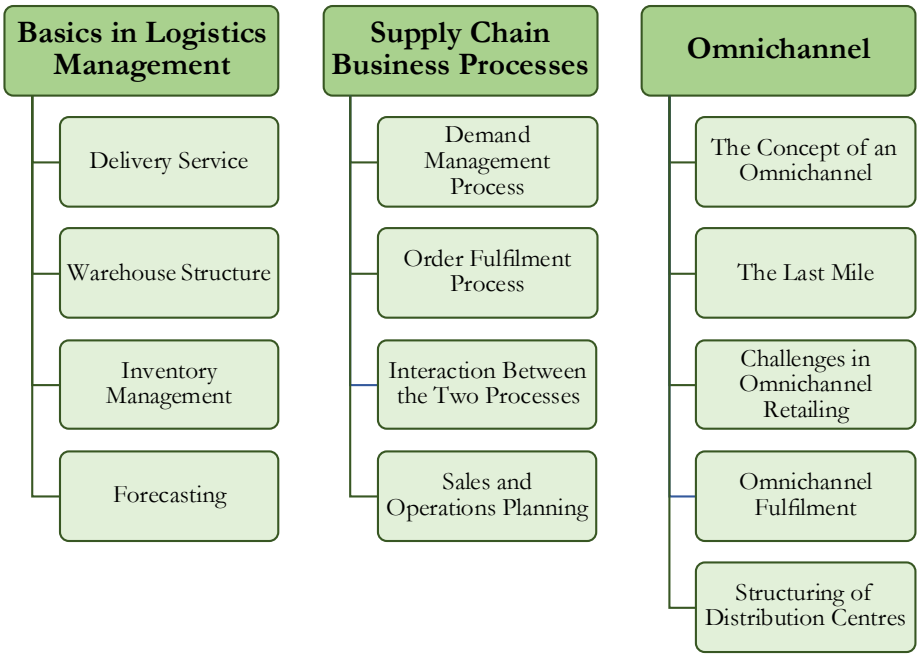

Figure 5: Overview of the literature areas presented in the frame of reference.

The frame of reference initially provides a brief overview of supply chain management, focusing on essential logistics concept. It then delves into supply chain business processes, with a particular emphasis on the demand management and order fulfilment processes. Additionally, the theory of omnichannel and omnichannel retailing is presented to gain a better understanding of the concept and critical factors associated. This is necessary to fully comprehend the supply chain processes specific to an omnichannel, given that The Company has adopted an omnichannel strategy.

3.1 Basics in Logistics Management

To be able to understand the context of this study in the supply chain management area, some logistics terms need to be explained. In this section, delivery service, warehouse structure, inventory management, and forecasting are presented. These terms are important to grasp since the following chapters in the frame of reference address them in several different aspects.

3.1.1 Delivery Service

Oskarsson et al. (2013) presents six elements which all together form a comprehensive format of what delivery service is. These elements are lead time, delivery reliability, delivery accuracy, inventory availability, information and lastly, flexibility. Bloomberg et al. (2002) define customer service within

logistics by *"the seven R's rule"*. The seven R's means having the *right* product, in the *right* condition, in the *right* quantity, at the *right* place, at the *right* time, for the *right* customer, and lastly for the *right* cost. Mattsson (2002) presents delivery service similar to Oskarsson et al. (2013). Mattsson (2002) model contains six elements: inventory availability, stock service level, delivery accuracy, delivery reliability, delivery time, delivery flexibility. The elements provided by Oskarsson et al. (2013) are explained further below in Table 1.

Table 1: Definitions of the delivery service elements.

Delivery service element (Oskarsson et al., 2013)	**Definition**
Lead time	The time from receiving the customer order to delivery of the order (Mattsson, 2002, Oskarsson et al., 2013). During the last years and due to the pandemic, the demand from customers for same-day deliveries and short lead times has grown extremely (Chen et al., 2022).
Delivery reliability	To which extent a delivery takes place in relation to the time promised to the customer (Oskarsson et al., 2013, Mattsson, 2002).
Delivery accuracy	Delivering the right quantity, in the right time and with the right quality (Oskarsson et al., 2013)
Inventory availability	The possibility of a product being in stock when a customer places an order (Mattsson, 2002, Oskarsson et al., 2013).
Information	Providing information about the order process is something that can give added value to the customer (Mattsson, 2002).
Flexibility	The company's ability to adjust according to altered circumstances (Mattsson, 2002).

3.1.2 Warehouse Structure

Warehouse structuring is a decision of a centralized or decentralized organization of the supply chain (Mattsson, 2002). The warehouses act as an intermediary between the production unit and the customers (Bloomberg et al., 2002). Therefore, the decision of how many warehouses and the structure in the logistics network are important for the organization as a whole (Mattsson, 2002).

Mattsson (2002) explains that a supply chain with several different levels of warehouses has a low centralization grade. A decentralized supply chain enables short lead times to customers since the warehouses are more locally distributed. Bloomberg et al. (2002) point out that the number of warehouses and the customer service that it provides must be weighed against the costs that it brings. With additional warehouses, the transportation and stockout costs decrease but at the same time the inventory and warehousing costs increase (Bloomberg et al., 2002). In contrast to a decentralized network, a high centralization grade enables economies of scale in terms of higher material flow, fewer non-value-adding activities, and the risk of obsolescence decreases (Mattsson, 2002).

3.1.3 Inventory Management

Oskarsson et al. (2013) present inventory management as when to make an order, how much to order each time, and how to handle uncertainty. Bloomberg et al. (2002) mention two different categories of models for ordering quantities. The first one is called the *push* model, where the order is made before knowing customer demand. The second one is called the *pull* model, where the decision of ordering is based on known customer demand. When it comes to when to order, Oskarsson et al. (2013) describe that it either can be through fixed intervals or varying intervals. Lastly, inventory management also deals with uncertainties. This is done by safety stock, which is derived by using information about customer demand variability and lead time variability (Oskarsson et al., 2013).

3.1.4 Forecasting

To plan future operational and strategic plans, companies need information about the customers' expected behaviour (Oskarsson et al., 2013). A way to predict customer behaviour is to use forecasting, often based on mathematical formulas and calculations, where the goal is to have the right products at the right time and place (Oskarsson et al., 2013). Long-term forecasting creates a basis for decisions regarding localisation and expansion of capacity, while mid-term forecasts manage contracts with suppliers, recruitment, and dismissal (Oskarsson et al., 2013). Presented in the book by Oskarsson et al. (2013) are three types of data commonly used in forecasting: causality, expert judgement, and historical- and databased models. Causality involves finding a causal relationship between two or more variables. Moreover, expert judgement forecasts are based on the great acquaintance that employees have with their products. Lastly, historical- and databased models are based on finding demand patterns in the market using data analysis, such as cyclical, seasonal, trends, or random variations (Oskarsson et al., 2013).

3.2 Supply Chain Business Processes

A process can be defined as a chain of activities with a clear starting and ending point that creates value for the customers (Mattsson, 2003, Oskarsson et al., 2013). Mattsson (2003) states that the activities within a process need to be linked to each other, where the activities that are linked together must either be a precondition for one another or a direct consequence of each other.

According to Lambert and Cooper (2000), activities in a supply chain need to be integrated into supply chain processes to be successful. Lambert and Cooper (2000) mention that the companies studied in their article had different numbers of processes, with different activities, and links between them. The companies also named their different processes differently, which becomes a problem when lacking consistency in a supply chain (Lambert and Cooper, 2000). Among these, the key supply chain processes were formed and are the following ones below (Lambert and Cooper, 2000, Croxton et al., 2001). The eight different supply chain processes and their definitions are further described in Table 2 below.

Table 2: Supply chain business processes.

Supply chain business process (Croxton et al., 2001)	**Definition**
Customer relationship management	Responsible for the identification of key customer segments and creating product and service agreements (PSA) that specifies the performance standards required from the customers (Lambert, 2010).
Customer service management	Process dedicated to operate the PSA and handle customer complaints and order requests (Bolumole et al., 2003).
Demand management	Process assigned to balance demand and supply by forecasting and synchronizing (Croxton et al., 2002).
Order fulfilment	Process including the activities from when receiving and order to delivering it to the customer (Bowersox et al., 2002, Lin and Shaw, 1998).
Manufacturing flow management	Process including all activities required to move products through the fabric (Goldsby and García-Dastugue, 2003).
Supplier relationship management	Process dedicated to define how a company should interact with their suppliers (Croxton et al., 2001).
Product development and commercialization	Process related to developing new products and getting them to market in an effective way (Croxton et al., 2001).
Return	Process dedicated to improving the operations and management so the amount of returns are minimized (Croxton et al., 2001, Lambert and Cooper, 2000).

Supply chain logistics is a part of supply chain management, focusing on one actor within a supply chain (Oskarsson et al., 2013). The demand management- and order fulfilment process focus more on the logistics part of supply chain management. Thereby, the following sections will be a more detailed description of those two processes.

3.2.1 Demand Management Process

The demand management process is dedicated to balancing demand and supply (Lambert and Cooper, 2000). According to Lambert and Cooper (2000), variance in customer demand is the largest source of variability, which is why the demand management process is one of the key processes within the supply chain business processes. The demand management process includes forecasting demand and synchronizing it with the production, procurement, and distribution capabilities (Croxton et al., 2002). In addition, demand management is also about how to reduce variability in demand and increase flexibility to be able to handle both internal and external happenings (Croxton et al., 2002). A successful demand management process can according to Croxton et al. (2002) allow a company to be more proactive when it comes to expected demand, and more reactive when it comes to unexpected

demand. Even more, functioning forecasting increases sales and customer loyalty (Croxton et al., 2002).

Different authors divide the demand management process into different activities. Activities from Croxton et al. (2002), Crum and Palmatier (2003), and (Nguyen et al., 2022) are illustrated in Table 3 and further described below.

Table 3: Demand management activities found in literature.

Croxton et al. (2002)	**Crum and Palmatier (2003)**	**Nguyen et al. (2022)**
Strategic sub-processes	*Elements*	*Activities*
Determine demand management goals and strategy	Planning demand	Goal formulation
Determine forecasting procedures	Communicating demand	Forecasting techniques
Plan information flow	Influencing demand	Source of information
Determine synchronization procedures	Managing and prioritizing demand	Forecasting in making a decision
Develop contingency management system		Communicating the forecasts and synchronizing supply and demand
Develop framework of metrics		
Operational sub-processes		
Collect data/information		
Forecast		
Synchronize (S&OP)		
Reduce variability and increase flexibility		
Measure performance		

Croxton et al. (2002) break up the demand management process into a strategic and an operational one, this can be seen in Table 3. The strategic sub-processes aim is to create a design for how an effective system should look to be able to balance demand and supply (Croxton et al., 2002). With this, the forecasting and synchronization method is set up, but also the people who should be involved in the supply chain are decided (Croxton et al., 2002). Regarding forecasting methods, there are plenty of them. Different methods are better suited depending on the time frame and market (Ingle et al., 2021, Croxton et al., 2002). The synchronization could also be referred to as Sales and Operations Planning (S&OP) (Croxton et al., 2002). This is where the coordination between marketing, manufacturing, sourcing, finance, and logistics is done (Croxton et al., 2002). In addition, Croxton et al. (2002) mention that it is important to examine the forecast and synchronize it back through the whole supply chain. When synchronizing is done, the authors further suggest that the company invites key suppliers and key customers to join the monthly S&OP meetings. Lastly, the strategic team should decide on metrics to measure the performance of the demand management process (Croxton et al., 2002).

The operational sub-processes aim to execute forecasting and synchronization, where the team collects data from the firm, creates the forecast, and synchronizes it (Croxton et al., 2002). The output of the synchronization is an execution plan which must be communicated internally but also with suppliers (Croxton et al., 2002). Another important component of the operational sub-processes, according to Croxton et al. (2002), is handling the variability. Reducing variability helps the company to be more consistent in its planning and reduce costs. The demand management process should not only look for sources of variability but also implement solutions by both reducing the variability and increasing flexibility within the supply chain (Croxton et al., 2002). This is what Croxton et al. (2002) mean by the big difference between demand planning and demand management.

Other authors that discuss the importance of the demand management process are Crum and Palmatier (2003). As seen in Table 3, Crum and Palmatier (2003) divide the demand management process into four elements: planning demand, communicating demand, influencing demand, and prioritizing demand. Planning demand includes activities such as creating a method and creating actions in advance. Crum and Palmatier (2003) state this is crucial to handle forecasts. In other words, the first step is demand planning, where an estimation of how much the organization believes customers will buy is done (Crum and Palmatier, 2003). Secondly, communicating demand is similar to the synchronization step in the activities presented by Croxton et al. (2002). Croxton et al. (2002) and Crum and Palmatier (2003) state the importance of sharing the demand plan and forecast throughout the supply chain. Further, the authors also mention that communication is essential to understand the actual state of demand, determine business actions, and identify relevant measurements to keep supply and demand balanced.

Thirdly, Crum and Palmatier (2003) give influencing demand as an element. This element includes making a methodology for how the company can influence customers to buy products and services which benefit the company. Lastly, managing and prioritizing is the fourth activity identified. The purpose of this element is to manage for optimum demand performance. This is used when volume and demand are not in synchronization with supply (Crum and Palmatier, 2003). Furthermore, Nguyen et al. (2022) present goal formulation as an activity, this includes understanding customers, demand, and supply capabilities. Moreover, the other activities presented by Nguyen et al. (2022) are done similarly to the activities defined by both Croxton et al. (2002) and Crum and Palmatier (2003). Croxton et al. (2002) and Nguyen et al. (2022) particularly push the fact that planning is essential for the supply chain processes.

As described above, different definitions of the demand management process and its activities occur in the literature, where some authors make a more detailed classification of the activities than others. Furthermore, authors call these different things, such as activities, sub-processes, or steps.

3.2.2 Order Fulfilment Process

The order fulfilment process starts when receiving an order and ends with delivering the order (Lin and Shaw, 1998, Bowersox et al., 2002). The process is complex since it requires cross-functional teams but is at the same time independent and executed by different functional units (Croxton, 2003, Lin and Shaw, 1998). Furthermore, good order fulfilment is a prerequisite to good inventory levels, therefore it directly impacts product availability (Croxton, 2003). Langley et al. (2008) state that the order fulfilment is a process handled by logistics. A key factor in achieving operational efficiency and higher customer satisfaction is effective order management (Langley et al., 2008). There are two main goals of the order fulfilment process according to Lin and Shaw (1998). Firstly, to deliver products with the right quality, at the right time and the right place (Lin and Shaw, 1998). Secondly, to achieve agility, in terms of flexibility, to be able to handle both internal and external uncertainties (Lin and Shaw, 1998). To shorten the lead times of the order fulfilment process, the lead times must be controlled throughout the whole supply chain (Lin and Shaw, 1998).

Different authors divide the order fulfilment process into various activities. Activities from Lin and Shaw (1998), Bowersox et al. (2002), Croxton et al. (2001), Croxton (2003), Langley et al. (2008), and Espino-Rodríguez and Rodríguez-Díaz (2014) are illustrated in Table 4 and further described below.

Table 4: Order fulfilment activities found in literature.

Lin and Shaw (1998)	**Bowersox et al. (2002)**	**Croxton et al. (2001) and Croxton (2003)**	**Langley et al. (2008)**	**Espino-Rodríguez and Rodríguez-Díaz (2014)**
Activities	*Information areas*	*Strategic processes*	*Activities*	*Activities*
Receive order from customer	Order processing	Market strategy, supply chain structure and customer service goals	Receive order	Receipt of order in the warehouse
Commit order request	Order assignment	Defining requirements	Enter order	Stock control
Production scheduling	Distribution operations	Evaluation of logistics network	Verify and check order	Production control
Material planning	Inventory management	Order fulfilment plan	Check credit	Manufacture
Capacity planning	Transportation and shipping	Framework of metrics	Check inventory availability	Transfer to warehouse storage
Shop floor control	Procurement	*Operational processes*	Process back order	Preparation of consignment
Logistics (e.g., inventory and transportation)		Generate and communicate	Acknowledge order	Control of delivery note
		Enter order	Modify order	Shipment of consignment
		Process order	Suspend order	Transport
		Documentation	Check pricing and promotion	
		Fill order	Identify shipping points	
		Delivery	Generate picking documents	
		Post activities and measure performance	Originate shipment	
			Inquire order status	
			Deliver order	

The order fulfilment process could be divided into two processes: a strategic and an operational one (Croxton et al., 2001, Croxton, 2003). The strategic process consists of how the sub-processes should be established and the management of each sub-process. Firstly, defining requirements includes defining customer and supply chain requirements, such as cut-off times and delivery times (Croxton, 2003). According to Croxton et al. (2001) evaluation of the logistics networks is a significant part of the order fulfilment process since the design influences the performance of the system. Moreover, the

evaluation of the logistics network will depend on the requirements defined in the former sub-process (Croxton, 2003). The aim of this sub-process is to establish various factors such as the most suitable inventory points for distribution, the optimal location for these inventory points, and the appropriate transportation mode to be used (Croxton, 2003). Following, the order fulfilment plan sub-process encompasses identifying the best approach to process orders, with emphasis on operational activities such as selection of technology and supporting systems (Croxton, 2003).

The operational part consists of the realisation of the sub-processes once the strategical process has been established (Croxton et al., 2001). All the sub-processes are shown in Table 4. Firstly, generating an order involves receiving an order, followed by communicating it to all relevant parties and systems required for order entry (Croxton, 2003). Croxton (2003) further divides the two sub-process into refined activities in contrast to Croxton et al. (2001). For instance, to process the order the company has to check the credit and inventory and plan order flow and transportation, while the fill order sub-process consists of picking, packing, loading stage and prepare load confirmation at the warehouse (Croxton, 2003).

Lin and Shaw (1998), on the other hand, make a less refined breakdown of activities. The authors only split up the order fulfilment process into the three main activities order management, manufacturing, and distribution divided into several sub-activities shown in Table 4. Espino-Rodríguez and Rodríguez-Díaz (2014) determined core activities in the order fulfilment process by conducting an empirical application study based on capabilities to create value. The authors then found eight activities based on creating value presented in Table 4**.**

Bowersox et al. (2002) define logistical operations as a process being part of an integrated supply chain where the purpose is to receive, process and ship inventory. It can be divided into an informational and inventory flow, where the informational flow is comprised of planning/coordination and operations. The activities in the planning process arise from given logistics information requirements such as capacity constraints and other logistics requirements (Bowersox et al., 2002). The operations activities are shown in Table 4 above.

As described above there are multiple different definitions of the activities comprising the order fulfilment process. Where some authors make a more detailed classification of the activities than others. Furthermore, authors choose to call these different things, such as activities, sub-processes, or steps for instance.

3.2.3 Interaction Between the Two Processes

Croxton et al. (2001) note that integration between key supply chain processes has become more important in supply chain management. The demand management- and order fulfilment process are not independent, the processes cross-functionally interface with each other (Croxton et al., 2001). The order fulfilment process interacts with the demand management process in its activities (Croxton et al., 2002), which is shown in Figure 6.

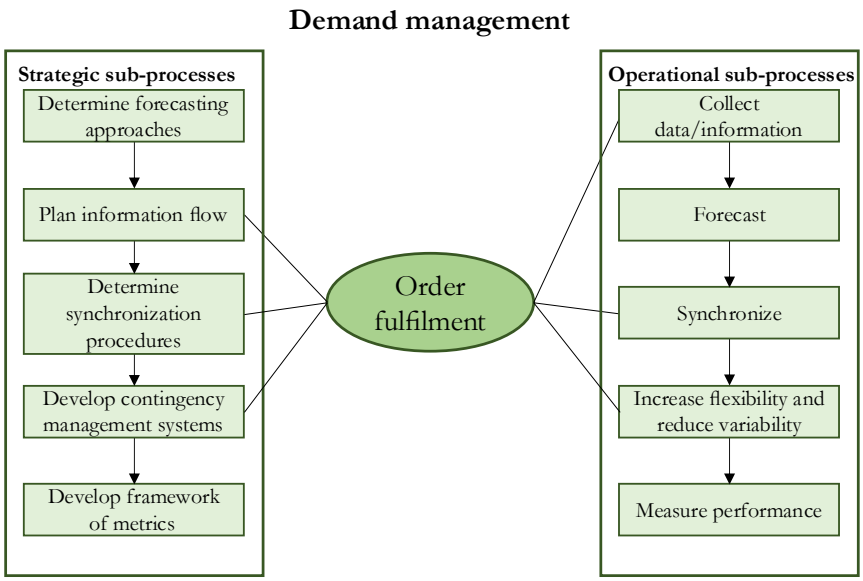

Figure 6: The interface of the order fulfilment process in the activities of the demand management process (Croxton et al., 2002).

In plan information flow, the demand management process team needs input from several functions across the company, including the order fulfilment team (Croxton et al., 2002). Furthermore, Croxton et al. (2002) describe the activity of determining synchronization procedures as where the sales and operations planning is done. The order fulfilment team contributes with information regarding supply capabilities since the demand management team is supposed to balance both demand and supply (Croxton et al., 2002). Further, the authors describe that the developing of a contingency plan is made together with the order fulfilment team among others. The order fulfilment process interfaces with the operational demand management activities due to data collection, execution of sales and operations planning, and ways to increase flexibility and reduce variability through supply operations (Croxton et al., 2002). Moreover, in the same way, the demand management process interfaces the activities within order fulfilment (Croxton, 2003), as shown in Figure 7.

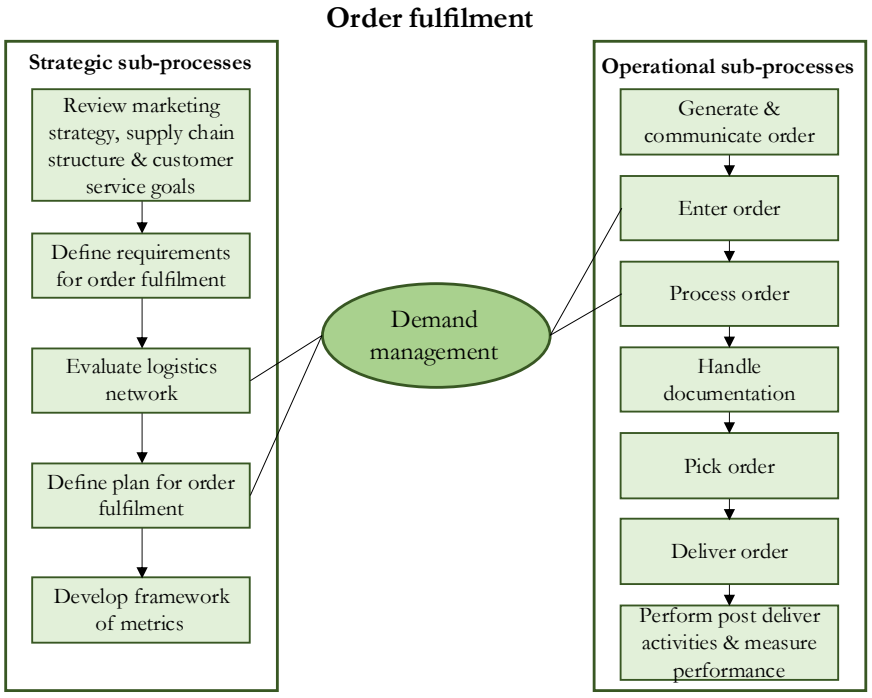

Figure 7: The interface of the demand management process in the activities of the order fulfilment process (Croxton, 2003).

Evaluation of logistics network includes steps such as collecting data from different functions within the company, whereas the demand management team is relevant according to Croxton (2003). Furthermore, Croxton (2003) describes that to create a suitable order fulfilment plan, the team needs to interact with the demand management team to find solutions on how to handle demand variability. Lastly, information regarding entered and processed orders are shared with the demand management team (Croxton, 2003). As described above, the two processes intertwine and are strongly connected due to the demand and supply characteristics.

3.2.4 Sales and Operations Planning

Sales and operations planning (S&OP) is a management process to create integration and coordination through the whole supply chain where the purpose is to balance the supply and demand and connect the strategic business plan with the operational plan (Ávila et al., 2019, Seeling et al., 2021, Tavares Thomé et al., 2012). As mentioned, sales and operations planning are a part of the demand management process (Croxton et al., 2002). Moreover, as presented in 3.2.3 Interaction Between the , the two processes are intertwined which motivates why a more profound description of sales and operations planning is relevant.

Tavares Thomé et al. (2012) describe five main characteristics of S&OP. Firstly, as mentioned before, it is an integrated and tactical planning process. Secondly, it creates a unified business plan, where the planning horizon is usually from 3 to 18 months. Furthermore, the main purpose of S&OP is aligning the strategic plan of the business with the operational work (Ávila et al., 2019). Lastly, it generates

value by measuring the performance of the business and its S&OP processes (Tavares Thomé et al., 2012).

Ávila et al. (2019) describe the S&OP process in five different steps, performed stepwise where the five steps defined are:

- Create unconstrained demand forecast
- Create initial supply plan
- Develop a final consensus operating plan
- Communicate and implement plan
- Measure process performance

In the S&OP process outlined by Ávila et al. (2019), the initial step involves data collection to gain an unconstrained understanding of demand forecasting. The second step in the model by Ávila et al. (2019) involves developing an initial supply plan based on the forecasted demand, with the supply chain team assessing the production and supply capacity of all relevant operations. Alternative supply plans are then created based on capacity constraints to determine the optimal approach for matching the business plan and strategy (Ávila et al., 2019). The subsequent step by Ávila et al. (2019) involves developing a final consensus operating plan that balances the initial supply and demand plans, with representatives from all business functions involved in the decision-making process. To ensure engagement, regular meetings should be conducted with representatives from all business functions, as suggested by Grimson and Pyke (2007). The business management team then considers the proposal and determines the appropriate supply plan and necessary actions (Ávila et al., 2019). In the fourth step of the model by Ávila et al. (2019), the plan is communicated and implemented across all parties involved and affected to ensure timely production and delivery to meet demand expectations. Finally, the S&OP process is evaluated by measuring performance using relevant key performance indicators to improve and develop the process and assess the efficiency of the initial supply plan (Ávila et al., 2019).

Ávila et al. (2019) found that implementing an S&OP process improved the quality of decision-making information and resulted in faster, more efficient decision-making and better communication within the organization. However, Ohlson et al. (2022) discuss challenges related to the S&OP process, such as critical implementation, lack of education, and problems with data collection and supply- and demand planning processes. To address these challenges, Ohlson et al. (2022) suggest implementing machine learning techniques, but practical tests are needed to determine their suitability for a particular company and situation.

3.3 Omnichannel

An omnichannel allows companies to interact with customers through innumerable channels (Rigby, 2011). Huang (2020) describes that the omnichannel provides customers with various channels, to gain a better understanding of the products sold by the company. From the company's perspective, the omnichannel allows the integration of numerous channels and a greater understanding of customers' views on their products and services (Huang, 2020).

3.3.1 The Concept of an Omnichannel

The omnichannel allows customers to buy and return a product anywhere in the system (Beck and Rygl, 2015). Solem et al. (2023) interviewed several companies to understand the capabilities needed to have a functioning omnichannel creating value for customers. One of the main conclusions was that an omnichannel company needs to provide several delivery options to its customers. These could vary from pick-up points to home delivery or mini hubs close to the customers (Solem et al., 2023). Companies use their existing supply chain infrastructure, such as physical stores or warehouses, to provide customers with online and offline orders (Barbosa and Casais, 2022, Guo and Keskin, 2022). According to Barbosa and Casais (2022), this enables synergies between the different channels in the supply chain.

Kembor et al. (2018) have identified ten themes within omnichannel logistics. One of the themes found was the role of logistic service providers (LSP), who could come to play an essential role in developing unique capabilities and new omnichannel solutions. Additionally, it could become a point of differentiation for omnichannel retailers (Kembor et al., 2018). To make omnichannel retailing successful it is essential to focus on achieving as high customer value as possible (Larke et al., 2018).

Solem et al. (2023) identified dynamic capabilities a retailer needs to have to succeed with omnichannel retailing. The authors stated the importance of the ability to have developed and implemented integrated software systems. Therefore, it could be vital to hire expertise within integrated systems and other software solutions to facilitate channel integration in the omnichannel (Solem et al., 2023). Furthermore, Solem et al. (2023) state the importance of the ability to achieve integration and collaboration among different business functions by focusing on having a good core management team. In addition, it is challenging, yet important, to collaborate with suppliers and other essential partners involved (Solem et al., 2023).

In an omnichannel, there are several ways for a customer to make a purchase and get the product delivered. The various options for forward distribution can be divided into three sections: *traditional bricks-and-mortar retailing*, *home delivery* and *store pick-up* (Hübner et al., 2016a). Within these categories, there are different ways in which bricks-and-mortar, home delivery and store pick-up can be arranged.

Bricks-and-mortar

Bricks-and-mortar (BM) retailing is the traditional in-store purchases made by customers coming to the store (Hübner et al., 2016a). BM allows customers to touch and feel the product and gives them a

sense of instant gratification since they receive the product right away (Brynjolfsson et al., 2013). Hübner et al. (2016a) describe that a store can be replenished by the distribution centre (DC), or directly by the supplier. The authors mention that the bricks-and-mortars can fulfil in-store purchases and online orders simultaneously, or only traditional in-store retailing. According to Brynjolfsson et al. (2013), the distinction between physical and online retailing will fade, due to technological advances such as mobile telephones and augmented reality.

Hübner et al. (2016a) mention some advantages and challenges with BM retailing. Firstly, having direct contact with the customers is a great advantage. In addition, having a physical store, which is being replenished by specific DCs, also increases the efficiency regarding packing and transportation (Hübner et al., 2016a). Although, the BM stores are often smaller than larger DCs which can lead to a limited item range (Hübner et al., 2016a). Further, having a good presence with many BM stores also requires more fixed costs.

Home Delivery

Several types of home delivery can be arranged. The first one is home delivery directly from the DC or supplier (Hübner et al., 2016a). Another alternative is *ship from store* (SFS) (Hübner et al., 2016a, Guo and Keskin, 2022). According to Guo and Keskin (2022), SFS is a cheaper alternative for a retailer since the product can be shipped from a local store close to the customer instead of a distant warehouse. Guo and Keskin (2022) also mention *buy in store ship home* (BSSH) as an alternative for home delivery. Hübner et al. (2016a) discuss the increased customer convenience as the main advantage of providing home delivery as an omnichannel retailer, which can increase the perceived customer value.

Store Pick-up

The use of the stores is a fundamental element of an omnichannel since it leads to the convergence of the channels in the supply chain (Hübner et al., 2016a). Many retailers have implemented the strategy of *buy online pick up in store* (BOPS), for which a customer can make the transaction online but pick up the item in one of the retailer's stores (Gallino and Moreno, 2014). Gallino and Moreno (2014) mention that having BOPS implemented requires credibility in inventory information provided on the website. This is because the customer takes a risk when deciding to visit the store to pick up their bought item. Although BOPS requires high creditability in inventory information, it also helps retailers to save costs from the last mile delivery and increase store traffic (Guo and Keskin, 2022, Gallino and Moreno, 2014).

Another type of store pick-up presented by Hübner et al. (2016a) is *click and collect* (CC). CC refers to the process where an online order is fulfilled by the retailer or supplier and then shipped, packed, and delivered directly to the stores. The CC package either goes with the same transport as the brick-and-mortar deliveries or as an independent delivery by the TPL (Hübner et al., 2016a). Whether the CC package goes with the brick-and-mortar replenishment or as an independent TPL delivery depends on the store delivery frequency (Hübner et al., 2016a).

Hübner et al. (2016a) also present *click and reserve* (CR) as an alternative for store pick-up. If the retailer has access to real-time inventory data, then the customer can reserve an item and go to the store to make the purchase and get the product. According to Hübner et al. (2016a), CR enables customers to place an online order and later on be served directly by the store. Hereby, the CR-orders are purely fulfilled from the store inventory (Hübner et al., 2016a).

Lastly, *ship to store* (STS) is an increasingly popular channel used for omnichannel retailing (Gallino et al., 2017). The description of STS made by Hübner et al. (2016a) is that a customer purchases an item online and has it shipped to a local store where it wasn't available from the beginning. In most cases, the shipment to the store is done without any extra cost for the customers (Hübner et al., 2016a). Below in Table 5, the different categories of delivery options and their designs described above are summarized.

Table 5: Different types of forward distribution and their designs (Hübner et al., 2016a).

Categories of forward distribution	**Design**
Bricks-and-mortar	In-store-buy
Home delivery	Home delivery directly from DC/supplier
	Ship from store (SFS)
	Buy in store ship home (BSSH)
Store pick-up	Buy online pick up in store (BOPS)
	Click and collect (CC)
	Click and reserve (CR)
	Ship to store (STS)

3.3.2 The Last Mile

Last mile deliveries is defined as "…all logistics activities related to the delivery of shipments to private customer households in urban areas." (Boysen et al., 2021). According to Boysen et al. (2021), the last mile context has grown in the recent years due to increasing volumes, sustainability, costs, time pressure, and aging workforce. To maintain required quality and delivery speed that is needed to satisfy customers today, innovations are needed regarding places of delivery (Asdecker, 2021). Asdecker (2021) presents several innovations of places of delivery in last mile deliveries. These are presented in Table 6.

Table 6: Places-of-delivery innovations and description (Asdecker, 2021).

Place-of-delivery-innovation	Description
Parcel locker	A collection of automated compartments that are securely located in public areas and available for self-service delivery collection by customers.
Reception box	Boxes attached to a customer's home and are accessible for a courier with a special key or code, big enough to fit a package.
Trunk delivery	An innovative approach known as trunk delivery allows delivery companies to utilize a vehicle's trunk as a designated delivery drop-off location. Customer is notified and the package is ready for pick-up given a temporary key.
Home access system	The courier can provide home delivery with access to a customer's house or apartment using technology.

When it comes to last mile distribution, the study conducted by Hübner et al. (2016b) showed that the choice of last mile option largely depended on the geographical situation. Regarding delivery modes, Hübner et al. (2016b) state having CC by picking up at a solitary station created a high opportunity for drive-through solutions, and simplified demand planning and inventory through their inventory. Although, there were high investment costs for setting up the pickup stations. CC with picking up in a store, was on the other hand, difficult to scale up due to limited storage space but had low investment costs (Hübner et al., 2016b).

Shopping in-store means that the customers bear a larger cost regarding the last mile than when using an online channel which does not include a home delivery option (Larke et al., 2018). The cost of last mile transportation increases in less dense geographical areas. One way to handle this dilemma for companies is by adding multiple delivery options such as order collection points or pick up from parcel lockers (Larke et al., 2018).

Weber (2021) noticed that an important factor and challenge for many omnichannel retailing companies during the pandemic was the capacity constraints of supply chain partners. Many of the companies in the study outsourced their last mile deliveries to TPL providers due to an increased demand for home deliveries. Although, scaling this kind of service might take time. Therefore, many of the companies in the study made by Weber (2021) expressed capacity constraints of the partners preventing them from scaling up their operations to meet the increased demand.

3.3.3 Challenges in Omnichannel Retailing

Omnichannel retailing does not solely come with opportunities and competitive advantages, challenges and obstacles are also found in the literature, which will be further discussed in the following section.

The complex structure of an omnichannel with regards to both retailing and supply chain management makes achieving the integration challenging for companies (Hübner et al., 2016a). Consequently, the high complexity of an omnichannel structure requires more knowledge regarding data, technology, and information systems (Larke et al., 2018, Lewis et al., 2014, Neslin et al., 2006). Moreover, the increased amount of distribution channels makes the structure even more complex (Hübner et al., 2016b). When adapting or adding new online sales channels, Larke et al. (2018) mean that it will be challenging to handle the inventory control due to difficulties in forecasting where there is a risk of increased inventory cost due to suboptimization of the inventory as a result of inaccurate forecasting (Larke et al., 2018).

Neslin et al. (2006) outline five challenges related to multichannel retailing, some of which also apply to omnichannel retailing. One such challenge is data integration, which is likely to arise as omnichannel retailing provides customers with multiple channels to interact with retailers. Additionally, retailers need to process and analyse large amounts of customer data across all channels using technological solutions (Neslin et al., 2006). While this can enable managers to fully understand customer behaviour, evaluating the performance of each channel and allocating resources across them can be challenging (Neslin et al., 2006). Furthermore, finding valid and relevant performance measurements is another challenge mentioned by Larke et al. (2018).

Lewis et al. (2014) suggest that acquiring new technological resources or changing the existing ones is essential to achieve integration between different channels, but it can also be a hindrance. Retailers often fail to understand the importance of creating an IT infrastructure that fully supports integration (Lewis et al., 2014). Furthermore, ensuring that employees have the required competencies and understanding the purpose and challenges of integration can be problematic, particularly when adding new channels (Lewis et al., 2014). Kazancoglu and Demir (2021) emphasize the importance of retailers providing channel integration between offline and online channels for long-term success. However, they argue that the complexity of online channels needs to be eliminated to ensure customer ease of use (Kazancoglu and Demir, 2021). Larke et al. (2018) conducted a case study and found that achieving an integrated inventory system across all channels is a long-term process that demands strategic planning.

3.3.4 Omnichannel Fulfilment

Retailers today offer both physical and online purchasing, which requires different order fulfilment processes and activities (Ishfaq and Raja, 2018). Ishfaq and Raja (2018) present four fulfilment options for fulfilling online orders: integrated fulfilment, dedicated fulfilment, store fulfilment and vendor fulfilment. Ishfaq and Raja (2018) describe integrated fulfilment as when the online order is fulfilled and delivered through existing infrastructure and DCs. The store fulfilment is to use the stores as a pickup stations for the customers (Ishfaq and Raja, 2018). Dethlefs et al. (2022) state, in their article about rapid fulfilment in omnichannel retailing, that the decision of fulfilment from DCs or stores depends on the location of the DC and the cost structure between the stores and DCs. The main conclusion drawn by the authors was that a combination of both DCs and stores helps to create a cost-efficient supply to the customers, rather than only using stores for online orders.

Ishfaq et al. (2016) state that to execute an omnichannel strategy, retailers must utilize their traditional physical networks and employ a third-party logistics provider (TPL) in their order fulfilment process. A key finding presented by Ishfaq et al. (2016) was that in an omnichannel, the stores have a bigger role in the last step of the order fulfilment process, which is delivery. More and more stores are part of an omnichannel, getting responsible for fulfilling online orders, handling returns and replacing the last mile deliveries (Ishfaq et al., 2016). Furthermore, Hübner et al. (2016a) mention relevant areas to achieve excellence in omnichannel fulfilment. One way was by optimizing the cross-channel processes in DCs and stores, where the goal is primarily to improve the operations in omnichannel retailing (Hübner et al., 2016a). For instance, adapting different distribution channel processes (Hübner et al., 2016a).

Hübner et al. (2016a) define three different dispatching points from where omnichannel retailers can fulfil customer orders: *retailers' distribution centres, stores,* and *suppliers' distribution centres*. Like the different fulfilment strategies Hübner et al. (2016a) mention, Buldeo Rai et al. (2019) only discuss two locations from where a customer order can be fulfilled, a DC or a physical store.

Retailer's Distribution Centre

Retailer's distribution centre is used both for home deliveries and online deliveries, such as BM stores, shipment from the DC or CC (Hübner et al., 2016a). Advantages of retailer's DC is common inventory, reduced handling in store and the possibility of a wider product range in store (Hübner et al., 2016a). Although, the authors mention that obstacles might be to achieve efficient picking processes and the disadvantage of cost arising when using CC to store.

Stores

Stores are mostly used for store shipments like SFS or BSSH. However, they could be used as a dispatching point for CR (Hübner et al., 2016a). Stores' inventory can be utilized for online or distance retailing, providing various delivery options and faster deliveries, including same day delivery (Hübner et al., 2016a). Buldeo Rai et al. (2019) mean that store fulfilment can be seen as a compliment to DC fulfilment. Buldeo Rai et al. (2019) argue that it is easier to expand geographically with store fulfilment as it makes it possible to postpone investments in new logistical facilities for the retailer. However, it is only valid when the right digital infrastructure and software is implemented, such as operational planning systems and inventory control (Buldeo Rai et al., 2019). In addition, according to Hübner et al. (2016b), home delivery from stores tends to be more expensive due to faster delivery and smaller quantities. Using stores as dispatch points also requires better IT infrastructure and real-time data exchange (Hübner et al., 2016a).

Supplier's Distribution Centre

Lastly, is the *supplier's distribution centre*, whereas the supplier is responsible for the order fulfilment (Hübner et al., 2016a). This dispatching point can be used for in-store buying operating as a replenishment strategy for the BM stores. It can also be used for home delivery directly from the supplier's DC or the CC option (Hübner et al., 2016a). The possible benefits of using a supplier's DC are mainly to reduce inventory and handling costs as the job is partly outsourced (Hübner et al., 2016a).

3.3.5 Structuring of Distribution Centres

An omnichannel retailer's distribution is used for many different channel concepts, and the distribution structure of an omnichannel retailer's DC can vary mainly depending on two factors (Hübner et al., 2016a, Buldeo Rai et al., 2019). Firstly, the degree of integration of online and offline DCs. Secondly, the degree of centralization within the retailer's network (Hübner et al., 2016a).

As mentioned earlier, the retailer's DCs can be separated for offline and online distribution or integrated. According to Hübner et al. (2016a), having separated DCs can reduce the risks when entering a new channel. In contrast, the advantages of having integrated DCs might be lower average inventory levels, capacity balancing effects or the possible outcome of higher overall service levels by merging inventory (Hübner et al., 2016a). Although, there is higher complexity in picking and order management to establish well-integrated distribution channels, and it requires more space at each distribution channel (Hübner et al., 2016a). Integrated distribution channels are favoured when there are minor deviations in order sizes between the different channels and the outlets are small and frequently replenished. Further, Buldeo Rai et al. (2019) argue that the integration model is the most advanced, of the two mentioned, and can potentially allow higher product availability.

The omnichannel retailer can choose between centralized or decentralized DCs, depending on their specific circumstances and needs (Hübner et al., 2016a). While a centralized organization is the most common in retailing and may be the best fit for an omnichannel strategy, according to Buldeo Rai et al. (2019). The participants in Hübner et al. (2016a) study preferred a centralized DC for home deliveries. However, a centralized structure may pose challenges, as it can result in longer distances to customers on average (Hübner et al., 2016a, Hübner et al., 2016b). Therefore, in a geographically concentrated area, a centralized centre is preferable if customers are densely populated (Hübner et al., 2016a).

Hübner et al. (2016b) conducted a study to create a planning framework for last mile order fulfilment in omnichannel grocery retailing. The study found that having a central warehouse resulted in lower picking costs as order volumes increased. However, a significant challenge was the need to adjust the picking system to enable integration (Hübner et al., 2016b). A decentralized structure is preferred in BM channels and for customers distributed over a larger geographic area, as it allows for shorter delivery times for store deliveries (Hübner et al., 2016a). However, a decentralized structure may lead to more complex reloads and require decentralized inventories (Hübner et al., 2016a).

4 Task Specification

In the following chapter, the purpose of the study is specified through four research questions. Firstly, relevant delimitations of the study's task specification are presented. Secondly, the four research questions are divided into different sub-questions used to answer the research question and form the basis for answering the study's purpose. Lastly, a summary of all research questions and their sub-questions is presented.

4.1 Delimitations and Studied System

To narrow down the scope of this study a few delimitations have been done according to below:

- **Focus on two supply chain processes:** There are eight supply chain business processes presented in section 3.2 Supply Chain Business Processes. All parts of the supply chain affect each other and are somehow integrated. However, it is the supply and demand that are considered most interesting to investigate when implementing 15-minute deliveries. This since this study aims to investigate and identify the logistical consequences that arise and it's the two processes considering foremost logistical aspects. Hence, the study will only focus on the demand management- and order fulfilment processes at The Company.
- **No financial costs considered:** Reaching customers within 15 minutes might imply new inventory points, which require investment, inventory, and maintenance costs. This study will not consider any of these costs due to time constraints. Instead, the focus will be on how strategical and operational activities in The Company's processes will need to change when offering 15-minute deliveries.
- **Only considering bicycle as transportation mode:** Depending on the means of transportation, customers can transport themselves variously long. Thus, the number of warehouses and inventory points will vary depending on the means of transportation. In this study, however, a directive from The Company is that a customer can travel 4 km in 15 minutes by bicycle.
- **Based on the current underlying warehouse structure:** There are multiple ways the warehouse structure of the company could be designed to achieve 15-minute deliveries. However, it is not within the scope of this study to investigate multiple alternatives to the current warehouse structure. Hence, the determined warehouse structure when implementing 15-minute deliveries will be based on the underlying warehouse structure, including central-, satellite warehouses, and stores, that The Company currently possesses with necessary modifications made.

The design of the studied system is based on The Company's omnichannel structure and the demand management- and order fulfilment processes, including the physical flows affected and business and operating systems used. Thus, based on the purpose of the study and its delimitations, the studied system is presented in Figure 8 below. Within The Company's logistics structure, the central warehouse, satellite warehouses and retail stores will be of interest. Furthermore, the different delivery options and omnichannel alternatives, for instance, home delivery or postal box, will also be of relevance to consider, as they are relevant to the distribution flows in the omnichannel system. How 15-minute deliveries will look in this system is the foundation for the rest of the study.

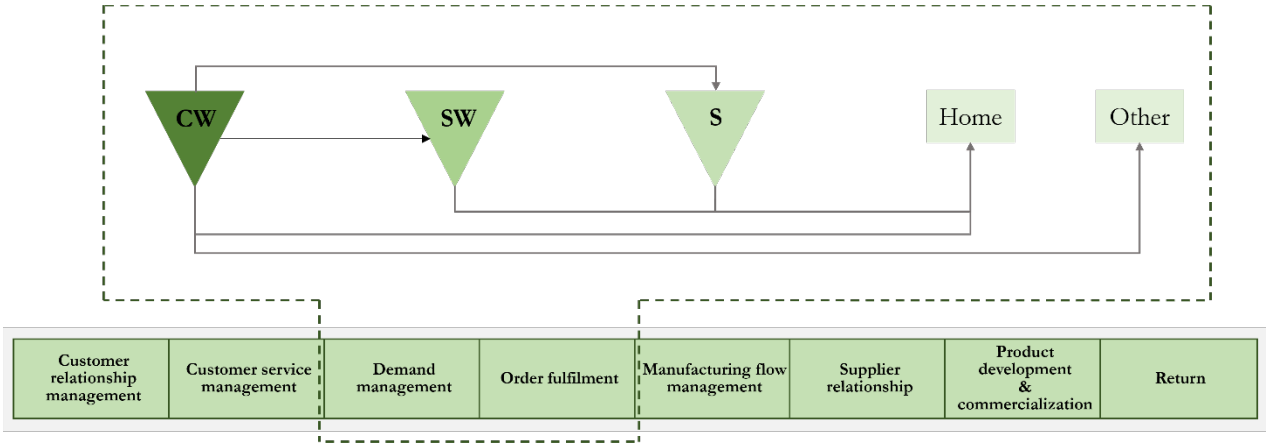

Figure 8: The studied system of this study.

4.2 Breakdown of Purpose

The following section aims to break down the purpose into four research questions comprising sub-questions. The purpose of the study is as follows:

The purpose is to investigate the logistical consequences for The Company Sweden if the logistics vision of 15-minute deliveries is realised.

For many companies, time has become a high priority to obtain high delivery service (Oskarsson et al., 2013). Logistics and fast deliveries of The Company's products are considered important according to the Company. With the ambition of The Company to deliver and make products available to their customers within 15 minutes, it is necessary to investigate The Company's processes and activities to identify areas for improvement. Omnichannel retailing and supply chain management pose a challenge to achieving integration and providing multiple delivery options (Hübner et al., 2016a, Solem et al., 2023). Thus, it is important to investigate relevant supply chain processes, its activities, and the logistical consequences at The Company. This is done by identifying what is required in the processes in designed scenarios and identifying the gaps compared to the current processes and activities. Once gaps have been identified, the logistical consequences occurring from the gaps will be identified. Consequently, The Company will know where to take action to improve relevant supply chain processes to enable deliveries within 15 minutes to all customers. The relevant terms used in this study will be further defined and exemplified in Table 7 below.

Table 7: Definition and examples of relevant terms used in the study.

Term	Definition	Example of an activity
Requirement	What is needed from the activities in the processes given the designed scenarios.	Pick an order in 3 minutes.
Gap	The difference between the current process and what is required in the designed scenarios.	Today they pick an order in 1 hour but need to pick it in 3 minutes.
Logistical consequence	What is needed to reduce the identified gaps.	Pick an order faster and review the picking activity.

The Company has been focusing on execution when it comes to demand and supply according to Process Owner. As a result, The Company has focused less on planning supply and demand, where S&OP is an important tool to create coordination and integration throughout the whole supply chain (Ávila et al., 2019, Seeling et al., 2021, Tavares Thomé et al., 2012). The second step of the S&OP process is to create an initial supply plan based on capacity constraints and the demand plan (Ávila et al., 2019). However, a lack of supply planning processes is a challenge according to Ohlson et al. (2022). Hence, it is relevant to investigate the order fulfilment process at The Company.

Furthermore, since it is important to consider both supply and demand, the demand management process is considered relevant to this study as well. This is because the demand affects The Company's ability to supply its customers. Where forecasting in the demand management process aims to help balance supply and demand (Croxton et al., 2002). High availability is important to be able to supply customers within 15 minutes, and good forecasting and demand management are a prerequisite to achieving that.

Although the logistics vision aims to reach all customers in Sweden within 15 minutes, it can be quite challenging. Hence, alternative scenarios will be designed to investigate if the logistics vision is less challenging when focusing on different sized geographical areas. Moreover, the number of local inventory points added to the underlying warehouse structure in each geographical scenario will be determined. When the number of scenarios, their geographical area and number of local inventory points have been determined the objective is to determine the underlying warehouse structure, based on the current underlying warehouse structure. Furthermore, the intention of each central warehouse, satellite warehouse, and store will be determined as well as the distribution and replenishment flow in each scenario. The goal of determining all mentioned above is to identify how and if the warehouse structure, replenishment-, and distribution flows are dependent on the geographical area where the logistics vision is being fulfilled. Therefore, all of this will be addressed in research question 1.

Furthermore, research questions 2 and 3 aim to investigate how the demand management process and order fulfilment process, respectively, are affected by the designed scenarios. Firstly, by identifying the activities that The Company has today. Secondly, by identifying what is required from the activities in the given scenarios to identify gaps and what logistical consequences the gaps imply. Lastly, in the

fourth research question, the gaps and logistical consequences identified in the two processes will be synthesised. Furthermore, the logistical consequences identified will be categorized based on the characteristics of the logistical consequences found.

In the upcoming sections, the choice of research questions will be further motivated. The research questions will be divided into sub-questions to further clarify the work process of the study. See Figure 9 for an illustration of the breakdown of the purpose.

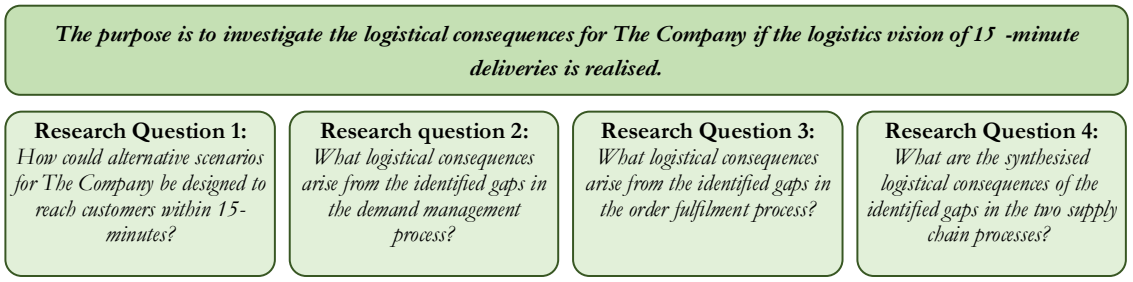

Figure 9: Illustration of the breakdown of the purpose into the four research questions.

4.2.1 RQ 1: Design of Scenarios

The main purpose of the study is to investigate the logistical consequences of implementing 15-minute deliveries in The Company's omnichannel structure. The logistics vision of "*Availability as the competitive advantage*" is a key element of the supply chain organisation at The Company. Today, The Company can offer same day or next day deliveries and has in single cases, where the city is densely populated, managed to deliver within one hour. In omnichannel, different delivery options need to be offered to the customers to have a functional omnichannel strategy (Solem et al., 2023). The Company offers for example collect in store services, which have enabled customers to pick up packages within a short time. However, the vision of 15-minute deliveries is consequently not manageable today on a large scale.

The essential requirement of the logistics vision at The Company is that a customer can reach and obtain a product within 15 minutes regardless of where the customer is in Sweden. For instance, The Company could deliver from a warehouse, a postal box, or a phone in the back of the neighbour's car. In this study, however, 15-minute deliveries are realised through a *local inventory point*. It is not possible to investigate all possible design options of the local inventory point for The Company. Therefore, the local inventory point in this study is defined as a very small local warehouse where the customer can pick up a product, in similarity with a postal box. In this study, the local inventory point will be seen as a non-movable smaller postal box consisting of a few smaller compartments, accordingly to the description of parcel lockers by Asdecker (2021). The local inventory point can be seen just as a postal box where each compartment is represented by an order line. Moreover, the fulfilment of each order is handled separately. This alternative is chosen because it is most like what The Company provides today. The alternative local inventory points that will be discussed in this study is presented in Figure 10.

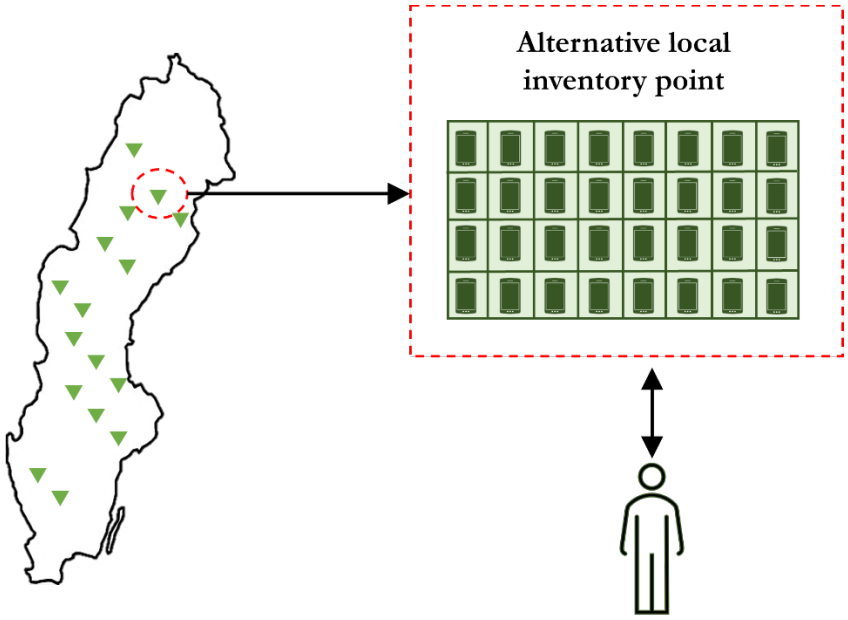

Figure 10: A representation of the alternative local inventory point defined in this study.

The Company already today has a decentralized warehouse structure, with a central warehouse in Ljungby, six satellite warehouses, and 59 stores across Sweden. The Company's customers are widely spread over Sweden, which argues for a decentralized warehouse structure. Hübner et al. (2016a) state that a centralized warehouse and distribution centre in an omnichannel increase the average distance to the customers. Designing several scenarios where The Company can offer 15-minute deliveries visualize how the structure and flows are affected by the geographical area where it is fulfilled. Moreover, several scenarios will also contribute to the purpose of the study by providing a comprehensive view of what would be the logistical consequences of their processes when implementing 15-minute deliveries in different sizes of geographical areas. The new local inventory points added in each scenario may affect other parts of the logistical systems and the underlying warehouse structure. Hence, it is necessary to investigate the overall design of the logistical system of The Company in each scenario. Therefore, the first research question is as follows:

RQ 1: How could alternative scenarios for The Company be designed to reach customers within 15-minutes?

The first research question has been divided into two sub-questions. Achieving product delivery to customers within 15 minutes throughout Sweden poses significant challenges, whereas accomplishing the same in smaller geographical areas with fewer customer orders may be comparatively less challenging. To conduct a comprehensive investigation into The Company's logistics vision and assess the associated difficulties, it is essential to determine the number of alternative scenarios and their geographical scope. This will allow for a thorough examination of the variations between these scenarios and their implications for The Company.

In addition, the design of these scenarios entails determining the required number of local inventory points for The Company to achieve the 15-minute delivery target. This is because a decentralized system with an increased number of inventory points, distributed more locally, leads to shorter lead

times (Mattsson, 2002, Hübner et al., 2016a). The current structure of The Company, comprising one central warehouse, six satellite warehouses, and 59 stores, is unable to achieve 15-minute deliveries. Therefore, it is necessary to incorporate new local inventory points into the existing underlying warehouse structure for each alternative scenario examined. Consequently, the first sub-question is as follows:

Sub-question 1.1: How many scenarios will be investigated and what is the required number of local inventory points in each scenario?

The foundation of the warehouse structure in the designed scenarios will initially be the current underlying warehouse structure. A new warehouse level with the calculated local inventory points will then be added to this foundation to reach all The Company's customers within 15 minutes, as seen in Figure 11 is an example of this. Yet, to fully understand if and how the foundation must change, there is a need to investigate the consequences of the added local inventory points on the current underlying warehouse structure, replenishment-, and distribution flows.

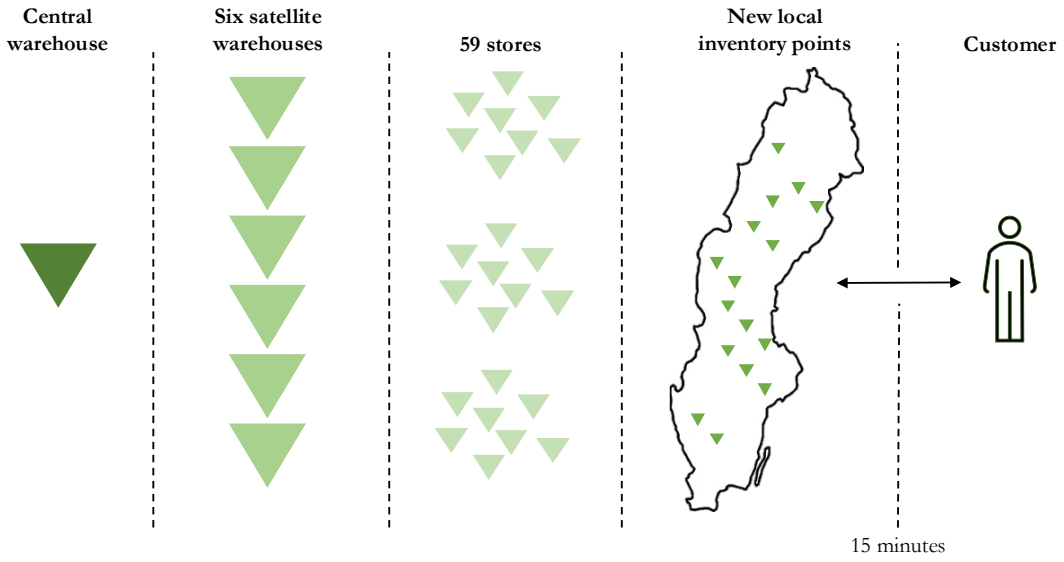

Figure 11: New local inventory points in The Company's warehouse structure.

Firstly, adding a great number of local inventory points could potentially impact the number and role of the different warehouses within The Company's current logistics network. The Company has a set warehouse structure where, for instance, the central warehouse accounts for a large part of both replenishment and order fulfilment of both satellite warehouses and stores. Therefore, the underlying warehouse structure must be addressed in terms of the number and purpose of each central warehouse, satellite warehouse and store in the underlying logistics network. Secondly, adding new local inventory points could potentially affect both the underlying replenishment- and distribution flows in The Company's logistics network in the alternative scenarios. Thus, multiple factors must be considered and determined once the number of scenarios and local inventory points in each scenario has been determined to have fully designed scenarios. All factors considered and determined in the scenarios are presented in Table 8 below.

Table 8: Factors considered in the design of scenarios.

Factors determined in the scenarios:
• The number of central warehouses, satellite warehouses, and stores • The intention with each type of warehouse, e.g., to replenish other warehouses, order fulfilment or both. • The range of products held in stock. • Replenishment flows. • Delivery options offered.

Thus, the distribution flows for all delivery options, the newly added local inventory points and underlying replenishment flows must be considered and decided in the scenarios. This motivates and leads to the second sub-question:

Sub-question 1.2: Given the added local inventory points, what are the consequences on the current underlying warehouse structure and distribution flows in each scenario?

With all factors in Table 8 determined, the scenarios used in this study are designed. A summary of research question 1, comprised of two sub-questions, is presented in Figure 12 below.

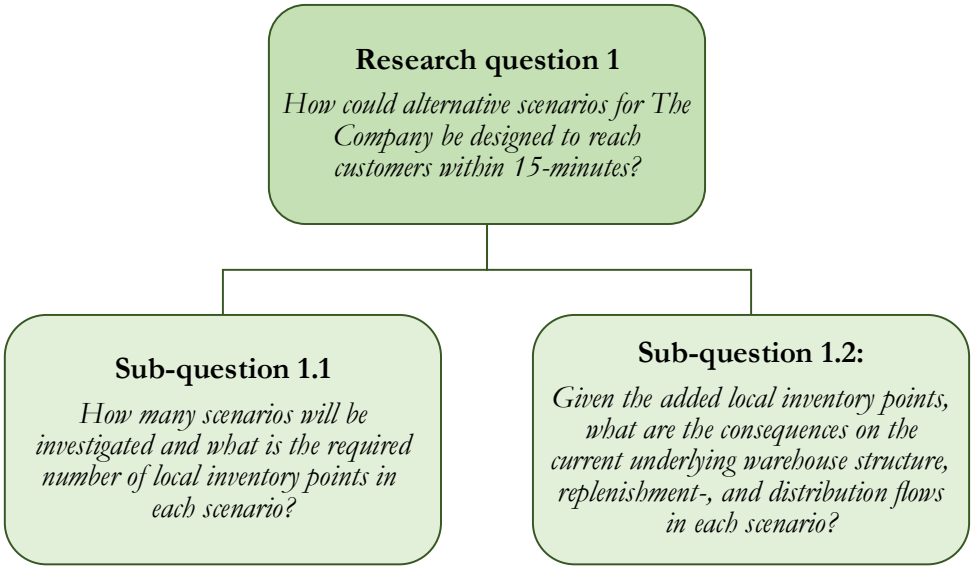

Figure 12: A summary of research question 1.

4.2.2 RQ 2: The Demand Management Process at The Company

The Company forecasts on an overall level to feed the central warehouse, satellite warehouses, and stores in their network. The Company uses the system SO99+, which is intended to plan and optimize demand, and stock levels in The Company's supply chain. Based on the designed scenarios, more inventory points will be added to the warehouse structure, requiring forecasting at all warehouse levels, including the new local inventory points and the underlying warehouse structure, to plan the

operations. The demand management process is a relevant process that takes this into account and aims to balance supply and demand (Croxton et al., 2002). The process contains activities such as forecasting demand and synchronizing it with the production, procurement, and distribution capabilities (Croxton et al., 2002). Larke et al. (2018) mention that when adapting new channels in an omnichannel, difficulties in forecasting can arise. Poor forecasting can lead to increased inventory costs due to suboptimal inventory management (Larke et al., 2018). If the forecasting is not done correctly for the logistics system in the underlying warehouse structure and new local inventory points, The Company will not be able to live up to its logistics vision of 15-minute deliveries to everyone in Sweden. However, different authors divide the demand management process into different activities based on what they consider important, as seen in Table 9 below.

Table 9: Demand management activities found in literature.

Croxton et al. (2002)	**Crum and Palmatier (2003)**	**Nguyen et al. (2022)**
Strategic sub-processes	*Elements*	*Activities*
Determine demand management goals and strategy	Planning demand	Goal formulation
Determine forecasting procedures	Communicating demand	Forecasting techniques
Plan information flow	Influencing demand	Source of information
Determine synchronization procedures	Managing and prioritizing demand	Forecasting in making a decision
Develop contingency management system		Communicating the forecasts and synchronizing supply and demand
Develop framework of metrics		
Operational sub-processes		
Collect data/information		
Forecast		
Synchronize (S&OP)		
Reduce variability and increase flexibility		
Measure performance		

Based on the activities presented in Table 9, relevant activities from the literature have been combined to identify a relevant demand management process for The Company to investigate. The demand management process focuses on forecasting, which is divided into different forecasting activities. The designed demand management process includes the activities *Plan Forecast, Collect Data, Forecast, Synchronization and Communication of Forecast, and Measure Performance.* These activities are presented in Figure 13 and further motivated and described below.

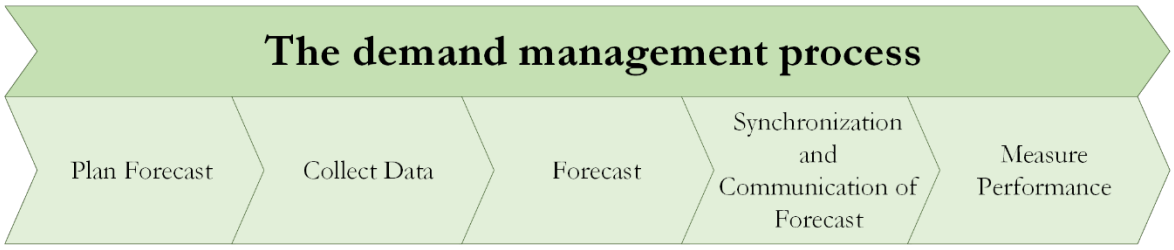

Figure 13: The included activities of the demand management process in this study.

The first activity within the demand management process for this study is *Plan Forecast*. This activity is chosen due to the emphasis that all authors place on planning demand and forecast. Croxton et al. (2002) present six strategic sub-processes that aim to establish a process for how to operate the demand management process. Meanwhile, Crum and Palmatier (2003) have dedicated a whole element to planning. In this part, the estimation of how much customers will buy is done (Crum and Palmatier, 2003). Lastly, Nguyen et al. (2022) emphasize the importance of planning in a supply chain. Determining and planning the forecast includes factors such as time frame, level, and data which have a strategic input (Croxton et al., 2002). Forecasting includes forecasting all warehouses (central, satellite and stores) and the new local inventory points, and not solely the new local inventory points since it could affect forecasting on the previous warehouse levels. Furthermore, it will be necessary to look at both the underlying warehouse structure and new local inventory points in activities further defined in the demand management process of this study.

The next activity in the demand management process of this study is *Collect Data*. In Determining forecasting procedures, the strategic team should identify sources of data (Croxton et al., 2002). Thus, this activity is included in *Collect Data*. Both Croxton et al. (2002) and Nguyen et al. (2022) present the collection of data as activities within their definition of the demand management process since it is crucial to be able to create a forecast. This argues and motivates why *Collect Data* is chosen as the second activity. The following activity after the collection of data is *Forecast*. This step is a combination of the activities Determine Forecasting Procedures and Forecast presented by Croxton et al. (2002) and Forecasting in making a decision presented by Nguyen et al. (2022).

The fourth activity included in the designed process is *Synchronization and Communication of Forecast*. This activity is a combination of the presented activities Determine Synchronization Procedures and Synchronize by Croxton et al. (2002), Communicating Demand by Crum and Palmatier (2003), and Communicating the forecasts and synchronizing supply and demand by (Nguyen et al., 2022). The synchronization can also be referred to as Sales Operations Planning (S&OP) (Croxton et al., 2002). Synchronizing the strategic plan of 15-minute deliveries to the operational plan will be important for The Company since lots of their operational work is done by the TPL partner. This argues why *Synchronization and Communication of Forecast* is included as an activity within the demand management process.

Finally, *Measure Performance* is the last activity in the designed demand management process. This is a combination of the sub-processes Develop Framework of Metrics and Measure Performance given

by Croxton et al. (2002) and the last step in the S&OP-process Measure Process Performance given by Ávila et al. (2019). Measuring the performance of the process will be important for The Company since this helps improve and develop the process further in the future (Ávila et al., 2019).

The identified activities will be further used in the following three sub-questions to investigate if and what activities in Figure 13 exist today. Furthermore, what activities that is needed according to The Company to fulfil the given designed scenarios. The demand management process becomes vital for The Company to be able to plan, forecast, and supply customers within 15 minutes. Thus, it is necessary to investigate the current demand management process at The Company and the process that is required according to The Company in the designed scenarios. This is to investigate the logistical consequences of what is needed to reduce the gaps. For instance, if the gap could be that The Company does not forecast on the right organizational level. This motivates and leads to the second research question:

RQ 2: What logistical consequences arise from the identified gaps in the demand management process?

The research question is divided into two sub-questions, which will give the answer to research question 2. Processes can be defined as a range of linked activities that create value for the customer (Mattsson, 2003). Mattsson (2003) states that activities within a process need to be linked to each other. If and how the different activities presented in Figure 13 are performed and designed at The Company is necessary to investigate. The activities identified in The Company's current demand management process allow for the activities to be analysed and put in contrast to what the designed scenarios would require from the process and its activities. This motivates the following sub-question:

Sub-question 2.1: How is the demand management process designed and operated at The Company today?

When the current demand management process at The Company is investigated, the given scenarios and requirements of the process need to be considered. As stated before, it becomes more difficult to forecast when adding a new online channel into the omnichannel (Larke et al., 2018). Even more, the new channel needs to be integrated into the existing infrastructure since this opens up synergies between the different channels in the omnichannel (Barbosa and Casais, 2022). The designed scenarios will imply added local inventory points in The Company's underlying warehouse structure that needs to be forecasted and integrated. The Process Owner has mentioned that The Company has focused more on execution than planning demand and supply. Through an effective demand management process, The Company can become more consistent in planning and also increase sales and customer loyalty (Croxton et al., 2002). Balancing demand and supply is the aim of the demand management process, and it is necessary to investigate how this should be done in the designed scenarios to further identify the logistical consequences. It will be especially important to investigate the requirements for the activities presented in Figure 13. Therefore, the second sub-question is formulated as follows:

Sub-question 2.2: Given the designed scenarios, what is required from the demand management process at The Company?

Furthermore, the previous sub-questions will result in the requirements for the demand management process at The Company in the four scenarios. Thus, the gaps between the current and required

demand management process can be identified. Consequently, the logistical consequences of the process can be found to answer the purpose of the study. This motivates and leads to the third sub-question:

Sub-question 2.3: What gaps are identified in the demand management process at The Company?

A summary of research question 1, comprised of sub-questions, is presented in Figure 14.

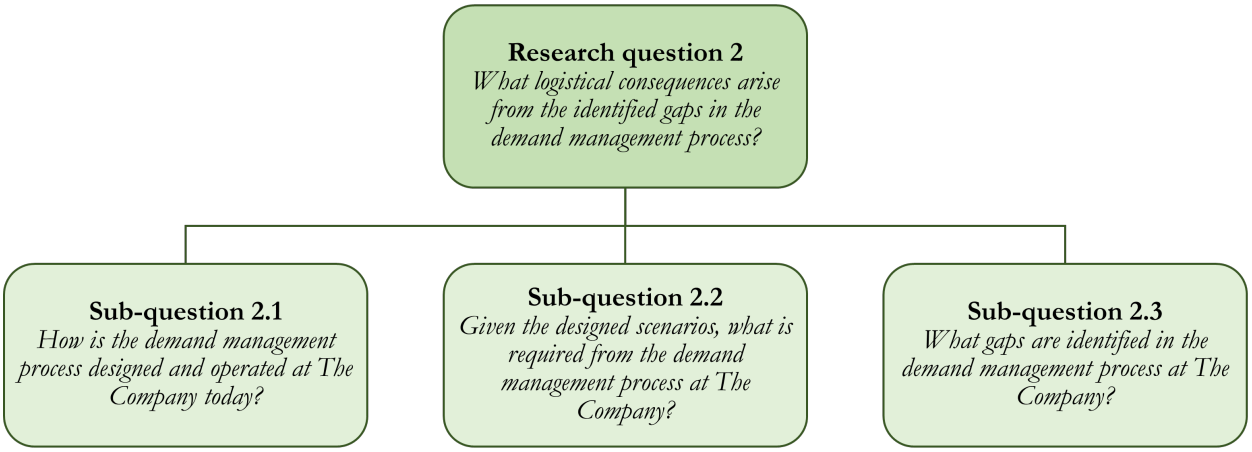

Figure 14: A summary of research question 2.

4.2.3 RQ 3: The Order Fulfilment Process at The Company

The third research question aims to find what logistical consequences that arise from identified gaps in the order fulfilment process when realising the logistics vision. Hence, research question three will be further divided into three sub-questions to explore the order fulfilment process today and what is required from the process given the designed scenarios.

The Company cannot deliver their products within 15 minutes today unless the customer goes to the store and the phone is available. Since the distribution of products is not fast enough in line with the logistics vision, it is of relevance to investigate the order fulfilment process. Where Lin and Shaw (1998) state the main goals of the order fulfilment process are to deliver the right product with the right quality, at the right time, and the right place. These main goals are in line with the logistic vision to have *"Availability as the competitive advantage"*.

Having an effective order management process is considered a key factor to achieve operational efficiency (Langley et al., 2008), where order fulfilment has a direct impact on product availability (Croxton, 2003). The process is complex since it requires cross-functional teams but is at the same time independent and executed by different functional units (Croxton, 2003, Lin and Shaw, 1998). The order fulfilment team must consider how to structure the process to meet customer expectations (Croxton, 2003). Since the process is complex, it is necessary to break down the order fulfilment process at The Company into activities to fully understand how the process works at The Company.

The different activities presented in section 3.2.2 Order Fulfilment Process are summarized below in Table 10. The numerous categorizations further demonstrate that not only companies but also the literature has various definitions, as supported by findings from Lambert and Cooper (2000). Therefore, it is important to define the activities that the order fulfilment process should include in this study.

Table 10: Order fulfilment activities found in literature.

Lin and Shaw (1998)	**Bowersox et al. (2002)**	**Croxton et al. (2001) and Croxton (2003)**	**Langley et al. (2008)**	**Espino-Rodríguez and Rodríguez-Díaz (2014)**
Activities	*Information areas*	*Strategic processes*	*Activities*	*Activities*
Receive order from customer	Order processing	Market strategy, supply chain structure and customer service goals	Receive order	Receipt of order in the warehouse
Commit order request	Order assignment	Defining requirements	Enter order	Stock control
Production scheduling	Distribution operations	Evaluation of logistics network	Verify and check order	Production control
Material planning	Inventory management	Order fulfilment plan	Check credit	Manufacture
Capacity planning	Transportation and shipping	Framework of metrics	Check inventory availability	Transfer to warehouse storage
Shop floor control	Procurement	*Operational processes*	Process back order	Preparation of consignment
Logistics (e.g., inventory and transportation)		Generate and communicate	Acknowledge order	Control of delivery note
		Enter order	Modify order	Shipment of consignment
		Process order	Suspend order	Transport
		Documentation	Check pricing and promotion	
		Fill order	Identify shipping points	
		Delivery	Generate picking documents	
		Post activities and measure performance	Originate shipment	
			Inquire order status	
			Deliver order	
			Measure service level	
			Measure quality of service	
			Assure continuous improvement	

Based on the presented activities in Table 10, activities from the literature have been combined to identify a relevant order fulfilment process to investigate at The Company. The activities included are *Defining Requirements, Evaluation of Logistics Network, Order Fulfilment Plan, Process order, Pick and Pack Order,* and *Transport and Delivery*. These activities are presented in Figure 15 below and further motivated and described.

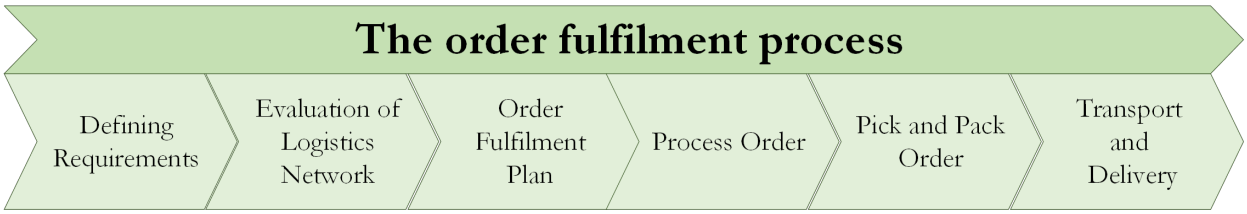

Figure 15: The included activities of the order fulfilment process in this study.

Ávila et al. (2019), Seeling et al. (2021) and Tavares Thomé et al. (2012) mention the importance of more strategic planning. Therefore, the first three activities in the order fulfilment process defined in this study will be *Defining Requirements, Evaluation of Logistics Network* and *Order Fulfilment Plan* given as more strategical parts in similarity with the definitions made by Croxton (2003).

What is included in *Defining Requirements, Evaluation of Logistic Network* and *Order Fulfilment Plan* is defined in similarity with how Croxton (2003) defines the activities. *Defining Requirements* includes different customer requirements as well as supply chain requirements such as delivery times or cut-off times. *Evaluation of Logistic Network* will be based on the requirements defined. The requirements found might require a change in the logistical network. However, the purpose of the evaluation of the logistics network is to determine factors such as what inventory points should distribute, the location of the inventory points, and the mode of transportation. Lastly, the *Order Fulfilment Plan* includes determining how the orders should be fulfilled, focusing more on the operational factors and what technology, and supporting systems to use. This also includes considering how inventory control is managed. The strategic parts of the order fulfilment process will be relevant to The Company to operate and realize the logistics vision.

The next step defined in this study is *Process Order*. This comprises checking inventory and inventory control as well as planning the order flow and transportation of the order (Croxton, 2003). Furthermore, noticed by all authors is to receive or generate the order itself from an operating point of view. There is no distinct difference between generating and processing the order. Hence, generating an order is also included in the activity *Process Order* in this study. The next activities defined in the order fulfilment process of this study are *Pick and Pack Order*. Picking and packing are important activities for The Company as a retailer since they do not produce the products themselves. The Company's operations are more in line with the activity distribution operations mentioned by Bowersox et al. (2002).

Lastly, the final activity defined in this study is *Transport and Delivery*. This is an activity mentioned by all authors presented in Table 10. Moreover, the logistics vision aims to deliver products to customers within 15 minutes where the transportation and delivery part is key to perceive customer satisfaction.

This activity includes both operational and strategic steps related to transportation and delivery. Today The Company has a well-established partnership with its TPL partner providing order fulfilment, which is important when having an omnichannel strategy (Ishfaq et al., 2016). Further, Ishfaq et al. (2016) mention that the retailer's distribution is used for many different channel concepts in an omnichannel. In addition, the degree of integration in the warehouse structure can vary as well as centralization and decentralization (Hübner et al., 2016a, Buldeo Rai et al., 2019). Thus, since order fulfilment and distribution can vary a lot in an omnichannel it is important to understand how The Company works with this and the effect of the designed scenarios.

Consequently, it is necessary to investigate the current order fulfilment process at The Company and the process that is required according to The Company given the designed scenarios. The identified activities will be further used in the following three sub-questions to investigate if and what activities in Figure 15 exist today. Furthermore, what activities that is needed according to The Company to fulfil the given designed scenarios. This is to investigate the logistical consequences of what is needed to reduce the gaps. Hence, it leads up to the third research question:

RQ 3: What logistical consequences arise from the identified gaps in the order fulfilment process?

The lead time will be of importance to shorten the delivery time. To be able to shorten the lead time, Lin and Shaw (1998) state that the lead time must be controlled throughout the whole supply chain. Whereas the order fulfilment process will be an important part of the delivery time experienced from a customer perspective. Firstly, it is necessary to investigate whether any of the activities in Figure 15 can be identified at The Company to further compare the gap between the activities required in the designed scenarios. Therefore, the first step is to identify the activities in the order fulfilment process at The Company today based on the order fulfilment process presented in Figure 15. Thus, the first sub-question is as follows:

Sub-question 3.1: How is the order fulfilment process designed at The Company today?

Once the current order fulfilment process and its activities at The Company have been mapped, the given scenarios must be considered. This is to investigate whether the designed scenarios will require the same or different activities as The Company has today and what logistical consequences arise when realising the 15-minute vision.

It has become more important to have short lead times (Mattsson, 2002, Chen et al., 2022). Mattsson (2002) states that supply chains with several different levels of warehouses could enable shorter lead times due to decreased transport distance to the customers. Although, it is a challenge to provide shorter lead times (Hübner et al., 2016a). Different fulfilment options require different warehouses- and infrastructure (Ishfaq and Raja, 2018). Hence, adding a new omnichannel will require a change in order fulfilment options which might affect the order fulfilment process. To achieve excellence in omnichannel fulfilment retailers can optimize the cross-channel processes, which means adapting different distribution channel processes between omnichannel (Hübner et al., 2016a). Hence, by improving the order fulfilment process The Company could decrease the lead time and achieve a delivery time of 15 minutes in the given scenarios. However, it is necessary to identify what the

activities in the order fulfilment process require according to The Company in the designed scenarios compared to the current process identified. Consequently, this motivates the second sub-question to research question 3:

Sub-question 3.2: Given the designed scenarios, what is required from the order fulfilment process at The Company?

Furthermore, the previous sub-questions will result in requirements according to The Company on the order fulfilment process in the four scenarios. Thus, the gaps between the current and required order fulfilment process can be identified. Consequently, the logistical consequences of the process can be found to answer the purpose of the study. This motivates and leads to the third sub-question:

Sub-question 3.3: What gaps are identified in the order fulfilment process at The Company?

Presented, in Figure 16, below is a summary of research question three comprised into sub-questions.

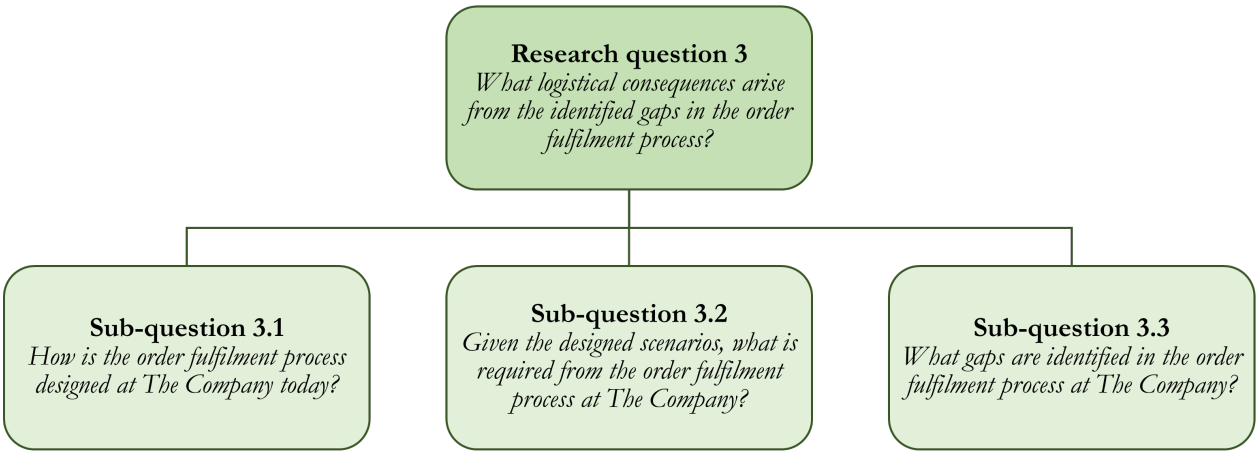

Figure 16: A summary of research question 3.

4.2.4 RQ 4: Synthesis of Logistical Consequences

Many different challenges and consequences can occur when adding a new channel into an omnichannel. Already, due to the complex structure of an omnichannel, achieving integration becomes challenging for companies (Hübner et al., 2016a). Lewis et al. (2014) mention that when integrating different channels there is a need to change or acquire new technological resources, which might be an issue for the company. Neslin et al. (2006) mention that companies with multiple channels need to handle huge amounts of data about customers, which in turn must be processed, analysed, and later shared through all channels with help from technological solutions. Moreover, when adding distribution channels such as in the designed scenarios, the structure becomes even more complex (Hübner et al., 2016b). Further, some activities in the two processes interact with each other (Croxton et al., 2001), and some logistical consequences may have similarities and could be categorized. Hence, it is important to synthesise the gaps and their logistical consequences from both supply chain processes to get a holistic view of the logistical consequences of the designed scenarios. By doing this, The Company will get a comprehensive view of how the processes interact and relevant areas to

improve to decrease the gaps found in the two processes. Hence, the purpose of the study is fulfilled by investigating the logistical consequences for The Company if the logistics vision is realised. Consequently, the fourth research question is as follows:

RQ 4: What are the synthesised logistical consequences of the identified gaps in the two supply chain processes?

Presented in Figure 17 below is a summary of research question 4.

Research question 4

What are the synthesised logistical consequences of the identified gaps in the two supply chain processes?

Figure 17: Research question 4.

4.3 Summarization of Task Specification

Presented in Figure 18 is an overview of the purpose, research questions and their respective sub-questions. The research questions are divided into three main areas: *Design of scenarios, Identification of gaps and logistical consequences* and *Synthesis of logistical consequences*.

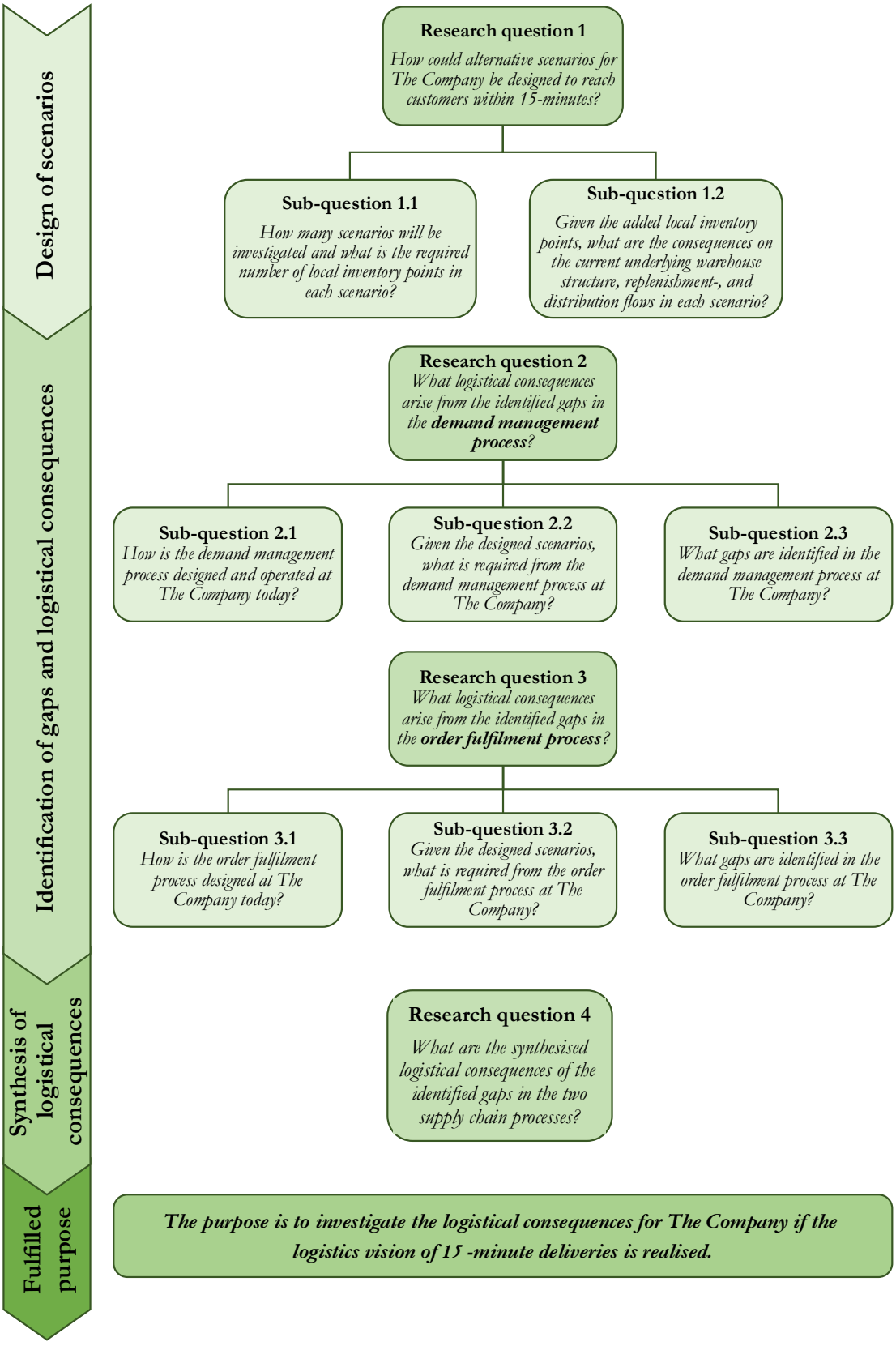

Figure 18: Summarization of the research questions and its sub-questions.

5 Methodology

This chapter aims to present the study's methodology and research approach. The chapter describes the choice of methodological approach and methods used in the four phases emerging from the research design. Further, the four phases will be presented separately discussing the research approach for each phase. A reflection of the credibility of the study, regarding the study's reliability, validity, and objectivity, will be discussed continuously in each phase. Lastly, the method criticism and research ethics of the study is being discussed.

Blomkvist and Hallin (2015) define the method as the approach followed to examine the choice of research. This study utilized a qualitative approach, which aims to investigate phenomena that are not easily quantifiable (Rennstam and Wästerfors, 2015). Thereby, it was a relevant approach for this study. In this study, the methodological approach is developed to be customized to this specific study, presenting the results in a final presentation and report.

The research design of this study is divided into four phases: the *initial phase, planning phase, analysing phase,* and the *final phase* presented down below in Figure 19. The choice of research design is inspired by the research design presented by Blomkvist and Hallin (2015) and the research design presented by Björklund and Paulsson (2003). The research design presented by Blomkvist and Hallin (2015) consists of four phases formulate, construct, produce, and deliver. It is adapted for research performed at a partner company or case studies. In contrast, the model by Björklund and Paulsson (2003) only consists of three phases: the initial phase, main phase, and final phase. In this research, the choice of four phases was made so that the authors could be more specific regarding the planning phase when designing the research approach. Using key elements from both models has then resulted in the four phases presented in this study. Blomkvist and Hallin (2015) state the importance of working in an iterative process with continuous feedback to succeed with a good report and research. Iterations of each phase have been done continuously during the study, in accordance with the supervisors at both The Company and the university. This is to adjust after the dynamic changes made along the way of the study to fulfil its purpose.

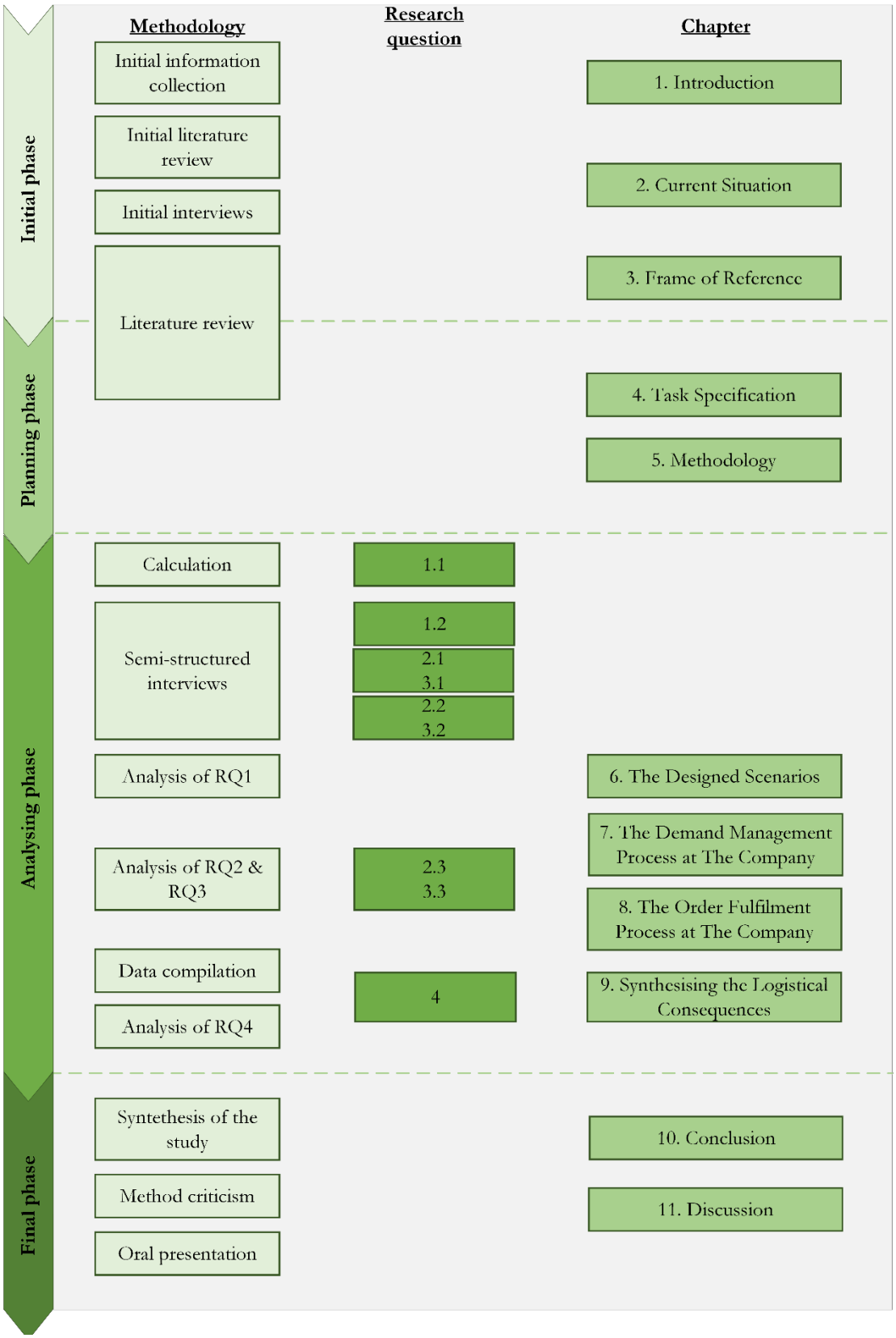

Figure 19: An overview of the research design.

The method of the study can be reflected upon by discussing the credibility of the method (Björklund and Paulsson, 2003). Furthermore, Björklund and Paulsson (2003) mention that credibility comprises three different aspects, which are validity, reliability, and objectivity. Throughout all phases of this study, a continuous discussion of how the study has considered these three aspects to ensure its credibility will be presented. Regardless of the method chosen, it is important to critically review the methodological choices of the study to question its credibility (Bell and Waters, 2014).

Validity refers to whether what is being studied is what the study intends to study (Bell and Waters, 2014, Björklund and Paulsson, 2003, Blomkvist and Hallin, 2015, Patel and Davidson, 2019). Reliability refers to whether the study is conducted reliably, i.e., whether the study achieves the same results if conducted multiple times (Bell and Waters, 2014, Björklund and Paulsson, 2003, Blomkvist and Hallin, 2015, Patel and Davidson, 2019). Lastly, objectivity refers to how personal values are treated and may have influenced the study (Björklund and Paulsson, 2003).

The methodology has been presented and structured into four different phases to contribute to overall validity and reliability. Furthermore, each of the phases has been divided further to describe each phase and its content. Despite the largely iterative process, the authors have tried to present the methodology as transparent and clearly as possible regarding what method has been used and in what order. This enables replication, increasing validity (Bell and Waters, 2014).

To increase objectivity and allow readers to assess the study's credibility, the authors have provided clear justifications for their choices of methods, literature, interviewees, and study elements. Björklund and Paulsson (2003) suggest that providing justifications can enhance the objectivity to the reader.

5.1 Initial Phase

The main aim of the initial phase was to understand the current situation of The Company so the purpose of the study could be formed. This was essential to lay the foundation for the rest of the study and its work. The initial phase included an initial collection of information from The Company and literature, purpose, introduction, current situation, and frame of reference. This is summed up below in Figure 20.

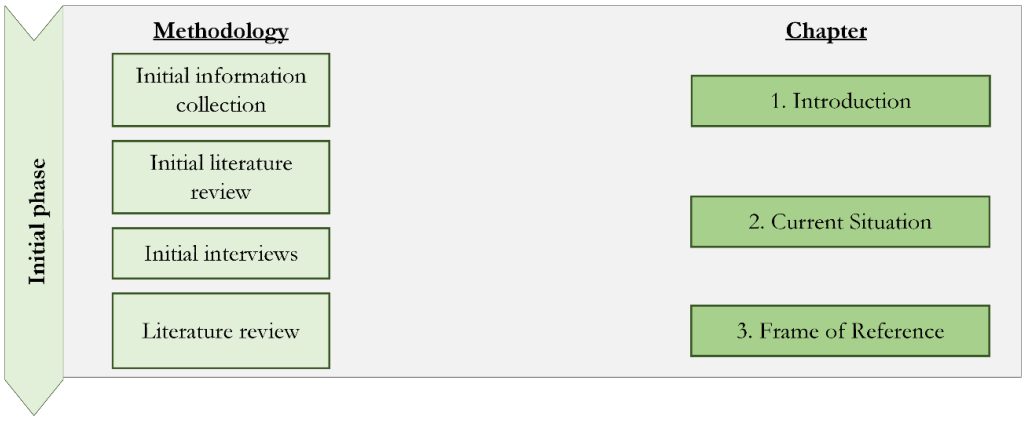

Figure 20: An overview of the initial phase.

5.1.1 Initial Information Collection

The initial information was collected to understand The Company's current situation, problems, purpose, and desired outcome of the study. Therefore, the initial information included initial meetings with Process Owner at The Company. The authors participated in a logistics inspiration day to understand the company's logistics department. The first interviews held were of qualitative character and unstructured with Process Owner from The Company. A qualitative study is used to create a better understanding and identify characteristics and structures regarding a certain area, which was the purpose of these initial meetings (Björklund and Paulsson, 2003, Patel and Davidson, 2019). Interviews are a common methodology for collecting information (Björklund and Paulsson, 2003, Blomkvist and Hallin, 2015). The questions during an unstructured interview are made successively during the interview (Blomkvist and Hallin, 2015, Björklund and Paulsson, 2003). Blomkvist and Hallin (2015) suggest that unstructured interviews can lead to unexpected findings. Unstructured interviews are useful at the beginning of a study to define its purpose and work (Blomkvist and Hallin, 2015).

Since the study was conducted in close cooperation with The Company, there is always a risk of biased information and selection of facts. The information collected throughout the study has been critically reviewed and selected to avoid an overly subjective perspective to increase the objectivity of the study as highlighted by Björklund and Paulsson (2003) and Patel and Davidson (2019).

5.1.2 Initial Interviews

Multiple meetings and initial interviews were held with multiple people within the logistics division at The Company to fully understand the current situation and formulate the purpose of the study. Some of these interviews were held due to a change of contact person. These interviews were both unstructured, but mostly, semi-structured. The subject area of an interview can be formulated beforehand when conducting semi-structured interviews and the questions to the responder are formulated during the interview (Björklund and Paulsson, 2003, Blomkvist and Hallin, 2015). When collecting empirical data, Blomkvist and Hallin (2015) state that it is the most common interview method. The interviews held varied between approximately 30 minutes to an hour through *Microsoft Teams* and on site. Before all interviews, the participants were informed of the purpose of the study and the area of subject. The initial interviews, participants, date, and the purpose of the interview are presented down below in Table 11. During the study, weekly meetings of 15 minutes, were conducted every other week with the contact person. The purpose of this was to keep all parts involved updated about the work as well as being able to get answers to short questions arising along the way.

Table 11: Initial interviews.

Interviewee	Referred as	Purpose with the interview	Site	Date
Process Owner	Respondent A	Introduction of Partner Company, the logistic vision, purpose with the study	On site	2022-11-15
Process Owner	Respondent A	Discuss purpose of the study	On site	2023-01-18
Manager within Logistics	Respondent B	Logistical flows, warehouse structure, system, and supply chain planning	Microsoft Teams	2023-01-23
Partner Manager	Respondent C	Logistical flows and last mile distribution, TPL partner	Microsoft Teams	2023-01-30
Head of Logistics Development	Respondent D	New information, change of responsible contact person at Partner Company	Microsoft Teams	2023-02-03
Business Developer	Respondent E	Logistics vision	Microsoft Teams	2023-02-06

Notes and recordings were taken during all interviews performed in the study, which according to both Blomkvist and Hallin (2015) and Patel and Davidson (2019) is crucial to be able to go back to what was said. Both ways of registering the interviews were used to ensure the correct documentation of the answers of the respondents (Patel and Davidson, 2019).

Interviews were only held with participants from The Company. Thus, it might give a subjective view of the situation. As the activities and processes have been defined specifically for this study, there is a possibility that certain aspects have not been adequately addressed because of only interviewing people at The Company. There may be gaps or activities that could have been identified by gathering information from other similar companies to gain a broader understanding and increase overall objectivity. However, the participants presented in the study were anonymized and only presented by describing the meaning of their role.

5.1.3 Initial Literature Review

To further understand the area and context of the problems ahead for The Company a broad literature review was conducted to gain basic knowledge. This was made parallel to understanding the current situation. The literature review was made over a broad area so that the authors did not close out potentially relevant subject areas not known. Reading extensively is important for understanding the topic and what areas to read into more thoroughly (Blomkvist and Hallin, 2015, Patel and Davidson, 2019). The authors focused on gaining broad knowledge in this stage, with mostly unstructured literature searches. According to Björklund and Paulsson (2003), an advantage of a literature review is that with few resources during a short period, one can collect a lot of information. Therefore, the authors used Google to find articles within the relevant area of the study's problem statement. Based on these articles, the authors used relevant keywords to conduct random searches on a database called

UniSearch, provided by Linköping University, reading abstracts with relevant titles. If an abstract was of relevance the article was read or skimmed through. Further, based on the random literature other relevant literature was found by snowball sampling. The snowball sampling method is done by using one known source of reference to find other relevant sources these sources use (Blomkvist and Hallin, 2015, Patel and Davidson, 2019). It is described as an efficient method to rapidly find relevant sources or not aim to find an exact answer, although it is hard to generalize the results since it cannot represent a whole population (Blomkvist and Hallin, 2015). The initial literature review was then used as a foundation for the further proper literature review. The initial literature review is presented in Appendix A: Initial

5.1.4 Literature Review

The frame of reference was created by conducting a more thorough structured literature review. The searches were initially made by relevant topics found in the initial literature review which became a foundation for the topics in the frame of reference. A method for how the literature review was conducted was set up beforehand. This included specifying what databases to use, how to search, and what to include or not in the search within the area of the main topics found in the initial literature review.

The authors mostly used the UniSearch database due to previous experience and the possibility to conduct more advanced searches, for instance, filtering only academic and peer-reviewed articles. Therefore, the authors used the advanced search function at UniSearch. The setup for this advanced filter function was firstly only to search within the full-text format in the articles, excluding searching for related topic areas or words. Moreover, the authors only searched for articles available through the university and available online in full text. Lastly, the results were restricted to academic peer-reviewed articles to assure that the articles were trustworthy. Only using peer-reviewed articles is thus a way of increasing validity according to (Björklund and Paulsson, 2003).

The search was narrowed down by only searching for words in the title and abstract. The searched words and number of hits were then noted in a document, see Appendix B: Literature If there were too many hits, the search was refined. The most useful keywords were "supply chain", "process", "order fulfilment", and "demand management". The authors only read abstracts of titles with searched keywords. If the article or title included any of the keywords but was about an irrelevant context to the study, e.g., finance, the article was also excluded. Relevant abstracts led to the whole article being read. The number of abstracts and articles read was noted as well. The authors used snowball sampling to find other relevant information in some of the articles. The articles found through snowball sampling were also noted. Below in Figure 21**,** the process steps of the literature review are presented and in Appendix B: Literature is the whole literature review including keywords and hits presented. This increased the objectivity and reliability of the study and makes it possible for the reader to enhance the same results if the literature review would be conducted once again.

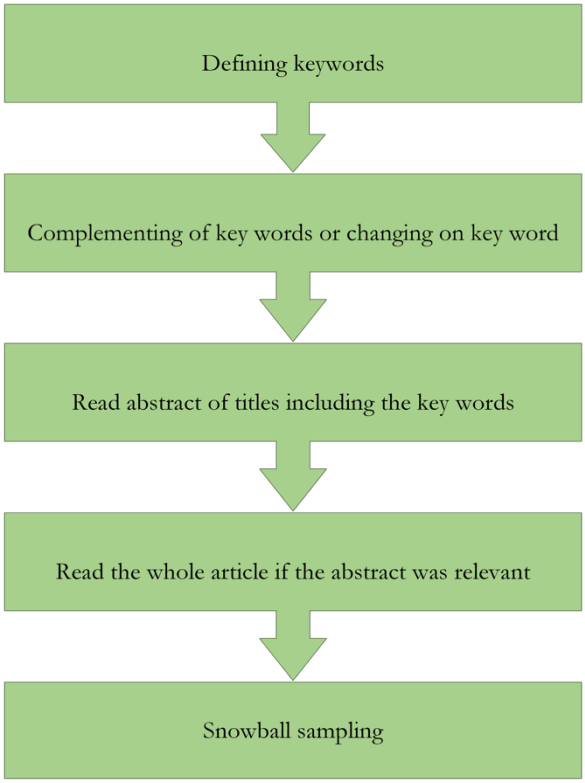

Figure 21: Overview of the steps in the literature review.

All steps above resulted in the introduction, purpose of the research, and current situation being conducted.

To study the logistical consequences that arise if The Company's logistics vision is realised, the theory and analyses were linked to ensure that the study addressed the intended purpose. Triangulating the literature increased the study's credibility and strengthened the theory base, as suggested by Patel and Davidson (2019) and Blomkvist and Hallin (2015) as a way to ensure appropriate investigation in a qualitative study.

5.2 Planning Phase

The aim of the planning phase was to specify the task further and concretize the methodology of the study. The different parts of the planning phase are illustrated in Figure 22.

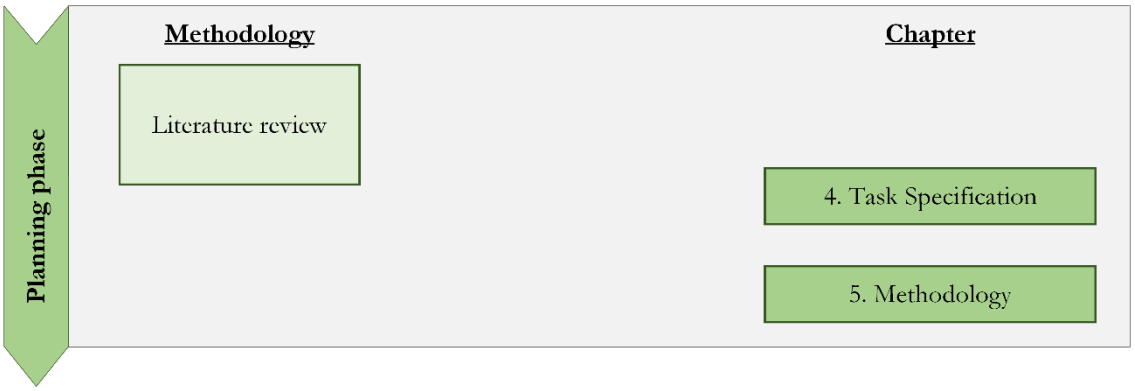

Figure 22: Overview of the steps in the planning process.

Firstly, the *task specification* was made based on the literature review and initial empirical collection from interviews made with The Company. This information was aggregated to determine the research questions of the study to fulfil the purpose of the study (Patel and Davidson, 2019). The task specification was conducted by an iterative process where the frame of reference was revised multiple times, which, according to Blomkvist and Hallin (2015), is a very common working process. Consequently, the aim is to break down the purpose of the study and formulate the research questions so that the purpose is answered (Blomkvist and Hallin, 2015, Patel and Davidson, 2019). To answer the research questions, they were further broken down into relevant sub-questions. Besides the above mentioned, it was also clarified what part of The Company's organization was studied, and what limitations were made.

Furthermore, the research questions laid the foundation for how to conduct the study and answer its purpose. Therefore, the *methodology* was created by composing a research design for the study. The methodology aims to answer how the purpose practically is going to be answered. Further, the choice of the methodology must be motivated (Björklund and Paulsson, 2003). Therefore, it was of great importance to justify and motivate the choices in this chapter.

Weekly meetings with the contact person at The Company were continuously held during the whole project. During the planning phase, they were mainly used to ask clarifying questions and get all facts correct. Asking clarifying questions is according to Björklund and Paulsson (2003) a way to increase the reliability of the study.

5.3 Analysing Phase

The analysing phase has aimed to collect and analyse relevant empirical material to answer the research- and sub-questions. The analysing phase contains activities such as calculation, semi-structured interviews, and analysis. Figure 23 below gives an overview of the analysing phase and its steps.

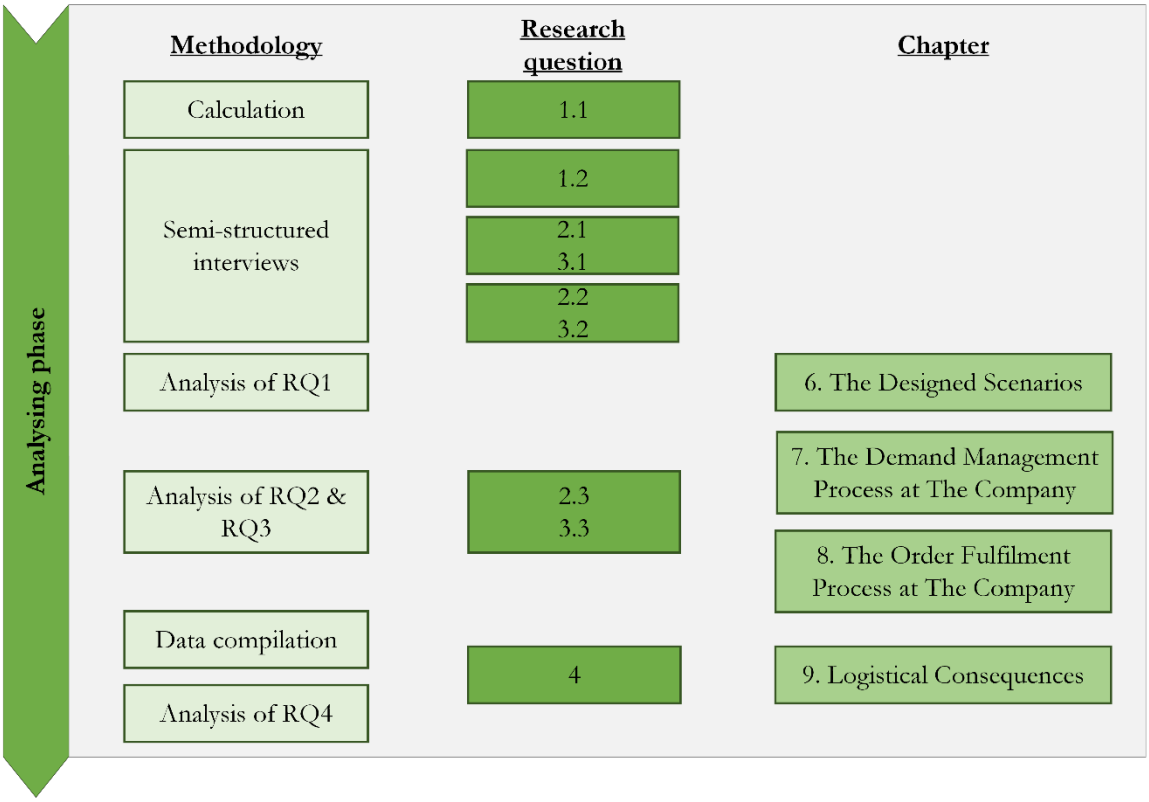

Figure 23: An overview of the analysing phase.

5.3.1 Calculation

According to Björklund and Paulsson (2003), it is primarily the purpose of the study that determines whether a study is quantitative or qualitative. However, this study is mainly qualitative, except for the calculations that needed to be done for the scenarios determined in research question 1.1. The calculations involved determining how many local inventory points The Company needed to deliver products within 15 minutes in four scenarios. This is one possible approach to calculate the number of local inventory points that are needed to reach customers within 15 minutes. However, other quantitative approaches may also result in reaching customers within 15 minutes.

In this study, four distinct scenarios were analysed to determine the appropriate number of inventory points required in different regions of Sweden. The calculations relied on The Company's directive that a customer can cover 4 kilometres on a bicycle within 15 minutes. The area of a circle was used

to calculate how the local inventory points should be placed, where the radius was set to 4 km. See the formula in Equation 1 below.

Equation 1: Area of a circle.

$$A = \pi r^2$$

Finally, the total land area for each scenario was divided by the area determined through Equation 1, as demonstrated in Equation 2 below.

Equation 2: Calculation for local inventory points.

$$\text{Number of local inventory points} = \frac{\text{Total land area}}{\pi r^2}$$

The resulting number of inventory points for each scenario was rounded up to an integer. The calculations do not consider the already existing central- and satellite warehouse and stores in The Company's warehouse structure. Thus, the calculations of the number of local inventory points in the designed scenarios were done. The calculations can be found in Appendix C: Calculation of Local Inventory Points.

5.3.2 Semi-Structured Interviews

Empirical data can be collected through various methods, such as interviews, surveys, and observations (Björklund and Paulsson, 2003, Blomkvist and Hallin, 2015, Patel and Davidson, 2019). This study focuses on identifying gaps in The Company and will primarily use qualitative methods (Björklund and Paulsson, 2003). Whereas Björklund and Paulsson (2003) and Patel and Davidson (2019) recommend using interviews and observations. Interviews are a suitable method for identifying gaps in The Company's logistical processes and will be used to collect data in this study. Interviews enable the possibility to do unexpected findings, whereas semi-structured interviews are most commonly used when gathering empirical data, according to Blomkvist and Hallin (2015). Semi-structured interviews allow respondents to provide open-ended responses because the subject area is predetermined (Björklund and Paulsson, 2003, Blomkvist and Hallin, 2015, Patel and Davidson, 2019). The subject areas for the semi-structured interviews were developed from initial information collection and literature review.

An interview guide was prepared ahead of time with predetermined subject areas. Following Patel and Davidson (2019), initial neutral questions were first asked to obtain a background. Open-ended questions were asked at the end of the interview to ensure all topics had been addressed. In between, the respondent was asked more specific questions. Interviewees received the specific subjects ahead of time to prepare for the discussion. This was to allow the interviewee to prepare for the topics that were going to be discussed. When using an interview guide, two factors must be considered. Firstly, the responsibility of the interviewer regarding the formulation and order of the questions during the interview i.e., the degree of *standardisation* (Patel and Davidson, 2019). Secondly, the extent to which the interviewer can interpret the questions in the light of, for instance, previous experiences. This is considered the degree of *structure* (Patel and Davidson, 2019). Both aspects, regarding the design of

the questions and how they are asked, are important factors to consider in collecting correct information. In addition, some questions arose during the interview due to the open nature of the questions and it was not clear what information would be shared by the respondent.

Because the study is qualitative, the interviews were crucial for ensuring validity and reliability. The interview questions were carefully reviewed in advance by the authors to avoid biased and leading questions or value-loaded language, ensuring objectivity and validity. Björklund and Paulsson (2003) suggest that this approach increases validity. However, sometimes it was unavoidable not to ask leading questions to help the respondents think outside the box since the scenario was hypothetical and not necessarily needed to be practicable today.

The semi-structured interviews were both recorded and transcribed with consent from the respondent. This was to ensure that all necessary empirical data for the study was documented as well as to facilitate the analysis made. According to Rennstam and Wästerfors (2015), qualitative interviews may have ambiguities due to the interaction between the interviewer and interviewee. Both authors always attended the interview where one took notes, and the other held the interview. This aimed to reduce any potential ambiguities and ensure validity and objectivity. In addition, it was made to minimize errors, as recommended by Patel and Davidson (2019). Reliability was enhanced by asking verification questions to clarify any ambiguities, such as asking respondents to restate their arguments or summarize their points. To improve validity and reliability, the study employed triangulation, which involved asking multiple respondents the same questions (Patel and Davidson, 2019).

Interviews were conducted both in person and digitally. The participants were always informed about the time, place and duration of the interview, which Bell and Waters (2014) consider important to do. The interviews were planned to be held for approximately one hour if possible. The main reason interviews were conducted digitally was the physical distance of the authors and participants from The Company. This led to both time and cost savings for both parties, making it easier to conduct a more comprehensive empirical data collection. Blomkvist and Hallin (2015) suggest that conducting interviews in a private and undisturbed environment is preferable. If the interview was held digitally, the risk of the respondent doing other things at the same time could have arisen. This may be easier to avoid if the interviews were held physically in person. Whereas this could affect objectivity negatively. To maintain objectivity, the authors aimed to interview only one respondent at a time. The main reason was to ensure that the respondent was not affected by any other opinions or reflections from other participants. However, some of the interviews were held with multiple respondents at once. Mainly due to the limited time of the respondents. Furthermore, the authors had no prior relationship with The Company or any study participants.

Once all interviews had been conducted, a questionnaire was made and sent to the participants in the study. The questionnaire involved questions regarding both processes that had been brought up during the interviews, but that later needed clarification and more detailed information. The document with questions was sent out through e-mail, where the answers were given in a reverse e-mail back from the respondents. The e-mail was sent out to five respondents, where respondents that knew the specific areas were targeted.

Sub-question 1.2

Semi-structured interviews were conducted to answer sub-question 1.2. The participants were asked about the impact of the new local inventory points in the four alternative scenarios. The effect on The Company's warehouse structure, distribution- and replenishment flows was the focal point of the interview.

Furthermore, the ones considered to have the best knowledge of The Company's logistics vision, structure, distribution, and- replenishment flows were interviewed to get suggestions on how these could be designed in the scenarios. By this, the scenarios could be better adapted to reality and The Company's business. One person interviewed was a Manager within Logistics, where the interviewee had great knowledge of both supply and demand in strategic and operational terms at The Company. Therefore, the interviewee's perspective was considered important. During the interview, all four alternative scenarios regarding warehouse structure and distribution flows were collected. The four scenarios were treated separately during the interview, beginning with Sweden. The questions were then repeated for all scenarios to collect how each scenario should be designed regarding warehouse structure, distribution- and replenishment flows. The questions used in the semi-structured interviews are in Appendix D: Interview Guide RQ 1.2**.**

Due to time constraints, questions regarding the design of scenarios were asked to respondents during interviews that aimed to map the current activity of the demand management- and order fulfilment process. However, the questions were only asked respondents that seemed to know enough to give the right input. Figure 24 presents the interviewees and the sub-questions the interviewees answered.

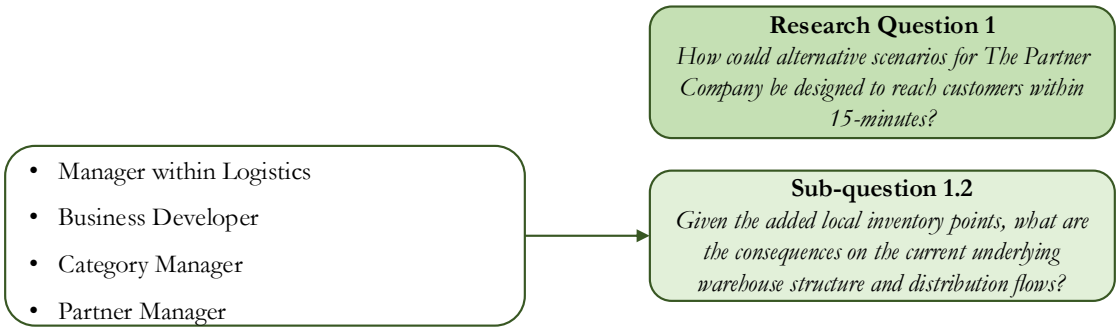

Figure 24: Interviewees at The Company to answer sub-question 1.2.

Research Question 2

Semi-structured interviews with relevant people at The Company were used to answer sub-question 2.1 and 2.2. The interviewees were chosen in consultation with the supervisor at The Company. The second research question aimed to identify the logistical consequences of found gaps in The Company's demand management process, with the first sub-question focusing on describing the current process and its activities. Therefore, a demand manager and category manager were interviewed. They could contribute information regarding the activities related to the demand management process at The Company by asking questions regarding the activities found in the literature. To map the entire process, the demand manager and category manager were asked questions

about each activity, such as who was responsible, which organizational levels conducted the activities, how the process was planned, and the systems used.

Furthermore, the second sub-question aimed to identify what is required from the demand management process given the designed scenarios. The given scenarios were described, and the demand manager and category manager contributed information on what would be required from the different activities within the demand management process to manage 15-minute deliveries. As responsible for the demand at The Company, the demand manager and category manager were considered appropriate to answer sub-question 2.1 and 2.2.

Moreover, since the study aims to investigate the logistical consequences at The Company on a higher level, the level of professionalism of the interviewee was considered. In Figure 25 below is all the participants and what sub-question they answered presented. In Appendix E: Interview Guide RQ 2.1 and Appendix F: Interview Guide RQ 2.2 are all questions used in the semi-structured interviews regarding the current and required demand management process presented.

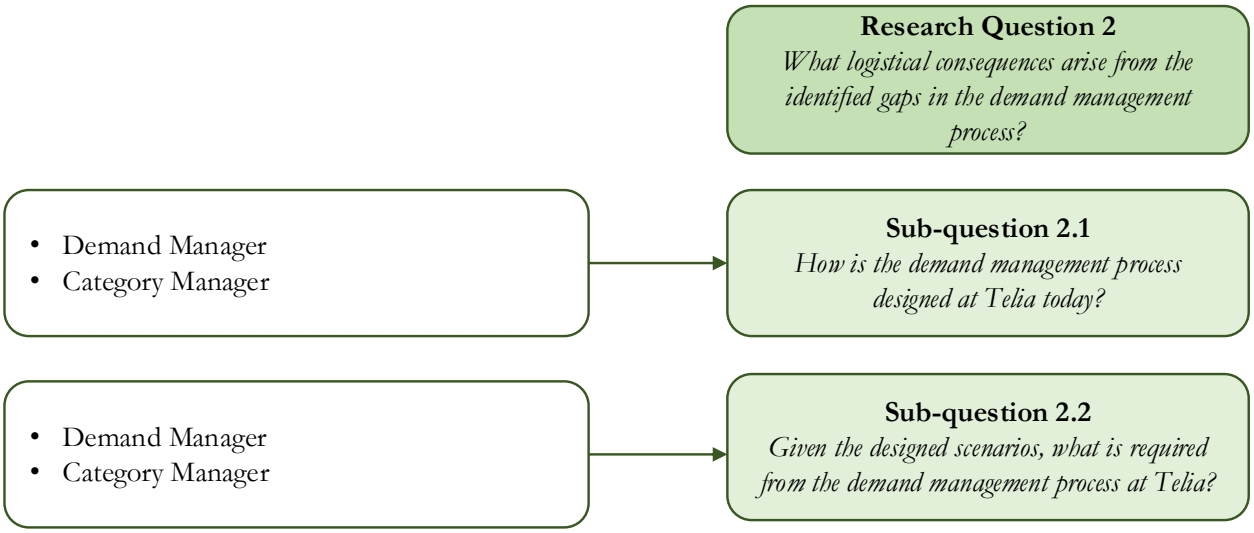

Figure 25: Interviewees to answer research question 2.

Research Question 3

Sub-question 3.1 and 3.2 were answered through semi-structured interviews. Research question 3 aimed to identify the logistical consequences of the found gaps in the order fulfilment process. The participants were asked questions regarding the different activities in the order fulfilment process identified in this study. Participants, including partner manager, business developer, process manager, and operational manager, were asked about the activities involved in the process, responsibilities, and systems used.

When the current process at The Company had been set, further interviews were held. The given scenarios were described, and information was collected on what would be required from the different activities within the order fulfilment process to manage 15-minute deliveries. The participants in the first interview to sub-question one was considered the most appropriate to answer these questions. In

research question 3, the level of professionalism was considered as well as in research question 2. In Figure 26 down below is all the participants and what sub-question they answered presented. In Appendix G: Interview Guide RQ 3.1 and Appendix H: Interview Guide RQ 3.2 are all questions used in the semi-structured interviews regarding the current and required order fulfilment process presented.

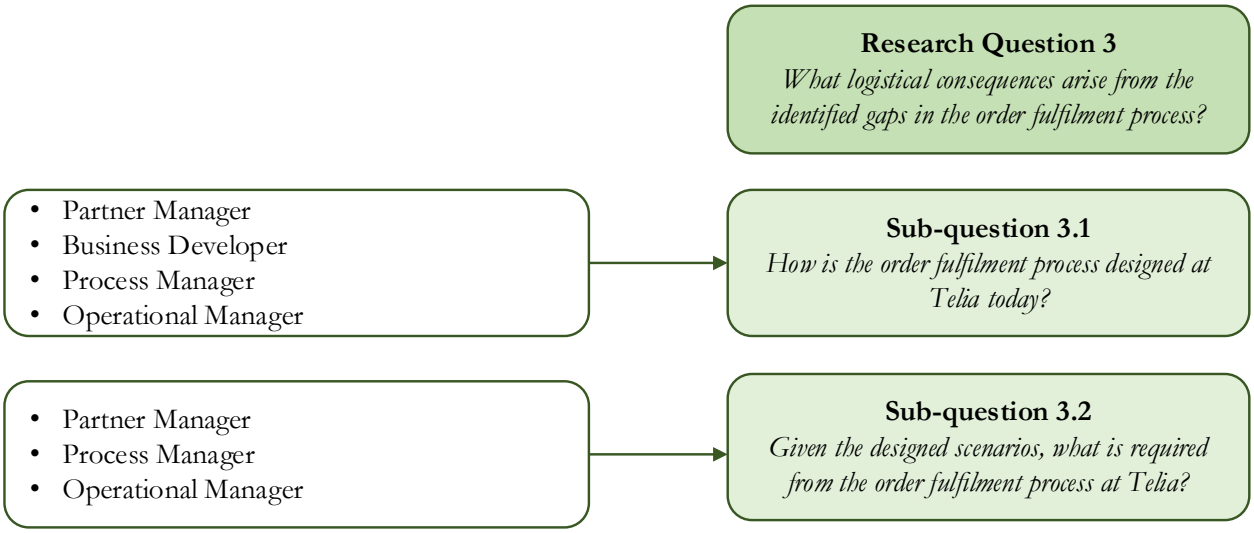

Figure 26: Interviewees to answer research question 3.

A summarization of all the interviews held and participants to answer research question 1, 2 and 3 are presented in Table 12.

Table 12: Summarization of all interviews held to answer research question 1, 2, and 3.

Sub-question	Interviewee/Interviewees	Referred as	Purpose with the interview	Date
1.2	Manager within Logistics	Respondent B	Setting the warehouse structure, distribution- and replenishment flows in all four scenarios.	2023-03-29
2.1	Demand Manager	Respondent H	Current demand management process	2023-04-05
1.2 and 3.1	Partner Manager, Head of Logistics Development, Business Developer, Process Manager	Respondent C, Respondent D, Respondent E, Respondent F	Scenario and current order fulfilment process	2023-04-05
3.1 and 3.2	Partner Manager, Process Manager	Respondent C, Respondent F	Current and scenario order fulfilment process	2023-04-11
3.1 and 3.2	Operational Manager	Respondent G	Current and scenario order fulfilment process	2023-04-14
2.1 and 2.2	Category Manager	Respondent I	Current and scenario demand management process	2023-04-14
2.2	Demand Manager	Respondent H	Scenario demand management process	2023-04-19

5.3.3 Analysing Research Question 1

Qualitative analyses aim to provide a deeper understanding (Patel and Davidson, 2019, Björklund and Paulsson, 2003). For this reason, the authors of this study have chosen to develop an analysis model suited to this specific study. The selection of a research method is primarily determined by the objective of the study (Björklund and Paulsson, 2003). Therefore, this study had a small proportion of quantitative analysis when calculating the local inventory points and a larger qualitative one. Patel and Davidson (2019) suggest that conducting analyses during a qualitative research study, such as directly after the interview, could be beneficial for moving forward in the study. In this study, such analyses were performed to design the scenarios for sub-question 1.2. Additionally, the empirical information was fresh in mind, which facilitated the analysis. As a result, the empirical data was continuously analysed.

As recommended by Rennstam and Wästerfors (2015), the information gathered from the interviews regarding sub-question 1.2 was sorted, categorized, and reduced, as it is not possible to capture and describe everything in the material. The input from the interviews was used to develop four scenarios for the warehouse structure and distribution flows in The Company's underlying structure. The scenarios were created by drawing the suggested warehouse structure and distribution- and

replenishment flows using PowerPoint, including the inventory points calculated. The scenarios created were then used as a demonstration to explain the scenarios when interviewing about research questions 2 and 3. Lastly, the information given in the scenarios was concluded in chapter 6 The Designed Scenarios.

Thereby, four designed scenarios for how to reach customers within 15-minutes in Sweden, Östergötland County, Jönköping County, and Stockholm were conducted and research question 1 was answered.

5.3.4 Analysis of Research Question 2 and 3

According to Patel and Davidson (2019) and Holme and Solvang (1997), there are no specific ways to process and analyse qualitative information such as interviews. However, there are certain guidelines the authors describe which have been used in this study. During the interviews, continuous analysis of gathered material is beneficial for the study (Patel and Davidson, 2019), and therefore this has been done in this study.

Sub-question 2.1 and 3.1

To answer research questions 2 and 3, the interviews and analysis were focused on sub-question 2.1 and 3.1 to map the current activities, before moving on to sub-question 2.2 and 3.2. To analyse sub-question 2.1 and 3.1, the authors of the study reviewed the interview material multiple times and identified different activities within the processes. This was done by rewatching the recordings several times and reading the notes. As recommended by Patel and Davidson (2019), notes were taken during the review process. The information collected from the interviews was then structured and sorted into each activity with help from 3 Frame of Reference. This followed the advice of Rennstam and Wästerfors (2015) to sort qualitative information for faster and easier analysis.

When the identification of all activities had been mapped out, a descriptive text was written to discuss and analyse the findings. This was done in chapter 7 The Demand Management Process at The Company and chapter 8 The Order Fulfilment Process at The Company. When the analysis of sub-question 2.1 and 3.1 was done, the current activities of the demand management- and order fulfilment processes at The Company could be concluded. Lastly, the identified activities in The Company's processes were visualized according to Figure 27 below. The activity represents one of the activities included in the demand management- and order fulfilment process, whereas the different steps represent what is included in that specific activity. The number of steps included in the process depended on the information collected from the respondents.

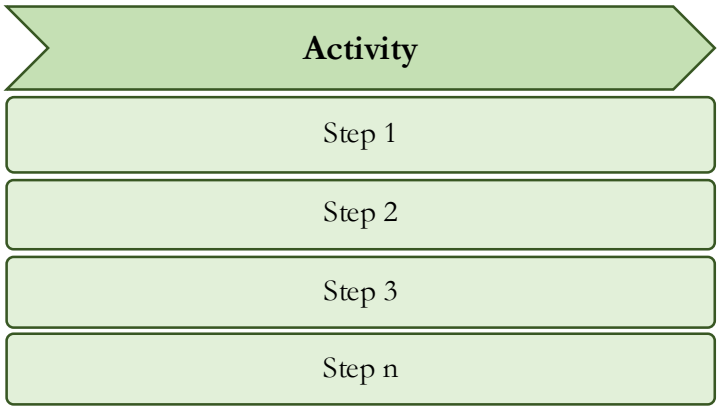

Figure 27: Finalized visualization of the current activities in the demand management- and order fulfilment process at The Company.

Sub-question 2.2 and 3.2

The second sub-question in research questions 2 and 3 addresses what the designed scenarios would require from the demand management- and order fulfilment processes. Foremost, sub-question 2.2 and 3.2 in both research questions involve presenting requirements on the processes when realising 15-minute deliveries. The material from the interviews was read through several times individually and keynotes was taken, similarly to the processing of 2.1 and 3.1.

The analysis connected to the second sub-question resulted in different requirements on the processes and activities that interviewees had mentioned during the interviews. These sub-questions were of a more explanatory nature with semi-structured interviews as input. Consequently, the analysis linked to these sub-questions was of a more discussant character at first. The discussion later resulted in a table form of each requirement of The Company's demand management- and order fulfilment processes, as shown in Table 13. The ticks visualize different requirements on the scenarios that were mentioned by the respondents during the interviews. Some of the requirements that were mentioned did not apply to all scenarios and this was thereby visualized by not setting a tick in the table in that column.

Table 13: Method of presenting the different requirements on the demand management- and order fulfilment process.

Requirement	**Scenario 1:** Sweden	**Scenario 2** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Requirement 1	X	X	X	X

This method of visualizing the results aligns with the method described by Holme and Solvang (1997), where analysis of conducted interviews can be split up into a holistic analysis and a sub-analysis of the text. The holistic analysis involves looking at the overall information collected, meanwhile, the sub-analysis is about building an interpretation of the investigated area from individual statements. These statements can later be categorised and described in tabular form (Holme and Solvang, 1997), such as in the summarized table of requirements on the process in Table 13.

The different requirements for the processes were taken out based on two parameters: the role and expertise of the interviewee and relevance in the studied processes. The role and expertise were based on how long the co-worker had been working at The Company and its role in the organization. Lastly, relevance to the studied processes, namely demand management- and order fulfilment processes were considered. This was done by using the frame of reference and identifying areas within the processes. See Figure 28 below for an illustration of how the relevant requirements were picked out.

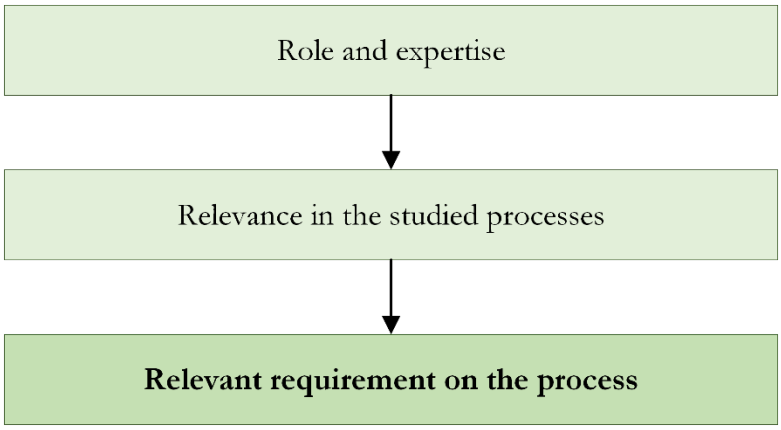

Figure 28: Process of picking out relevant requirements on the demand management- and order fulfilment process from the interviews.

Sub-question 2.3 and 3.3

When the different requirements on the demand management- and order fulfilment process was taken out, the last sub-question 2.3 and 3.3 in both research question 2 and 3 was analysed. The gaps between the current process and future scenarios were identified by analysing the current activity and the empirics that had been collected regarding the requirement of the activity. The gaps were identified and sorted out one by one in each activity in the process. The logistical consequences addressing how to reduce the gaps were then identified and summarized for each activity according to Table 14. The found gap and logistical consequence were then described in the table. Lastly, the logistical consequence was analysed with assistance from chapter 3 Frame of Reference.

Table 14: Gaps and logistical consequences of the designed scenarios.

Gap	Logistical consequence

5.3.5 Analysis of Research Question 4

To further analyse the logistical consequences on the processes and answer research question 4, a data compilation was done of the found logistical consequences in the demand management- and order fulfilment process. Therefore, the collected data from research questions 2 and 3 were taken and summarized.

At first, an assembling and compilation were made of the logistical consequence of the different processes separately. After that, a relative assessment was done on the gaps and logistical consequences. The relative assessment was done to visualize the differences between scenarios 1, 2, 3, and 4. The assessment was done based on the empirics collected from the respondents in the study. Questions had been asked during the interviews about how the required activities would differ between the scenarios, and thereby the assessment of the differences could be done.

Each gap and logistical consequence were separately graded by the authors, where the comparison of the collected empirics regarding the four scenarios was analysed. The scenario that implied the largest gap and logistical consequence was graded first, followed by the other scenarios. Four different angled arrows were used to visualise the differences between the scenarios in each activity. The horizontal arrow visualises a statement that a gap exists between the current and required activity. Furthermore, the increased slope of the arrow visualizes where the difference between the scenarios increases. For example, in Table 15, the analysis was done that scenario 4 implies a bigger gap compared to scenarios 1, 2, and 3. Meanwhile, scenario 1 implies less change than in scenarios 2, 3, and 4. Furthermore, the arrows were highlighted with green and red to illustrate between which scenarios the relative gap and logistical consequence are more significant. In Table 15 the gap is the biggest between the scenario 1 and 4, which is why they are highlighted in green respectively red.

Table 15: The method used for assessment of the gaps and logistical consequences.

Activity	Logistical consequence	Scenario 1	2	3	4
					

After the relative assessment was done, a synthesis of both processes was done. The synthesis was done by using the presented empirics and analysis done in chapter 7 The Demand Management Process at The Company, 8 The Order Fulfilment Process at The Company, and 3 Frame of Reference. As the characteristics of the found logistical consequences were similar, a categorization of the different consequences was possible to make. All logistical consequences from both processes were clustered into different themes, where all consequences that belonged to the same category had joint characteristics. This resulted in four main categories, and a conclusion was written whereas the areas of the logistical consequences were presented and discussed.

5.4 Final Phase

The final phase included the study's conclusion, discussion, and presenting the results to The Company. Furthermore, the discussion included a generalization of the study's results, future work, and a method evaluation. The final phase is presented in Figure 29.

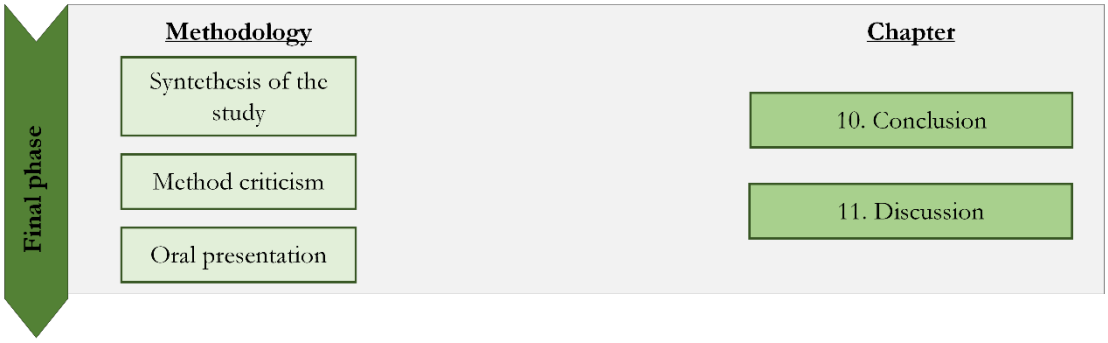

Figure 29: An overview of the final phase.

In the conclusion, the results from the study were summarized and presented. Accordingly, to what is described by Bell and Waters (2014) and Björklund and Paulsson (2003), the conclusions only contained information that had been presented before in the study. More specifically, the findings and results of the research questions were presented, and thereby the study's purpose was answered. Furthermore, this led to the discussion where the generalization of the study was made. Björklund and Paulsson (2003) push the fact that it is important to do a generalization of the study and transfer the conducted results to other situations. The study's imprint was also discussed, and suggestions for future work and studies were given.

Lastly, an oral presentation was given to The Company to present the results of the study. According to Blomkvist and Hallin (2015), it is important to give an oral presentation in the final phase, since the written study will be better if it is bound to an oral one.

5.5 Reflection of Methodology

In the following sections the method criticism and research ethics will be further discussed.

5.5.1 Method Criticism

A few sources of error could be criticized in this study, mainly connected to the design of the scenarios and semi-structured interviews held. Firstly, the designing of scenarios included deciding the number of local inventory points that are needed to reach customers within 15 minutes by bicycle. The first source of error to be mentioned is that the calculations are a rough approximation. However, neither the exact number of local inventory points nor another warehouse structure would affect the results of this study in any significant way. The number of local inventory points foremost implied that more inventory points would be needed rather than the exact number and an indication of how it would affect The Company realizing 15-minute deliveries. Interviewing more respondents could affect the warehouse structure which is the foundation of the designed scenarios. Despite this, most respondents mentioned factors that were somehow independent of the warehouse structure. Therefore, it seems to have no great impact on the results. In addition, multiple respondents indirectly confirmed in other interviews that the presented warehouse structure would be necessary, which further confirms the reliability of the study.

The next source of error in this study is the semi-structured interviews that have been held. The original plan was that only one person at a time from The Company should have participated in the interviews. However, due to time constraints at The Company, some interviews had several participants at the same time. Thus, this may have meant that the respondents influenced each other's opinions and perspectives and that some respondents took more initiative than others to talk and discuss which could affect the validity of the study.

Furthermore, two participants only had time for one interview, where both the current process and the designed scenario's effect on the process were discussed. By this, the time to discuss and dig deeper into the processes and activities was limited. Lastly, the participants in the semi-structured interviews have been chosen in consultation with the supervisor from The Company. However, since the supervisor does not have full knowledge of the theory that is the base of the study, the risk of not interviewing the correct respondents exists. To obtain objectivity and validity, the right method could have been to choose respondents ourselves. However, this was not possible due to time constraints, and it has not been considered to affect the results of the study that much even though it could have brought broader perspectives on the processes in the scenarios.

Lastly, the choice of methodology for this study is not considered to have any major impact on this study or its results. If a similar study were to be conducted at another omnichannel company, the methodology is considered applicable without any remarkable changes, which indicates god reliability. Worth mentioning is to increase objectivity by carefully choosing the respondents to answer all research questions to get a broader perspective.

5.5.2 Research Ethics

Besides considering the study's credibility, Patel and Davidson (2019) describe research ethics as important to consider in an academic study. Therefore, it is important to consider how the research is conducted, that it is focused on relevant and essential questions and enhances high quality (Patel and Davidson, 2019). To ensure this, the study is required to have a balance between the general purpose of the society of the study and the protection of the integrity and inappropriate insight into individuals (Patel and Davidson, 2019). Further, Patel and Davidson (2019) describe four research ethical aspects presented by The Swedish Research Council: *the information requirement, consent requirement, confidentiality requirement*, and *utilisation requirement.* This study has been conducted with consideration of all four aspects.

As mentioned before, the respondents and participants in the study were always informed regarding the purpose of the study before the interviews were held. This is under *the information requirement* (Patel and Davidson, 2019). Furthermore, as mentioned, the respondents were always given the choice to participate in the study or not. Thus, they had the right to decide whether they wanted to participate or not in *the consent requirement* (Patel and Davidson, 2019). Thirdly, the anonymity of all respondents was considered by only explaining their role and purpose in the study, without presenting personal data. The recordings were later deleted to ensure this. Further, the confidentiality of the company has been kept by anonymizing the company name. By doing this, *the confidentiality requirement* has been

fulfilled (Patel and Davidson, 2019). Lastly, the information collected from all parties involved has only been saved and documented so that the researchers can assess the information. Hence, the information was solely used for the research, and the *utilization requirement* was considered (Patel and Davidson, 2019).

6 The Designed Scenarios

This chapter aims to present the findings for research question 1, the design of scenarios where 15-minute deliveries is available. Each design aspect will be discussed separately. Firstly, the alternative number of scenarios and number of local inventory points will be presented. Given the scenarios and number of local inventory points, the empirics collected regarding the replenishment- and distribution flows will be presented for each scenario. Lastly, this results in a final design of each scenario.

6.1 Scenarios and Number of Local Inventory Points

The purpose of this study is to investigate the logistical consequences if the logistics vision of 15-minute deliveries is realized. The logistics vision aims to deliver products within 15 minutes throughout Sweden, which is challenging. Therefore, several scenarios will be used in this study as a complement to the scenario of covering the entire Sweden within 15 minutes. The selection of the scenarios primarily aims to investigate potential variations among different-sized geographical areas and the presence or absence of nearby satellite warehouses. Hence, consideration has been given to The Company's current underlying warehouse structure when selecting the investigated scenarios. The different scenarios considered in this study are presented in Table 16.

Table 16: Four different scenarios that will be designed.

Scenario	Explanation
1	15-minute deliveries in Sweden
2	15-minute deliveries in a county with a satellite warehouse, Östergötland County
3	15-minute deliveries in a county without a satellite warehouse, Jönköping County
4	15-minute deliveries in a big city, Stockholm

The first scenario encompasses 15-minute deliveries to all locations across Sweden, aligning with the logistics vision of The Company, despite the potential challenges involved. The second scenario focuses on providing 15-minute deliveries in Östergötland County, which benefits from a nearby satellite warehouse situated in Norrköping. The third scenario examines Jönköping County without a satellite warehouse. These counties were selected due to their similar geographical characteristics and population density. In the presence of a satellite warehouse within the county, a larger warehouse becomes available, capable of accommodating a broader assortment of products and effectively restocking both the stores and local inventory points. Which is why these two scenarios have been chosen to investigate if the presence of a satellite warehouse has an impact or not. Lastly, the design of 15-minute deliveries will be explored for Stockholm, a smaller yet densely populated area. Consequently, these scenarios may have an impact on the overall warehouse structure, distribution, and replenishment flows compared to today.

Consequently, the determined scenarios facilitate the calculation of the required number of local inventory points (LIP) to achieve 15-minute deliveries for each scenario. The calculations of the required number of local inventory points are presented in Table 17.

Table 17: The calculated number of local inventory points for the scenarios.

	Scenario 1: Sweden	**Scenario 2:** A county with a satellite warehouse (Östergötland County)	**Scenario 3:** A county without a satellite warehouse (Jönköping County)	**Scenario 4:** A big city (Stockholm)
No. of LIP	8 103	211	208	4

6.2 Underlying Warehouse Structure

Given the calculated number of new local inventory points, the warehouse structure for each scenario needs to be determined. The decision of how many warehouses and the structure in the logistics network are important for the organization as a whole (Mattsson, 2002). As mentioned in section 3.1.2 Warehouse Structure, a decentralized warehouse structure can enable shorter lead times (Hübner et al., 2016a, Mattsson, 2002), which is something Respondent B confirms as an enabler.

Further, Respondent B believes that The Company's current warehouse structure, with a central warehouse, six satellite warehouses and 59 stores, is potentially enough for a logistical system providing 15-minute deliveries. Respondent B believes the problem lies in the systems, processes, activities, and support around the underlying warehouse structure, regardless of the geographical area the logistics vision aims to fulfil. Respondent E does not believe that The Company can manage to operate a logistics system offering 15-minute deliveries today due to too few central and satellite warehouses, and stores to be able to replenish all local inventory points. Regardless of the four scenarios, Respondent E thinks that more stores will be needed in the warehouse structure to be able to offer 15-minute deliveries. Since the stores are the closest warehouses to the local inventory points, they will be essential for replenishing the inventory at those locations.

As a result, the underlying warehouse structure will consist of one central warehouse and six satellite warehouses. Today, The Company has 59 stores which is insufficient for handling replenishment of local inventory points according to Respondent E. Therefore, more stores will be needed in the scenarios as stated by Respondent E. Hence, the number of stores will be more than 59 in the underlying warehouse structure, which will require major modifications. However, no information has been given on how many more stores will be needed. Lastly, the number of local inventory points calculated for each scenario is added to the structure. This is presented in Table 18.

Table 18: Number of warehouses determined in each scenario.

	Scenario 1: Sweden	**Scenario 2:** County with satellite warehouse	**Scenario 3:** County without satellite warehouse	**Scenario 4:** Big city
Number of central warehouses	1	1	1	1
Number of satellite warehouses	6	6	6	6
Store warehouses	> 59	> 59	> 59	> 59
Number of local inventory points	8 103	211	208	4

Respondent B believes that the purpose of the central and satellite warehouse, and stores will be identical to before, but with the difference that all satellite warehouses will need to store all article numbers. Today, satellite warehouses store a limited range of products. Consequently, both the central warehouse and all satellite warehouses are assumed to store all article numbers in this study. However, stores are assumed to potentially manage all article numbers, even if it is not required to have them all in storage at once. In scenario 4, Respondent I does not believe that every store and local inventory point will need to have a full range of products. This since it is easier in a smaller dense area to send products from and between the central and satellite warehouse, and stores.

6.3 Replenishment Flows

An efficient and effective replenishment of the stock throughout the whole logistical system is something that Respondent B considers essential to be able to offer deliveries within 15 minutes to all customers, regardless of scenario, and thus the geographical area. Due to the omnichannel strategy of The Company, Respondent B argues that replenishment must be available to and from the central warehouse, all satellite warehouses, and all stores.

As local inventory points have been added to the warehouse structure, these will also need to be replenished by the central and satellite warehouses, and stores. According to Respondent E, The Company's strategy is to move capacity from the central warehouse to the stores. As of today, the stores cannot handle any replenishment. When the functionality of replenishing from the stores is implemented, the stores will be the nearest and most local warehouses to replenish the local inventory points. Therefore, most of the replenishment of the local inventory points will be done by the stores in the designed scenarios. The importance of more stores in relation to replenishment flows could be exemplified with Norrbotten County. The geographical area is large, and the population is sparsely populated all over the county. Hence, having only one store and one satellite warehouse would not be sufficient to supply all customers within 15 minutes. Although, due to the omnichannel strategy it will be possible to replenish the local inventory points from the central warehouse and satellite warehouses too. Hence, the replenishment of the central warehouse, satellite warehouses, stores, and local inventory points in the four scenarios will be identical, as presented below in Figure 30.

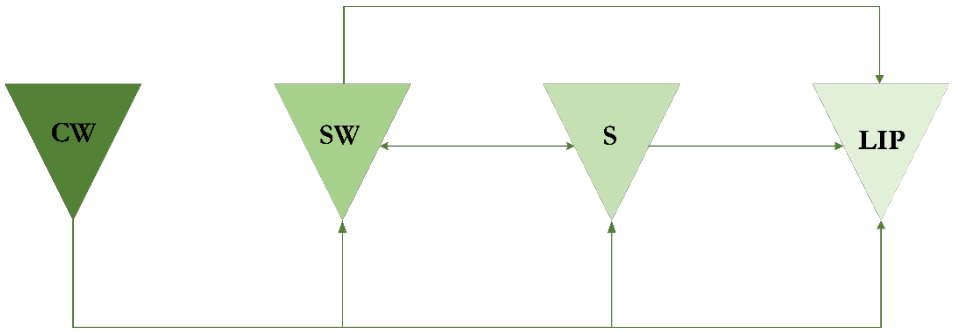

Figure 30: The replenishment flows determined in the four scenarios.

Respondent C believes that the replenishment of the central and satellite warehouses, stores, and local inventory points will be done in smaller order quantities but with higher frequency. According to Respondent C, especially the stores will require frequent replenishment several times a day as they primarily bear the responsibility for replenishing the local inventory points. Hence, it is important that enough stock is kept at the stores.

6.4 Distribution Flows

Respondent B believes that if The Company can promote the new local inventory points effectively, the customers will prefer that as a delivery option. Respondent B does not believe that any delivery option The Company provides in their omnichannel today will disappear. Although, Respondent B thinks that the distribution flows will be reallocated and delivery flows such as packages sent to the postal office will be less popular. In all four scenarios, it will be important that the central- and satellite warehouses stand for home deliveries, packages sent to postal office and, parcel boxes. Meanwhile, stores account for buy in store, collect-in-store, ship from store, and home deliveries. Figure 31 presents the distribution flows and delivery options that will be provided by The Company in the designed scenarios.

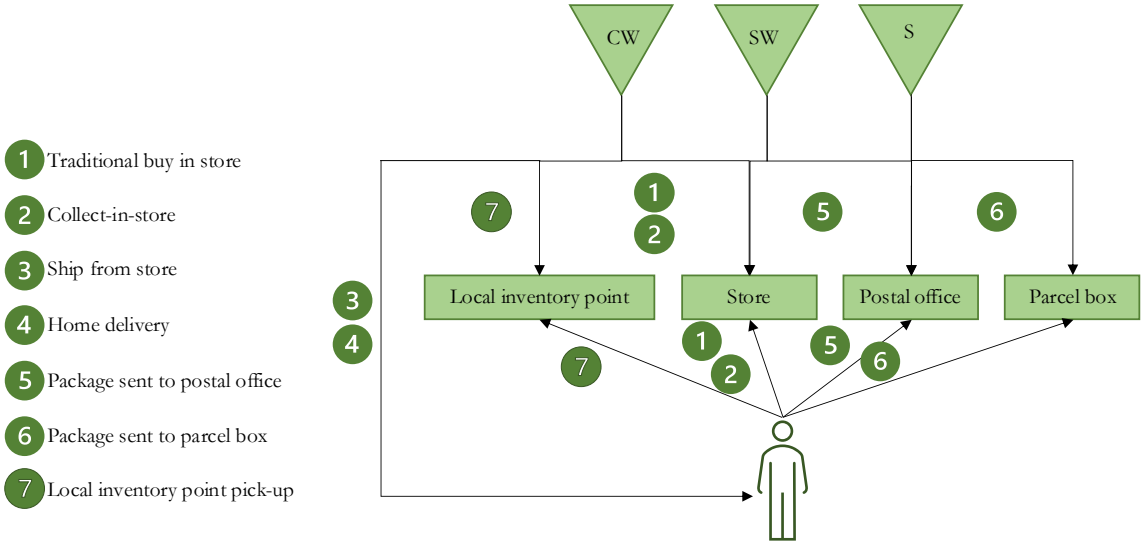

Figure 31: Delivery options in the designed scenarios.

The local inventory points will both act as a parcel box and a storage point. In the local inventory points, products are stored based on the forecast. When a customer places an order, the local inventory points start to act as a postal box where the customer can access its products. In conclusion, the local inventory point is a storage point until a customer place an order.

6.5 Final Design of the Scenarios

According to the information presented above, the underlying warehouse structure in all four scenarios will comprise one central warehouse, six satellite warehouses, and more than 59 stores. The central warehouse, satellite warehouses, and stores will have the capability to replenish each other or any local inventory point. However, as described by Respondent E, The Company foremost intends to allocate capacity from the central warehouse to the stores. Consequently, with the increased number of stores, they will assume a more central role in the designed scenarios, particularly in terms of replenishment and distribution of the local inventory points. Respondent B emphasizes the significance of maintaining a full range of products in both the central warehouse and satellite warehouses to facilitate prompt deliveries. Additionally, as more stores are added to The Company's warehouse structure, they will need to accommodate a broader range of products. Due to space constraints, the local inventory points will not have access to a full range of products.

Moreover, the order quantities sent to the satellite warehouses, stores, and local inventory points will be smaller but with higher delivery frequencies, varying based on the population and location of the warehouses. The central warehouse and satellite warehouses will handle home deliveries and packages sent to postal offices or parcel boxes. The stores will manage in-store purchases, collect-in-store services, ship-from-store operations, and home deliveries. Lastly, the local inventory points will primarily be responsible for most 15-minute deliveries. Table 19 provides a fully detailed summary, with highlighted cells representing where the scenarios differ from each other.

Table 19: Final design of the four scenarios.

Scenario 1: Sweden				
Type of warehouse	**CW**	**SW**	**S**	**LIP**
Number	1	6	> 59	8 103
Replenished by	Supplier	CW, S	CW, SW	CW, SW, S
Range of products	Full range	Full range	Partly full range	Not full range
Delivery options offered	HD, postal office, parcel box	HD, postal office, parcel box	HD, BM, CC, SFS	LIP
Scenario 2: County with satellite warehouse, Östergötland County				
Type of warehouse	**CW**	**SW**	**S**	**LIP**
Number	1	6	> 59	211
Replenished by	Supplier	CW, S	CW, SW	CW, SW, S
Range of products	Full range	Full range	Partly full range	Not full range
Delivery options offered	HD, postal office, parcel box	HD, postal office, parcel box	HD, BM, CC, SFS	LIP
Scenario 3: County without satellite warehouse, Jönköping County				
Type of warehouse	**CW**	**SW**	**S**	**LIP**
Number	1	6	> 59	208
Replenished by	Supplier	CW, S	CW, SW	CW, SW, S
Range of products	Full range	Full range	Partly full range	Not full range
Delivery options offered	HD, postal office, parcel box	HD, postal office, parcel box	HD, BM, CC, SFS	LIP
Scenario 4: Big city, Stockholm				
Type of warehouse	**CW**	**SW**	**S**	**LIP**
Number	1	6	> 59	4
Replenished by	Supplier	CW, S	CW, SW	CW, SW, S
Range of products	Full range	Full range	Partly full range	Not full range
Delivery options offered	HD, postal office, parcel box	HD, postal office, parcel box	HD, BM, CC, SFS	LIP

To conclude, all scenarios will necessitate significant changes in The Company's logistics system compared to the present setup. A considerable number of new local inventory points will be introduced, with more stores assuming responsibility for replenishing these points. Additionally, the replenishment flows will undergo changes in terms of frequency and processes. These modifications in The Company's logistical system will serve as the basis for subsequent chapters in this study, although they will not be further investigated. The focus of the study lies in understanding the requirements of the demand management and order fulfillment processes within the aforementioned logistics system.

7 Investigating The Demand Management Process at The Company

In the following chapter, the empirical collection of the identified demand management process and its activities at The Company will be presented to answer research question two. Following, the empirical collection of what is required from the demand management process in the designed scenarios is presented. Once the requirement from the process is presented, the gaps and logistical consequences will be identified and presented. The demand management process and its activities defined in this study is presented in Figure 32 below.

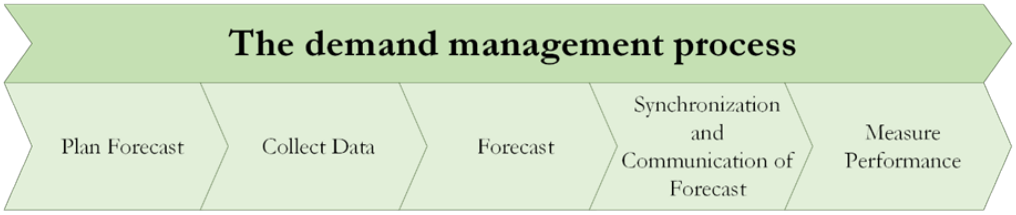

Figure 32: The demand management process defined in this study.

7.1 Plan Forecast

In the following section is the current activity Plan Forecast at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

Current Activity

According to Respondent H, planning of forecasts at The Company includes making a base forecast using total sales data from previous years and information regarding new product launches and future campaigns from the category team. The base forecast is done as a total for all sales channels in Excel.

Both Respondent I and H explain that the time frame for planning of forecasts heavily depends on product type and supplier. The suppliers need the forecasts to plan their operations, where some suppliers may require the forecasts three weeks beforehand whereas other requests the forecasts months in advance. When the time frame from the supplier is passed, the forecasts is locked and cannot be changed. In addition, different products have different supplier. Thus, the planning horizon of forecasts is different depending on product and supplier. Below in Figure 33 is an overview of identified ways of how the activity Plan Forecast is currently designed at The Company presented.

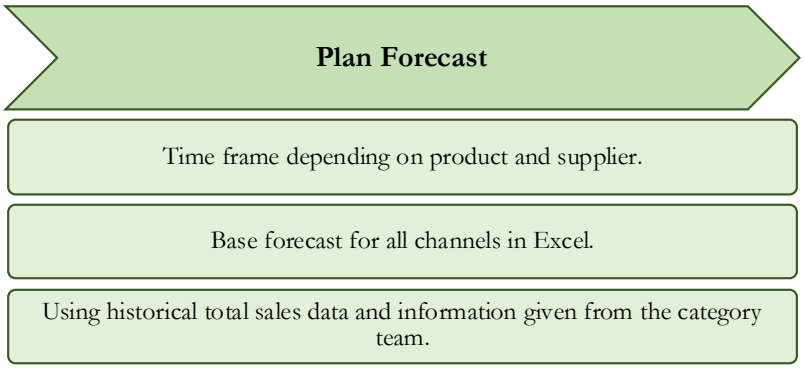

Figure 33: The current activity Plan Forecast at The Company.

Identified Gaps and Logistical Consequences

Respondents C, H, and I believe that to forecast and supply all local inventory points in all designed scenarios, planning of what to forecast and store in each local inventory point is required. Respondent H means that it will be more difficult to estimate the sales the local inventory points will bring The Company, and therefore planning will become more complex for the local inventory points. Respondent H believes that it needs to be a business decision from the management team of what products and quantity to store in the local inventory points. Respondent H mentions that it will be more difficult to know what to store in the local inventory points when covering a larger area such as in scenario 1, than compared to scenario 4. This since more and varied demand much be considered. However, planning of what to forecast and store in the local inventory points is mentioned as necessary in all four scenarios.

Respondent H believes that the planning phase still will include making a total base forecast to get an overview in all four scenarios. Presented in Table 20 below is the identified requirement in the activity Plan Forecast summarized, where the tick represents if it is required in the specific scenario.

Table 20: Requirements found in the activity Plan Forecast at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Planning of what products to forecast and store in each local inventory points.	X	X	X	X

The found gap to address in the activity Plan Forecast is that the company does not have the tools or method for planning what to forecast and store in the local inventory points. Therefore, the logistical consequence of this gap is to review a forecast method of what products to forecast and store in the local inventory points. Creating a method for the forecast and creating actions in advance is a way of planning the demand, which is stated crucial for forecasting (Crum and Palmatier, 2003). Furthermore, planning of demand is a way to estimate how much a company will sell (Crum and Palmatier, 2003),

why planning and decision of what to store will be of great importance. Also, creating actions in advance and reducing variability is all included in planning for the forecasts and is not something that the company does today. The logistical consequence includes planning what to sell, forecast, and store in the local inventory points, which in turn will be a way for The Company to keep the control of both the forecast, stock, and variability in demand. In Table 21 below is gap and logistical consequence summarized.

Table 21: Gap and logistical consequence of the requirement for better planning of what to forecast in what warehouse.

Gap	Logistical consequence
The Company does not have local inventory points today and therefore does not know how to plan what to store and forecast.	1. Review forecast method for deciding what products to forecast and store in each local inventory points.

7.2 Collect Data

In the following section is the current activity Collect Data at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

Current Activity

There are two separate occasions for when collection of data is done. Firstly, data is collected for the planning of forecasts, whereas The Company does a total base forecast. For the base forecast, historical sales data, and information regarding, for instance future campaigns, is gathered from the category team. The second data collection is for the main forecasts that are done in SO99+. The data collected is historical sales data, the base forecast made, and master data parameters for The Company. The historical sales data is the basis of all forecasts done and is gathered from the system Common Demand Purchase Planning Tool (CDPPT). This can be seen in Figure 34.

First data collection (base forecast)	Second data collection (SO99+)
• Historical sales data • Data from the category team	• Historical sales data • Base forecast • Master data parameters

Figure 34: Data collected to forecast.

Respondent H states that The Company has not yet integrated the data from the different sales channels in their systems. For example, an order that is shipped from store is forecasted as an item kept in stock at the central warehouse, even though it should be forecasted to the stores. This since the package is not scanned in the stores cashier and sold over the desk, and therefore not considered

as a sale made in store by the systems. Below in Figure 35 is an overview of identified ways of how the activity Collect Data is currently designed at The Company presented.

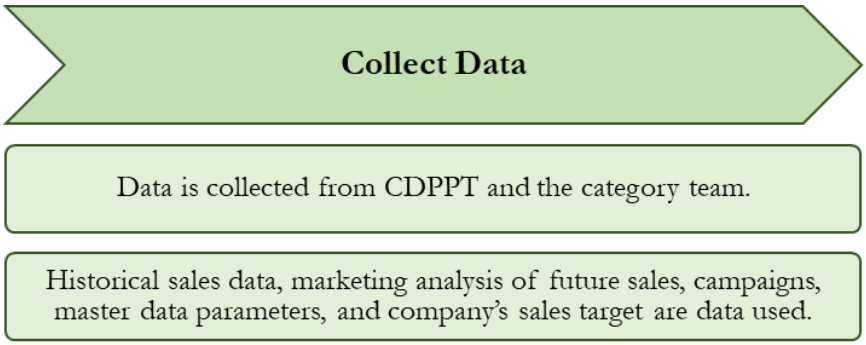

Figure 35: The current activity Collect Data at The Company.

Identified Gaps and Logistical Consequences

A challenge regarding the data lies in the system's capability to integrate the data from all sales channels, for instance, stores should report both sales from traditional BM-retailing, ship from store, and sales from the local inventory points. This is necessary because the stores handle most of the distribution to the local inventory points in all scenarios. Consequently, the forecasts and stock held in each store will be based on sales from different omnichannel alternatives, which is not currently done. Respondent H suggests that The Company must develop a system to manage all four scenarios. Furthermore, Respondent H notes that integrating data from all sales channels becomes increasingly important when covering larger areas such as scenario 1, as the forecasts must be highly accurate when covering the entire country compared to a single large city in 15 minutes. Presented in Table 22 below is the identified requirement in the activity Collect Data summarized, where the tick represents if it is required in the specific scenario.

Table 22: Requirements found in the activity Collect Data at The Company

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Systems need to integrate all sales data for the different sales channels.	X	X	X	X

System integration of data is something that Neslin et al. (2006) states as a challenge for omnichannel companies, where the challenge arises when the retailers and customers connect through multiple channels, which is the case for The Company. The logistical consequence in Collect Data is integrating the sales data for all omnichannel alternatives in the systems used. This will become of importance for the stores since they will account for the replenishment of the local inventory points. Whereas both the demand for brick-and-mortar retail, collect in store, ship to store, and orders sent to the local inventory points needs to be forecasted as store sales. There is also a possibility that some percentage of the sales in stores is reallocated to the local inventory points, something mentioned by Respondent

B, which makes it even more important for the systems to integrate common sales data. The integration of the different sales channels an omnichannel company provides, is an enabler for long-term success (Kazancoglu and Demir, 2021). Hence, for long-term success for The Company it is important to consider this logistical consequence of making the systems used integrate all common sales data. Presented in Table 23 below is the gap and logistical consequence summarized.

Table 23: Gap and logistical consequence of the requirement to have integrated data.

Gap	Logistical consequence
The systems used do not integrate the sales data for all omnichannel alternatives. For instance, the systems separate the sales made over desk and delivered or ordered to stores.	2. Integrate the sales data for all omnichannel alternatives in the systems used by The Company.

7.3 Forecast

In the following section is the current activity Forecast at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

Current Activity

The forecasts for products are done in SO99+, The Company's inventory management system. SO99+ forecasts the central warehouse, satellite warehouse, and stores. In specific, SO99+ splits the base forecasts that has been put into the system and forecasts the central warehouse, satellite warehouses, and stores based on that.

Respondent H mentions that The Company does not trust SO99+ enough to let it manage the forecast of all products on its own, this since the system is quite new in The Company and not fully implemented for all products or flows yet. Thus, Respondent H notes that there remains a considerable amount of manual processing involved in forecasting, exemplified by the continued use of Excel. Every week, the forecasts are adjusted where it is needed. According to Respondent H, big adjustments are not very common. Adjustments are most often done when The Company has made a big affair with another company, if it's a new article, or where campaigns have been missed. Although, with the base forecast as a foundation, SO99+ handles uncertainties well according to Respondent H. See Figure 36 for an illustration of the current forecasting process, where forecasting is done with SO99+ and support from calculations in Excel.

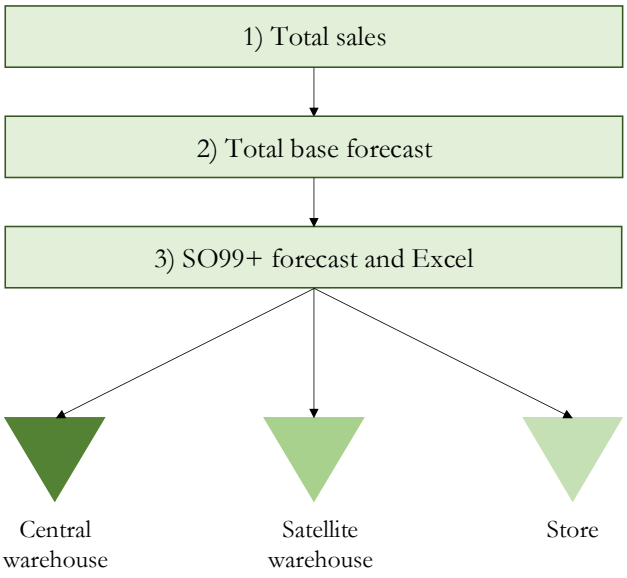

Figure 36: Current forecasting process at The Company.

Respondent I mentions that based on the forecasts, the category team sets requirements for safety stock and the demand team should forecast and ensure that this is enforced by passing on the information to the supply team. Presented in Figure 37 below is the current activity Forecast at The Company presented.

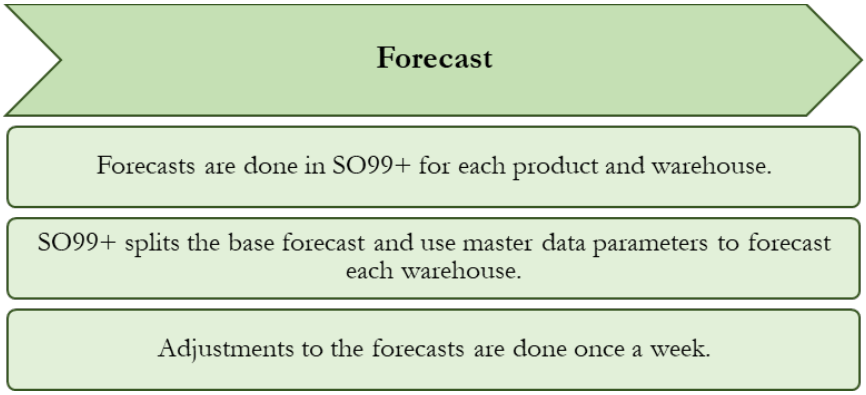

Figure 37: The current activity Forecast at The Company.

Identified Gaps and Logistical Consequences

Respondent I says that for the company to forecast the local inventory points, the company would need a better warehouse and management system regardless of scenario. Respondent I push the fact that The Company needs an automatised system, offering a clear overview of what is in stock in the central warehouse, satellite warehouses, stores, and local inventory points. Furthermore, Respondent I states that one of the challenges would be to keep the control of what is in stock in each local inventory point. In all scenarios, Respondent I states that it is required that the inventory management system used by The Company can optimize the forecasts and make adjustments to the forecasts by its own without the manual processing that is done today. Respondent I mentions that in scenario 3, it

might be a challenge to keep stock in the local inventory points due to no satellite warehouse and more sparsely populated area. Thereby, the forecasts for the stores and local inventory points must be more accurate when covering a county without a satellite warehouse than in scenario 2. Hence, using an automatised inventory management system becomes very important, for instance SO99+. By letting SO99+ forecast the demand, Respondent H believes that SO99+ would be sufficient in all four scenarios. In Figure 38 is the described required forecasting process shown, where SO99+ is handling the forecasting only.

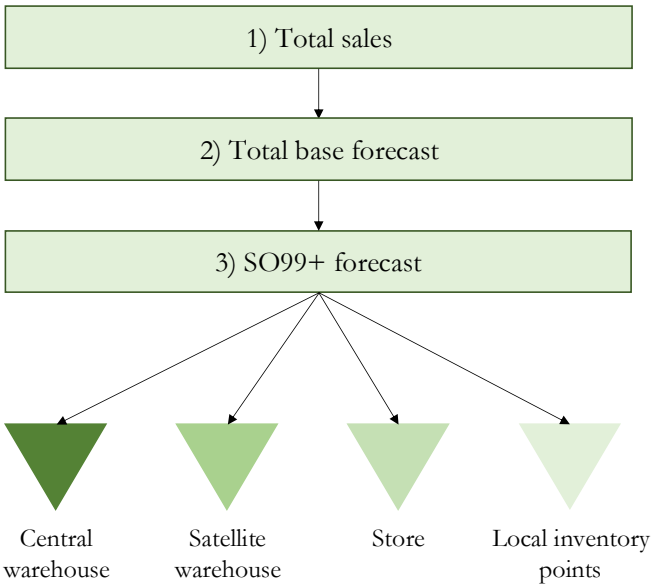

Figure 38: Required forecasting process in scenarios.

Presented in Table 24 below is the identified requirement in the activity Forecast summarized, where the tick represents if it is required in the specific scenario.

Table 24: Requirement found in the activity Forecast at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Implement and use an inventory management system that can optimize and adjust forecast and inventory levels without manual processing for the local inventory points.	X	X	X	X

A logistical consequence of above-mentioned requirement is to implement and use an inventory management system, as S099+, and review configurations to optimize and adjust the forecasts of the local inventory points. A complex omnichannel needs more knowledge regarding technology and

information systems (Larke et al., 2018, Lewis et al., 2014, Neslin et al., 2006). Hübner et al. (2016a) state that when using stores as dispatching points, better IT infrastructure is needed. The designed scenarios all require stores to replenish the local inventory point, which calls for The Company to use and configure their existing inventory management system, SO99+. Gallino and Moreno (2014) also mention that when utilising the stores in the omnichannel structure, the inventory credibility needs to be high in the stores. Respondent I states that functions that are needed in the inventory management system are adjustment to stock and corrections when the forecasts are not in line with real demand. Configuring these kinds of functions could increase the credibility of inventory at the stores, which would help The Company when using the stores to replenish the local inventory points and thus decrease the manual handling when forecasting. In Table 25 below is the gap and logistical consequence summarized.

Table 25: Gap and logistical consequence of the requirement to implement an automatised inventory management system.

Gap	Logistical consequence
The Company has an inventory management system, SO99+, but does not use it for all replenishment- and distribution flows. Moreover, The Company lacks some trust in SO99+ and still do some manual processing.	3. Increase the use of the inventory management system SO99+ and review functions to optimize and adjust forecast of the local inventory points to reduce manual processing.

According to Respondent H, the advantages of SO99+ is that it uses AI, machine learning, and trends when it creates the forecasts, which is very important when having so many local inventory points as in all scenarios. However, consistent monitoring of SO99+ and the proposals that it gives for the local inventory points is what Respondent H believes would be needed. Respondent I and H mention that more workforce in the demand team would be required in scenario 1, 2, and 3 to monitor the forecasts and stock of the local inventory points. However, in scenario 4 the geographical area is not as big thus more workforce is not required. Presented in Table 26 below is the identified requirement in the activity Forecast summarized, where the tick represents if it is required in the specific scenario.

Table 26: Requirement found in the activity Forecast at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
More workforce in the demand team to monitor and control the proposals of forecast by SO99+ in the local inventory points.	X	X	X	

The logistical consequence of the previously mentioned requirement is to review the workforce needed in the demand team to monitor the forecasts made for the local inventory points in SO99+.

Although respondents mentioned automation of forecast adjustments, they also highlighted the importance of manual monitoring and control to ensure that SO99+ generates accurate forecasts for the local inventory points. This to be able to ensure that 15-minute deliveries are aimed for. Utilising employees knowledge of what a reasonable forecast is when having them monitoring the forecasts is partly a method called expert judgement forecast, which is a commonly used method (Oskarsson et al., 2013). In Table 27 below is the gap and logistical consequence summarized.

Table 27: Gap and logistical consequence of the requirement to review the workforce at demand.

Gap	Logistical consequence
The Company does not have enough workforce on the demand team to monitor and control the forecasts generated by SO99+ for the local inventory points.	4. Review the workforce required on the demand team to monitor and control the forecasts made for the local inventory points.

7.4 Synchronization and Communication of Forecast

In the following section is the current activity Synchronization and Communication of Forecast at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

Current Activity

The forecasts are available through SO99+ and a common cloud system used by the company. For the supply team to plan the purchasing, the forecasts are shared with the supply team through a cloud-system that the organisation operates in. Respondent H describes that The Company shares parts of their forecasts with external stakeholders, such as suppliers. Further, Respondent H mentions that the supply team may occasionally operate on outdated or incomplete forecasts due to lack of communication between the demand and supply teams and the absence of a set deadline for the forecast's completion. In addition, Respondent H thinks it is unclear when the demand team are finished with their tasks and where the supply team takes over.

According to both Respondent H and I, the demand team has weekly meetings with the category team to follow up on fluctuations and discuss different adjustments that needs to be considered in the forecasts. Presented in Figure 39 below is the current activity Synchronization and Communication of Forecast summarized.

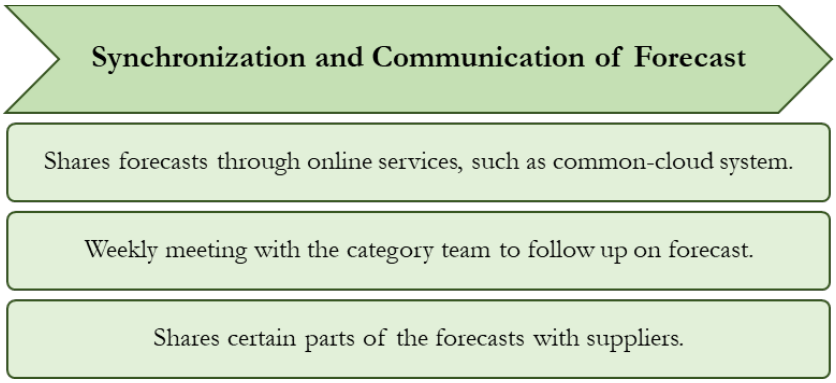

Figure 39: The current activity Synchronization and Communication of Forecast at The Company.

Identified Gaps and Logistical Consequences

Respondent I and H believe that scenarios 1, 2, and 3 require more synchronization and communication of forecasts overall between the supply, demand, category team, and TPL-partner. The TPL-partner is important to communicate with since it is those who are responsible for operating the logistics. Moreover, Respondent I believes that more time needs to be spent on communication between the category and demand team to keep control of the forecasts and what is in stock in the local inventory points. Especially does Respondent H mean that more synchronization and communication need to be done in scenario 3, an area without a satellite warehouse. This since it is only the stores that are keeping stock, whereas Respondent H means that the forecasts need to be monitored carefully to make sure it is aligning with real demand.

As mentioned, not all scenarios require more synchronization and communication of forecasts. Respondent H does not believe that scenario 4 would require more synchronization or communication of forecasts than today. This since the area is small and demand is more foreseeable in a bigger city than in the other three scenarios.

Presented in Table 28 below is the identified requirement in the activity Synchronization and Communication of Forecast summarized, where the tick represents if it is required in the specific scenario.

Table 28: Requirements found in the activity Synchronization and Communication of Forecast at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
More synchronization and communication of forecasts between demand, supply, category team, and with the TPL-partner.	X	X	X	

The importance of synchronizing demand and forecasts is confirmed by Crum and Palmatier (2003), and Nguyen et al. (2022). The synchronization and communication of forecasts will be needed both internally and externally, which is the logistical consequence of this gap. To synchronize the forecast throughout the whole supply chain is supported by Croxton et al. (2002), since this can help balance demand and supply. Externally, Respondent I and H believe that communication with the TPL partner needs to be increased. 15-minute deliveries are heavily dependent on that the TPL-partner has capacity, why sharing the forecasts with the TPL-partner is important. Internally, more follow-ups between supply, demand, and category team will be needed. This to know how the suppliers are performing, and whether the forecasts are as expected or need to be adjusted. Synchronizing and communicating the forecasts both within The Company, with TPL partner, and suppliers will help The Company to be more proactive to expected demand, and reactive to unexpected demand (Croxton et al., 2002). Furthermore, advantages such as improved quality of decision-making has been given when synchronizing forecasts in the supply chain (Ávila et al., 2019). Hence, the logistical consequence will be to increase the communication and synchronization of forecast both internally and externally. In Table 29 below is gap and logistical consequence summarized.

Table 29: Gap and logistical consequence of the requirement of more synchronization.

Gap	Logistical consequence
The Company does not synchronize and communicate all forecasts enough between the different logistical teams.	5. Increase synchronization and communication of all forecasts between the demand, supply, category team and with TPL-partner.

7.5 Measure Performance

In the following section is the current activity Measure Performance at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

Current Activity

Respondent H mentions three key performance indicators that the demand team uses; channel availability, days of supply, and forecast accuracy. According to Respondent H, these measurements are not something that they actively follow up on. It is on pure interest of the employee to follow up on the different indicators. Respondent H mentions that the biggest impact on the forecasts' performance are the suppliers. It is often due to constraints at the suppliers' end that the forecasts are not followed, where the supplier cannot deliver accordingly with the forecasts. Another reason for forecasts not performing is, according to Respondent H, the characteristics of new products. The forecasts for new products are mainly based on estimations in most cases, certainly if the new product is unlike any other product in range. Presented in Figure 40 below is the current activity Measure Performance summarized.

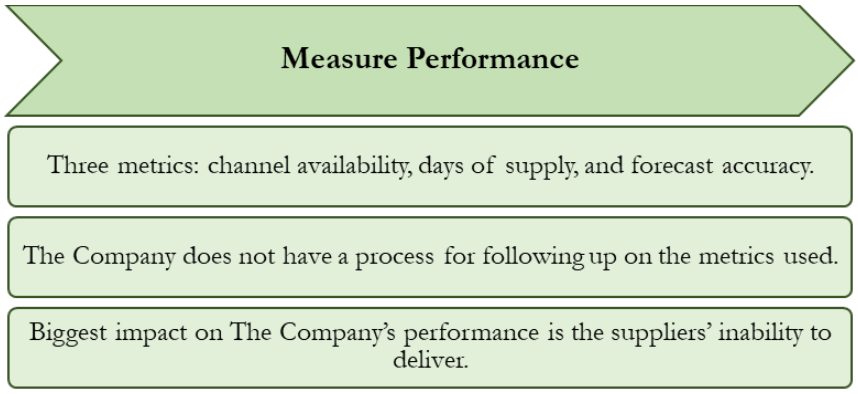

Figure 40: The current activity Measure Performance at The Company

Identified Gaps and Logistical Consequences

Respondent H believes that the current measurements channel availability, days of supply, and forecast accuracy still will be of relevance. Additionally, Respondent H mentions delivery accuracy as a measurement relevant to add. This is to be able to measure how many customers that received their order within 15 minutes. Respondent H thinks that all scenarios would require the same measurements. Presented in Table 30 below is the identified requirement in the activity Performance summarized, where the tick represents if it is required in the specific scenario.

Table 30: Requirement found in the activity Measure Performance at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Add delivery accuracy as a measurement to evaluate the performance of 15-minute deliveries.	X	X	X	X

Delivery accuracy is defined as delivering the right quantity, in the right time and with the right quality (Oskarsson et al., 2013). The logistical consequence is therefore to measure delivery accuracy to evaluate the performance of 15-minute deliveries. According to Crum and Palmatier (2003), it is important to identify relevant measurements to keep supply and demand balanced. Whereas delivery accuracy could be seen as a measurement of how good the forecast is performing, and how well the suppliers and TPL-partners are performing. However, Larke et al. (2018) mentions that finding relevant and valid measurements is a challenge for many companies. In Table 31 below is the gap and logistical consequence summarized.

Table 31: Gap and logistical consequence of the requirement of adding delivery accuracy as measurement.

Gap	**Logistical consequence**
The Company does not have delivery accuracy as a measurement today.	6. Measure delivery accuracy to evaluate the performance of 15-minute deliveries.

Furthermore, Respondent H believes that more follow-ups will be important to see if the goals of 15-minute deliveries that have been set are met and thus an implication of how well the forecasts were performed. Respondent H means that the importance of monitoring the measurements increases compared to today, since The Company needs to keep track of how well it is performing in comparison with the company's set goals. The importance of following up on measurements were mentioned as equally important in all four scenarios. In Table 32 below is the identified requirement in the activity Measure Performance summarized, where the tick represents if it is required in the specific scenario.

Table 32: Requirement found in the activity Measure Performance at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Follow up on measurements used at The Company.	X	X	X	X

Therefore, the logistical consequence is to set up a process of following up on measurements at The Company. To measure and follow up the performance of the process is important, since that can visualize the problems of when demand are not in synchronization with supply (Crum and Palmatier, 2003). Evaluating the measurements used in a company is also important to be able to develop and improve the processes (Ávila et al., 2019). Evaluating the measurements could also be a way of controlling that the suppliers are delivering accordingly with the forecasts, since that was mentioned as one of the factors that affects the forecasts performance. Presented in Table 33 below is the gap and logistical consequence summarized.

Table 33: Gap and logistical consequence of the requirement of following up on measurements.

Gap	**Logistical consequence**
The Company does not evaluate or follow up on set measurements today.	7. Set up a process to follow up on determined measurements to improve the performance of The Company.

7.6 Summary of Gaps and Logistical Consequences

Seven gaps and consequences have been identified in the demand management process. Specifically, two consequences were found in each of the Forecast and Measure Performance activities, while the remaining activities had one consequence each. The consequences primarily highlight the systems used at The Company, while also emphasizing the significance of communication and workforce. Remarkably, the gaps are more noticeable when dealing with a larger area like scenario 1, but they

decrease when focusing on a smaller geographical area. This pattern is evident for most logistical consequences in the demand management process.

8 The Order Fulfilment Process at The Company

In the following chapter, research question three will be answered by presenting the empirical collection of the identified order fulfilment process and its activities at The Company. Following, the empirical collection of what is required from order fulfilment process in the designed scenarios is presented. Once the requirement from the process is presented, the gaps and logistical consequences will be identified and presented. The order fulfilment process and its activities defined in this study is presented in Figure 41 *below.*

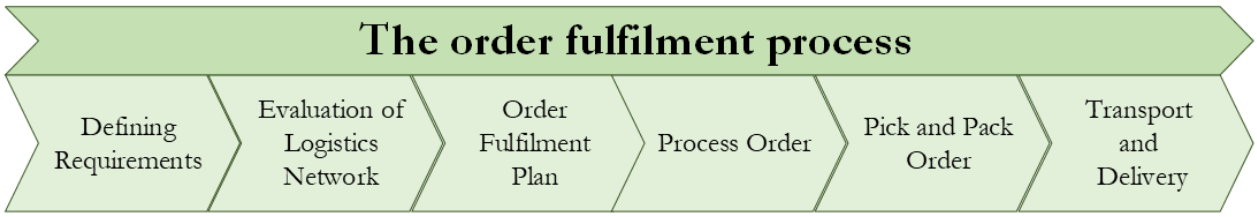

Figure 41: The order fulfilment process defined in this study.

8.1 Defining Requirements

In the following section is the current activity Defining Requirements at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

The Current Activity

Respondent A, C and E highlight that customers want rapid deliveries. Hence, the process at The Company has been developed in line with the logistics vision and customer requirements to provide rapid deliveries, where the desired delivery time of 15 minutes is set first. Therefore, this has been the foundation for The Company when determining further requirements of the order fulfilment process.

When the logistics vision was developed, Respondent E explains there was a bigger focus on delivering to customers within 15 minutes. The focus has now shifted towards being more flexible since deliveries within 15 minutes is hard to achieve according to Respondent E. Looking at a combination between where the stores and warehouses are located is an enabler for more rapid deliveries according to Respondent E. Further, Respondent E states that as an innovator The Company must look forward and not as much as where they are today regarding supply chain capabilities.

Even if the delivery times are mainly set based on customer requirements of rapid deliveries, they are also based on the TPL partner and its capacity and flexibility to provide rapid deliveries according to Respondent C and E. However, both Respondent C and E state The Company has some impact on the TPL due to the good partnership between the two of them. For instance, The Company can affect some delivery aspects such as the mode of transportation for the last mile deliveries of the TPL

partner. Presented in Figure 42 below is the current activity Defining Requirements at The Company summarized.

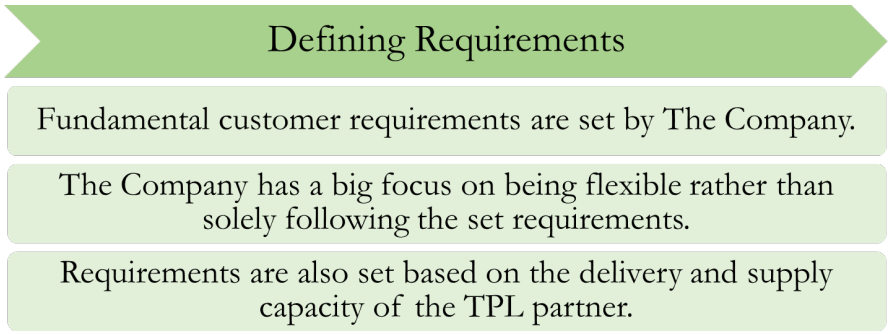

Figure 42: The current activity Defining Requirements at The Company.

Identified Gaps and Logistical Consequences

Independent of scenario, Respondent C still believes that the main customer requirement that The Company identifies is more rapid deliveries. According to Respondent E, this is providing deliveries within 15 minutes. Like today, but with a more significant focus on the requirement of delivery time. Thus, it shows that The Company needs to set delivery and customer requirements as the fundamental requirements when determining the order fulfilment process at The Company. Neither Respondent E nor Respondent C has mentioned any difference of relevance of the requirement between the scenarios. Presented Table 34 is the identified requirement in the activity Defining Requirements summarized, where the tick represents if it is required in the specific scenario.

Table 34: Requirements found in the activity Defining Requirements at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Set delivery and customer requirements as the fundamental requirements.	X	X	X	X

As a result of above mentioned, the gap has been identified that The Company does not follow the set customer and delivery requirements through all remaining activities in the order fulfilment process. Thus, it results in the logistical consequence of reviewing the supply and delivery capacity at The Company and its TPL partner. By reviewing the supply and delivery capacity, the company can match the capacity to the customer requirements and ensure that the set customer requirements can be compiled through all activities of the order fulfilment process. Logistical service partners and suppliers, such as the TPL partner, could come and play an important role in developing necessary capabilities and new omnichannel solutions (Kembor et al., 2018, Ishfaq et al., 2016). Having a good partnership with the TPL partner is something The Company has stated as a strategy and thus could be further important creating new omnichannel solutions such as the local inventory points.

Evidently, the current delivery capacity and delivery speed of the TPL partner are quite good since both same day and next day deliveries can partly be fulfilled from central warehouse to customers. However, the deliver capacity could still be improved since 15-minute deliveries are not fulfilled. Foremost, this will be of importance regarding the replenishment of the local inventory points so that what customer wants are in stock at the specific local inventory point. In addition, Solem et al. (2023) states that it can be challenging to collaborate with essential partners, yet important to enhance the capability to collaborate with others. This will be of more importance in all replenishments and distribution flows to The Company to provide even more rapid deliveries together. Although it is important to have good collaboration with essential partners, and to continue developing it, it can take time to scale up the capacity of the TPL partner (Weber, 2021). Foremost regarding the distribution and replenishment flows, but also operating the local inventory points in practice. Because of this, it might be important for The Company to take this into consideration and have good patience when implementing the new local inventory points to achieve long-term success. In Table 35 below is the gap and logistical consequence summarized.

Table 35: Gap and logistical consequence of the requirement to set fundamental delivery and customer requirements.

Gap	Logistical consequence
The set requirement for the order fulfilment process is not followed through all remaining activities. This is because the current supply and delivery capacity does not match the set customer requirement.	8. Review the supply and delivery capacity to ensure that the set customer requirement can be complied through all activities in the order fulfilment process.

8.2 Evaluation of Logistics Network

In the following section is the current activity Evaluation of Logistics Network at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

The Current Activity

The location of warehouses is mainly determined based on demographical factors and where the population is dense according to Respondent E. Furthermore, Respondent E states that an analysis tool provided by the TPL partner helped identifying appropriate warehouse for distributing products to customers, based on the supply and delivery capacity to provide home deliveries from central and satellite warehouses. Continuously, The Company has the goal to provide home deliveries from all stores. According to both Respondent C and E, The Company has some impact on the alternative modes of transportation for last mile deliveries provided by the TPL.

Based on the warehouse structure determined, The Company review and determine the alternative mode of transportation possible. It is necessary for The Company to have delivery partners who have a high frequency in more dense areas or more local delivery partners at the last mile, according to Respondent E. Consequently, therefore The Company provide delivery options by both the TPL and a few other companies. Respondent C also mentions that the TPL partner they are using today has good coverage in areas that are more sparsely populated, which is one of the reasons why they are partners. Lastly, Respondent C explains that today The Company has determined to replenish the satellite warehouses and stores every day. Presented in Figure 43 below is the current activity Evaluation of Logistics Network at The Company summarized.

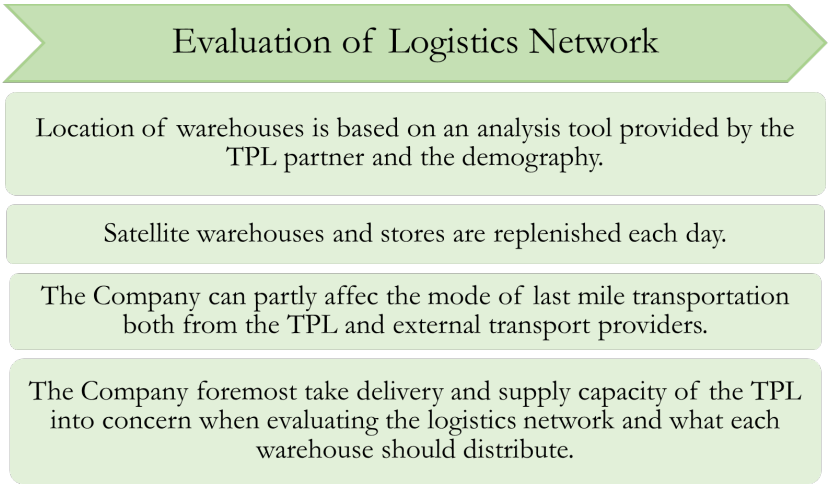

Figure 43: The current activity Evaluation of Logistics Network at The Company.

Identified Gaps and Logistical Consequences

Respondent C believes that the importance of SO99+ will be of great significance when offering 15-minute deliveries in all four scenarios. To achieve rapid deliveries through local inventory points, The Company should fully utilise the AI and machine learning capabilities offered by SO99+. Furthermore, SO99+ must handle replenishment to and from every warehouse which it cannot do today. The possibility of sending products between the different warehouses is an enabler for having lower inventory in the different warehouses. However, Respondent C mentions that smaller order quantities and higher frequency requires better planning from The Company. Presented in Table 36 below is the identified requirement in the activity Evaluation of Logistics Network summarized, where the tick represents if it is required in the specific scenario.

Table 36: Requirement found in the activity Evaluation of Logistics Network at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Configure SO99+ to replenish all warehouses and local inventory points.	X	X	X	X

Consequently, the first gap identified is that The Company does not know or utilise all possible functions and applications of its inventory management system, SO99+. As of today, SO99+ is not configured to handle replenishment to and from all warehouses and local inventory points, most likely since it was recently implemented, which is a prerequisite to realise all four scenarios. Lewis et al. (2014) highlight the fact that companies often fail to understand the importance of an integrated IT infrastructure. Utilising the technological resources The Company has is essential for integrating channels (Lewis et al., 2014). Therefore, it can be considered essential for The Company to have an integrated IT infrastructure to ease the use of the system, especially when integrating the new local inventory points. By that enable replenishment of all warehouses and local inventory points from any of the warehouses and increase the possibility to deliver within 15 minutes from the local inventory points.

Hence, the logistical consequence of this gap is for The Company to evaluate the possible functions of SO99+ and utilise those necessary to supply all warehouses and local inventory points to enable 15-minute deliveries. Since the strategy is to replenish the local inventory points foremost by the stores, SO99+ will be an important tool to forecast and calculate the inventory levels of the stores. If SO99+ is not fully configurated it can affect the possibility to automize the forecast and calculations. As a result, it may imply that a greater portion of the tasks performed by SO99+ would have to be carried out manually, which would require a lot of time and workforce in all replenishment flows having approximately 8 000 local inventory points in scenario 1. Presented in Table 37 below is the gap and logistical consequence summarized.

Table 37: Gap and logistical consequence of the requirement to configurate SO99+ more.

Gap	**Logistical consequence**
Today, SO99+ is not fully configurated to handle replenishment of all warehouses and local inventory points.	9. Evaluate possible functions of SO99+ and increase the use of the inventory management system by configure necessary functions, such as replenishment between all warehouses and local inventory points.

Evaluation of the logistics network also includes deciding the mode of transportation for last mile deliveries, which is a subject that Respondent C highlights when talking about the different scenarios. In all scenarios, the requirement for more local transportation services is mentioned by Respondent C as a way of operating the logistics vision effectively, such as different partners and modes of last mile transportation. For instance, having a bicycle courier. The possibility of using more local transportation alternatives also increases when covering a densely populated city, as in scenario 4. Meanwhile, in scenario 3, the possibility to use local transportation decreases since it is a bigger geographical area to cover and less densely populated. Respondent C mentions that there is system support on the market for offering several transport services, this is something that Respondent C means is required to handle the transportation in the scenarios. Presented in Table 38 below is the

identified requirement in the activity Evaluation of Logistics Network summarized, where the tick represents if it is required in the specific scenario.

Table 38: Requirement found in the activity Evaluation of Logistics Network at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Use local transportation services for last mile deliveries, such as from or to replenish the local inventory points.	X	X	X	X

The gap found is that The Company is using too few external transportation partners. To be able to replenish all different warehouses, and especially the local inventory points, the requirement is to use more local transport services. Using several local transport services might also be a way of hedging towards capacity constraints at the TPL partner. According to a study made by Weber (2021), companies have expressed capacity constraints of their TPL partners which have prevented them from scaling up their operations to meet increased customer demand. Thereby, the logistical consequence is to increase the number of local transportation services that The Company uses. However, increasing the number of local transport services does not only come with possibilities. It could imply a challenge to integrate the local TPL providers into the systems used by The Company, such as SO99+. Therefore, it may lead to an even more complex IT infrastructure. Presented in Table 39 below is the gap and logistical consequence summarized.

Table 39: Gap and logistical consequence of the requirement to use more local transport services.

Gap	**Logistical consequence**
The Company uses too few external transportation services for last mile deliveries.	10. Increase the number of local transportation services for last mile deliveries, foremost in terms of more local actors.

8.3 Order Fulfilment Plan

In the following section is the current activity Order Fulfilment Plan at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

The Current Activity

The overall order fulfilment process, described by Respondent F, is as follows; the order is generated into an order processing system, OPT, and further sent to other systems, such as Siebel, Colt and SAP. The systems configurate where the product should be sent from. Then, the product is picked and packed by the TPL partner. Lastly, the picked and packed product is sent from the warehouse to the customer by the chosen delivery option. According to Respondent F and G, this process is the same for all omnichannel options. It mainly differs in BM retailing, where the supporting systems in the stores differ and the system called Duco is used.

The Company has decided to outsource the operative parts of the order fulfilment process to the TPL partner. The TPL partner provides The Company with the replenishment of products and their inventory in all warehouses. All respondents explain that the strategy for inventory management and safety stock is to use automated systems, such as AI and machine learning by using SO99+. Presented in Figure 44 below is the current activity Order Fulfilment Plan at The Company summarized.

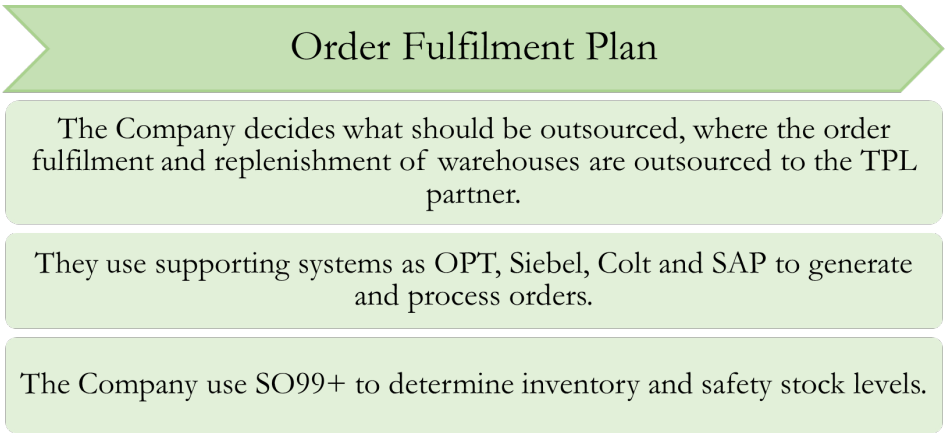

Figure 44: The current activity Order Fulfilment Plan at The Company.

Identified Gaps and Logistical Consequences

According to Respondent G, many functions in the systems used are not fully integrated, which they believe is a consequence of implementing new systems, processes, and routines without fully running them beforehand. Therefore, Respondent G believes this could be partly avoided by having better coordination and integration between the different parts of the company. Especially making operational people part of the strategic work, this is because they know how to work with the systems and processes set. However, Respondent F does not think any new systems need to be implemented when implementing the local inventory points. However, Respondent F believes that simplified processes, in terms of less steps and manual handling, are required in all activities and all services performed to obtain an automized order flow when providing deliveries within 15 minutes. Presented in Table 40 below is the identified requirement in the activity Order Fulfilment Plan summarized, where the tick represents if it is required in the specific scenario.

Table 40: Requirement found in the activity Order Fulfilment Plan at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Better coordination between the employees in the supply chain development team.	X	X	X	X

A gap has been identified that The Company today implement new systems without full acknowledgement from the operational teams, including demand management such as order fulfilment and strategical supply chain developers. This is in line with Croxton et al. (2001) who have noted that integration between the different supply chain processes has become more important. However, Respondent G believes new systems and processes are not tested enough before implementing them. This could potentially affect the flexibility of the company, having to handle problems and challenges along the way, which could have been avoided by including more operational functions in decision making. For instance, determining what system functions are most necessary to have and how to operate them.

Hence, the logistical consequence implies The Company to include more employees and different logistical functions in decision making, such as what configurations of SO99+ that shall be done, and how and in what order. This is confirmed by both Croxton (2003) and Ávila et al. (2019) who state that to create a suitable order fulfilment plan, the team needs to interact with both the demand management team and other operational order fulfilment activities. Further, this will potentially lead to better testing before the implementation of new systems and processes. Which consequently could decrease the problems and challenges arising when implemented. The ability to interact and collaborate with other business functions is therefore important (Solem et al., 2023). Presented in Table 41 below is the gap and logistical consequence summarized.

Table 41: Gap and logistical consequence of the requirement to include operational employees in decision making.

Gap	**Logistical consequence**
The Company implements systems and working processes without full involvement from the operational teams and their perspectives.	11. Include operational employees from all logistical functions in decision-making regarding logistics and supply chain development.

8.4 Process Order

In the following section is the current activity Process Order at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

Current Activity

Firstly, when it comes to online orders the order is created in a specific system provided by The Company. The order is then sent to OPT, an order processing tool, where the order is created. OPT collects all the information regarding the order placed. OPT then sends the order to a system called Siebel, a customer relationship management system, with the chosen mode of delivery by the customer. Siebel creates the actual order and gathers all information from all systems previously used. The information about what is sent to who and where is then sent from Siebel to a system called Colt, a digital infrastructure system. Colt has information about the order status, and product availability in the warehouses and presents all the order information in a unified way among all. Once the stock levels of the warehouses are reviewed, Colt configures where the product should be sent from by sending all information to SAP, a customer relationship management tool. SAP sends information to Astro, a system used in the warehouses by the TPL partner, on what to pick and pack. Lastly, when all this is done, the package number and other necessary delivery information are sent back to Colt. Once the order is delivered, Colt sends the information back to the internal system and Siebel, which will present the order as delivered. The system used in stores is called Duco and differs from the internal system being used when handling online orders. Duco can for example be used if shipping from stores is available. Different systems can be used in offline and online channels, which is why the information from all systems used is gathered in Colt and SAP according to Respondent G. Presented in Figure 45 below is an overview of the systems used to generate and process an order, and their interaction with each other.

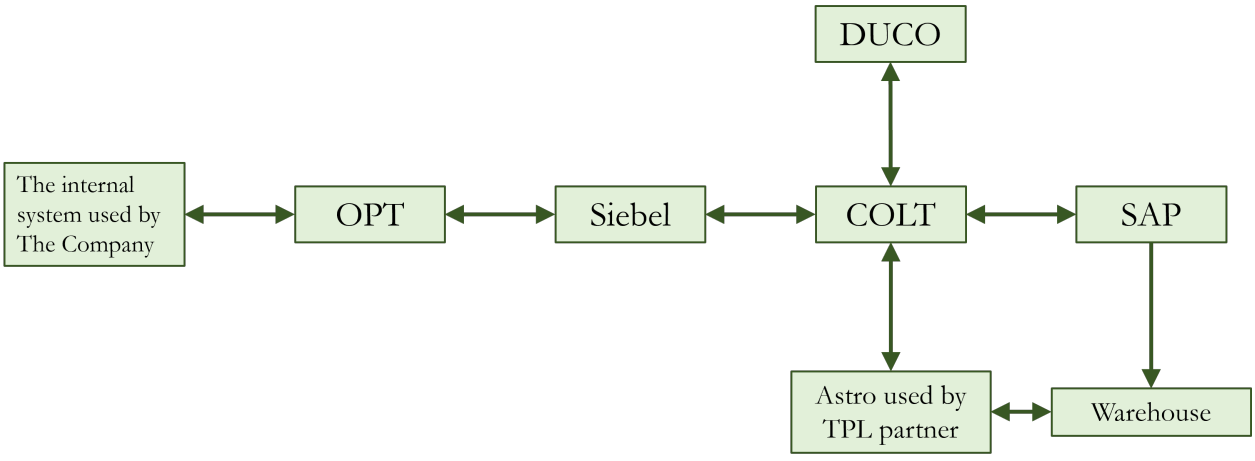

Figure 45: Overview of the system flow when processing an order at The Company.

These systems are mainly used to send information regarding the order and customer. However, Respondent F explains that all information sent between the systems is quite the same. What differs is the main purpose of each system. In addition to these systems, more operational systems, for instance, SO99+, are used to handle inventory and more. The systems used are divided into four categories by The Company: *Customer, Sales Channel, Logistical Functional Layer* and *Backend System.* These four categories, the systems included in each category and what kind of information each system mainly handles is presented in Figure 46 below.

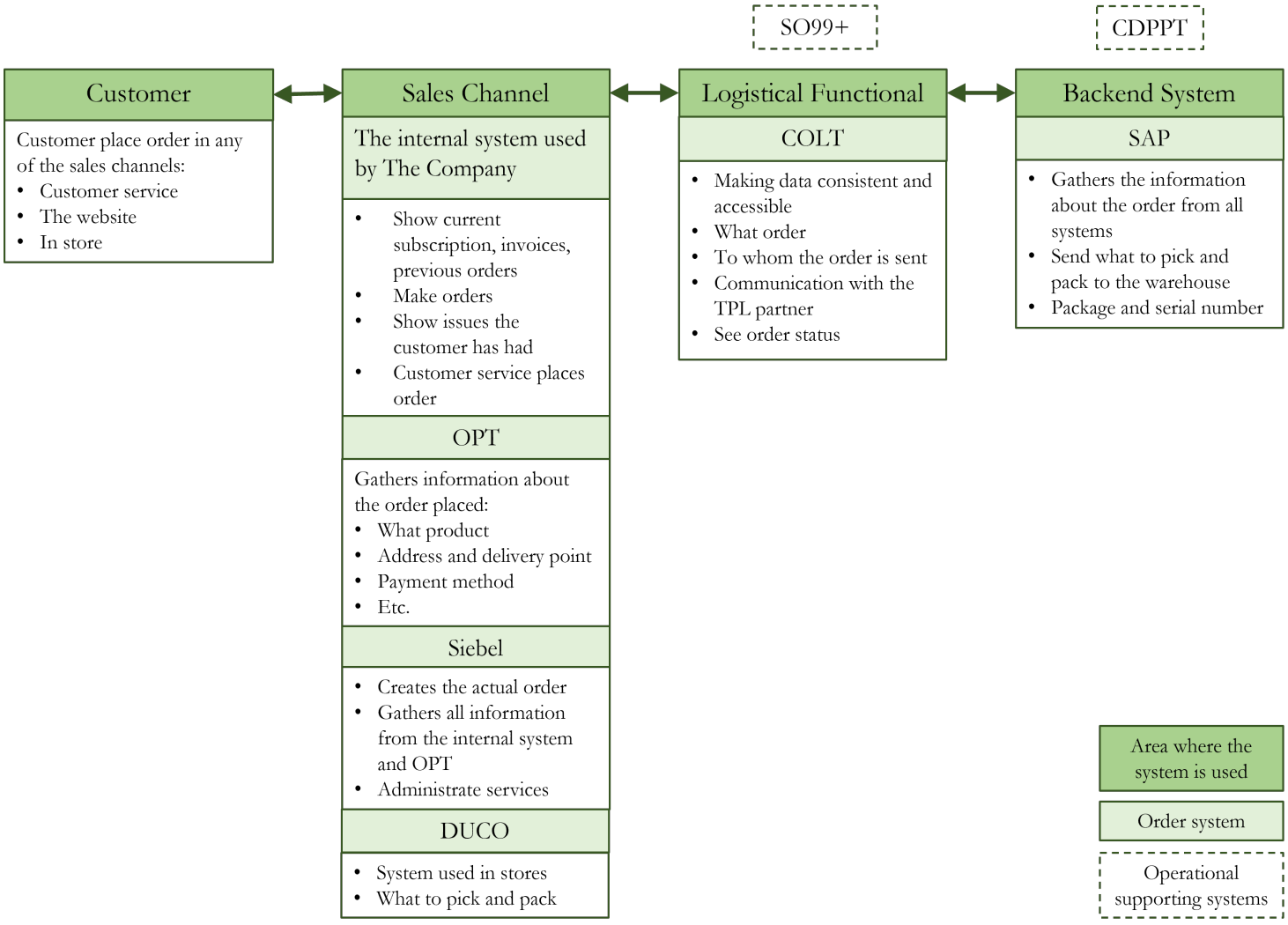

Figure 46: Systems used to process an order at The Company.

Correcting problems with an order are handled manually according to Respondent G. The customer is often contacted about a delay in their order, otherwise, the order can be replaced. However, for instance, if the product is available at a satellite warehouse, the product must be sent back to the central warehouse first before being sent to the customer. In other words, the product cannot be sent directly from the satellite warehouse then. Presented in Figure 47 below is the current activity Process Order at The Company summarized.

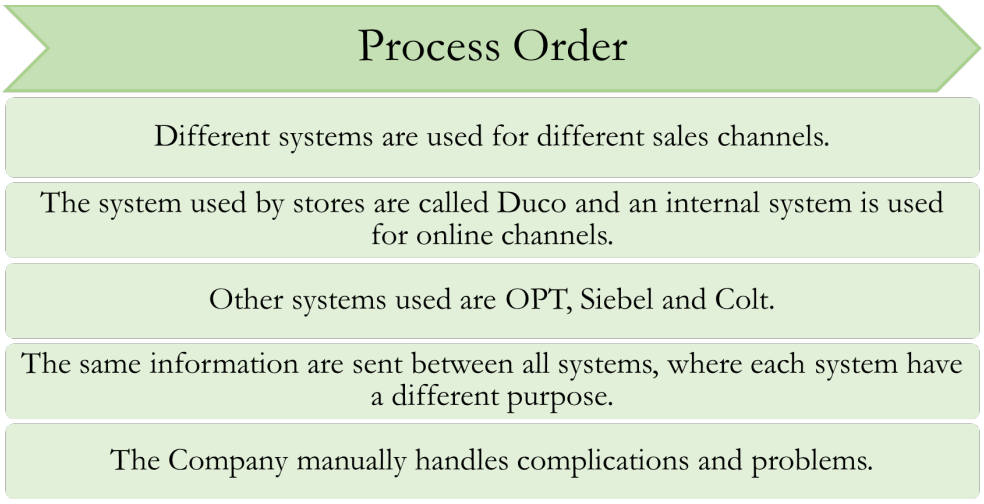

Figure 47: The current activity Process Order at The Company.

Identified Gaps and Logistical Consequences

As explained in the previous section, The Company uses many systems to process an order today in all distribution flows. Respondent G states that it is important that the information must be correct from the beginning in the systems used by The Company to avoid following complications. Since The Company uses different systems depending on omnichannel, Respondent G believes too many systems are being used. Respondent G further believes this leads to inefficient work. Respondent F, on the other hand, believes that the systems used, such as Colt and Siebel, will be required and could manage deliveries within 15 minutes in all scenarios. The problem is that the systems require more functions and configuration. For instance, the possibility of Colt giving the alternative to send an order from any warehouse, which is assumed in the designed scenarios. Despite, both Respondent C, F and G further state it is required to have more configurations in Colt to provide deliveries within 15 minutes. In addition, Respondent F explains that it can be complicated to get an overview of the order in some of the systems, which does not make some of the systems user-friendly.

Furthermore, Respondent F believes that the processing of an order must become less complex, in terms of manual handling and activity steps. Respondent F believes that to handle all four scenarios, the order flows must be more computerized with less manual processing and fewer steps.

Moreover, Respondent F thinks many temporary solutions may arise if the processing of an order and the systems used are not fully thought through for all warehouses, local inventory points, distribution- and replenishment flows, which could lead to more systems being used than necessary. However, both Respondent F and G believe it could be required, or at least preferable, if online and offline orders were processed in the same system. For instance, having both kinds of orders handled by the internal system is used instead of using Duco in stores. Lastly, neither of the respondents stated any significant difference between the four scenarios. The requirements and problems would still be the same independent of scenario. Presented in Table 42 below is the identified requirement in the activity Process Order summarized, where the tick represents if it is required in the specific scenario.

Table 42: Requirement found in the activity Process Order at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Have an order processing system that can send a customer order from any warehouse.	X	X	X	X

Consequently, the first gap identified in the activity Process Order is that The Company does not have fully configurated systems, such as the possibility for Colt to send a customer order from any of the warehouses. Furthermore, configurations refer to the functionalities obtained by the systems currently used by The Company, where more configurations indicate that all functionalities are not currently used or available to use. Consequently, this leads to a lot of manual handling that takes time. For instance, if the product is available in a satellite warehouse but not in the central warehouse. According to Kembor et al. (2018), it is an important ability to have developed and implemented integrated software systems, which The Company not fully has done. Hence, the complexity of an omnichannel requires more knowledge regarding data and technology (Larke et al., 2018, Lewis et al., 2014, Neslin et al., 2006).

Respondents C, F and G all mention the ability of Colt to send products between all warehouses and customers. Hence, it can be considered an important configuration to implement prior. Configuring the systems more may therefore lead to less complex order processing, which Respondent G mentions as a problem. Although it is essential to acquire new technological solutions, it can also be a hindrance if The Company does not fully understand the importance of creating an IT infrastructure at The Company that supports the integration of the new local inventory points (Lewis et al., 2014). Presented in Table 43 below is the gap and logistical consequence summarized.

Table 43: Gap and logistical consequence of the requirement to configurate the order processing systems with more functionalities.

Gap	**Logistical consequence**
The Company does not have fully configurated order processing systems with a lot of manual processing and restrictions.	12. Configure necessary functionalities in the order processing systems used, such as sending a customer order from any warehouse in Colt.

Secondly, Respondent G thinks one of the problems in processing order is the ambiguities in who is responsible for what and that everyone is not fully informed and included in the decisions taken. In addition, Respondent H mentions that it is unclear when the supply team will take over from the demand management team. Furthermore, it may be required to clarify what each employee is responsible for, regardless of the scenario to ease the handling of deliveries within 15 minutes. Presented in Table 44 below is the identified requirement in the activity Process Order summarized, where the tick represents if it is required in the specific scenario.

Table 44: Requirement found in the activity Process Order at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Have clear work assignments for each employee within the logistics department.	X	X	X	X

Therefore, the gap identified is that the employees within the logistics department do not fully know who is responsible for what work assignment. Lewis et al. (2014) mention that it can be especially problematic to ensure that all employees have the right competencies and understand the purpose when integrating new channels, which is the case in all four scenarios with the new local inventory points. Thus, it is essential to clarify what each employee does in all scenarios when processing an order so that The Company has the right competencies for each task and that all employees know the purpose of their tasks. Consequently, the logistical consequence is that The Company needs to set more clear and distinct activities and work assignments for each employee within the logistics department, so they know the purpose of implementing the new channel and their work assignments. Thus, it will result in more efficient work for all employees and enable better coordination, integration, and synchronization of the different logistics departments. Since a new channel will be implemented in all four scenarios it will be equally important in all four scenarios to set more distinct activities and work assignments. Presented in Table 45 below is the requirement, gap, and logistical consequence summarized.

Table 45: Gap and logistical consequence of the requirement to set more distinct work assignments of each employee.

Gap	**Logistical consequence**
The employees within the logistics department do not fully know who is responsible for what work assignment.	13. Set more clear and distinct activities and work assignments of each employee within the logistics department.

8.5 Pick and Pack Order

In the following section is the current activity Pick and Pack Order at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

Current Activity

The picking and packing of orders are today done by the TPL partner at the central warehouse and satellite warehouses, whereas The Company picks and packs orders in selected stores where ship from store is provided. Who is responsible for the picking and packing at each warehousing level is presented in Figure 48 below.

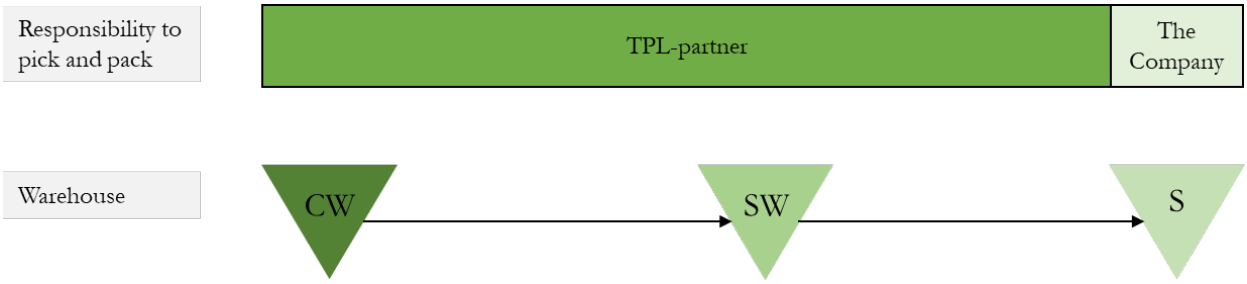

Figure 48: Responsibilities for picking and packing at the different warehouses.

Respondent G describes that the incoming order is received in the IT-system Astro at the TPL partner. The information collected in Astro is regarding what product to pick and the customer specific details for packing. Respondent G explains that the TPL partner is using an automatised robot called Autostore to pick products in the central warehouse. The picking only takes a few minutes due to the automatised picking process at the central warehouse. The picking is done order by order, where the robot picks one whole order at a time. Respondent G says that it sometimes occurs that the picking process is done manually and thereby takes longer. When the order is picked, the products included in the order are packed and ready for delivery. Respondent G states that The Company does not have any set requirements for how an order should be picked and packed. Presented in Figure 49 below is the current activity Defining Requirements at The Company summarized.

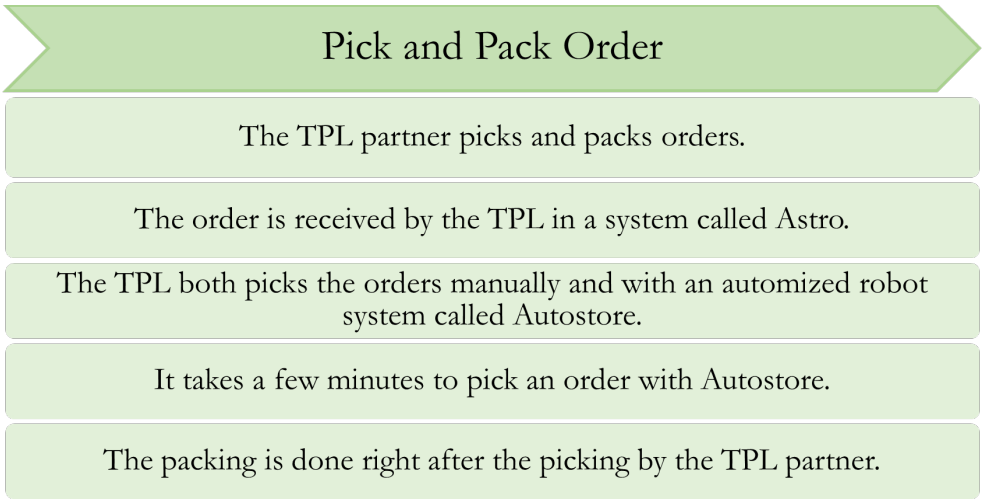

Figure 49: The current activity Pick and Pack Order at The Company.

Identified Gaps and Logistical Consequences

Respondent G does not believe that picking and packing need to change to handle 15-minute deliveries in all scenarios. Mainly this is since the TPL partner is already using a fast automatised picking process that only takes a few minutes per order. However, Respondent G believes that picking and packing must be done at the stores to handle distribution to all local inventory points in the designed scenarios. Respondent G states that the picking and packing at the stores will require incentives for the staff to operate that, such as bonuses and economic compensation. Presented in Table 46 below is the identified requirement in the activity Pick and Pack Order summarized, where the tick represents if it is required in the specific scenario.

Table 46: Requirement found in the activity Pick and Pack Order at The Company.

Requirement	**Scenario 1:** Sweden	**Scenario 2:** County with SW	**Scenario 3:** County without SW	**Scenario 4:** Big city
Pick and pack at the stores to mainly replenish the local inventory points.	X	X	X	X

The gap identified in the Pick and Pack order activity is that no packing and picking is done at the stores today. The Company has started to implement ship from store in some selected stores and areas. However, this implies that the stores pick and pack for home delivery, not for replenishment of a new kind of warehouse and distribution point. Larke et al. (2018) confirms that it can be challenging handling inventory when adding a new online channel. Further, Larke et al. (2018) mention that it could lead to increased inventory costs, something Respondent G sees as very problematic at the local inventory points. It could be problematic in the stores as well. Further, Ishfaq and Raja (2018) states that stores are getting a bigger role in the fulfilment, which is why it is important to consider how to pick and pack and set up a process how to do this. This will be important to replenish the local

inventory points. Having stores as a fulfilment strategy is something Buldeo Rai et al. (2019) further state is easier when expanding geographically. Hence, it will be important in all scenarios, but mostly when providing deliveries within 15 minutes in Sweden, to set up a process to pick and pack in stores, which will be the logistical consequence for The Company. This will both include the work routines as the workforce. For instance, The Company may need to hire more workforce or redistribute the current workforce. Presented in Table 47 below is the gap and logistical consequence summarized.

Table 47: Gap and logistical consequence of the requirement to pick and pack in the stores.

Gap	Logistical consequence
No replenishment from the stores is made by The Company today.	14. Set up a process and work routine to pick and pack in stores for replenishment of the local inventory points.

8.6 Transport and Delivery

In the following sections is the current Transport and Delivery at The Company presented. Once the current activity has been presented the required activity can be identified, based on the empirical findings. This results in a gap between how The Company currently works with the activity and what is required. Ultimately, this leads to the identification of logistical consequences for The Company to bridge the gap highlighted by the empirical findings, which will subsequently be presented.

Current Activity

Trucks departure from the central warehouse twice per day with customer orders, one late in the afternoon and one late at night. Respondent G describes that before departure, an initial sorting is done where packages going to the south and north of Sweden are separated. The initial sorting is done to save time at the different distribution points that the TPL partner has.

Respondent G described that the central warehouse is responsible for both replenishment of the satellite warehouses and stores. According to Respondent G, the satellite warehouses are not used as much as they could. Trucks for replenishment of the stores is sent five to six times a week from the central warehouse. Presented in Figure 50 below is the current activity Transport and Delivery at The Company summarized.

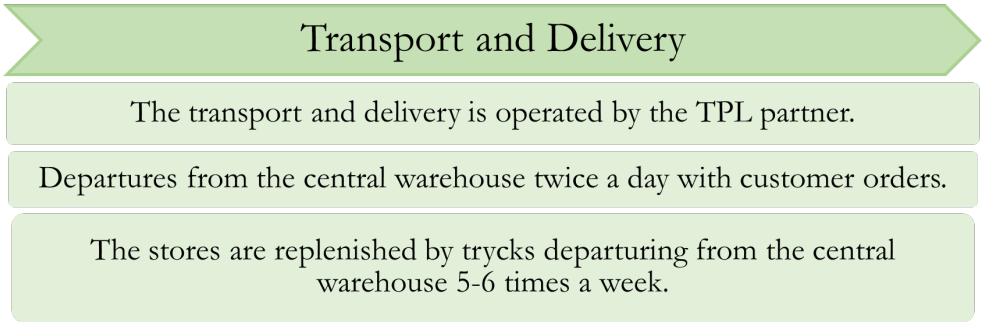

Figure 50: The current activity Transport and Delivery at The Company.

Identified Gaps and Logistical Consequences

According to Respondent G, it is not required to have more frequent deliveries from the warehouses to manage 15-minute deliveries. However, having smaller order quantities and more frequent replenishment is already stated as necessary in the designed scenarios in chapter 6. The Designed Scenarios. This since SO99+ would still be responsible for calculating the warehouse levels, and Respondent G does not believe that more departures than they have today would be suggested by SO99+. However, Respondent G believes that bigger trucks would be needed in all four scenarios to handle the transportation and replenishment from the central warehouse to the satellite warehouses and stores. Furthermore, Respondent G believes that delivering and filling the local inventory points would require a lot of manual handling and time, which in turn requires more workforce and capacity to manage that. However, in the designed scenarios, small order quantities with more frequent deliveries have been implemented. Therefore, the statement made by Respondent G regarding the need for larger trucks because of fewer departures is contradictory. As a result, the Transportation and Delivery activity follows the established scenario, and no logistical consequences have therefore been found.

8.7 Summary of Gaps and Logistical Consequences

A comprehensive analysis of the activities in the order fulfilment has revealed the findings of seven significant gaps, and thus seven logistical consequences has been identified. In all activities, except for the Evaluation of Logistics Network and Process Order, one logistical consequence was identified, whereas two logistical consequences were identified in those two activities. No logistical consequence within the scope of this study was identified in the activity Transport and Delivery.

The activities primarily revolve around operational and system-related aspects within the order fulfilment process. The logistical consequences are largely associated with increasing capacity in terms of supply, systems, and transport services. These findings indicate the need for increased resources and improved efficiency to address the challenges posed by the different scenarios. In addition, it will require continued collaboration with the TPL-partner. Interestingly, there is no discernible pattern between the scenarios and the logistical consequences identified in the activities. Some of the logistical consequences show a greater demand for resources in scenario 1 compared to scenario 4, while the reverse is true for other activities. This suggest that the consequences are dependent on scenario and necessitate tailored approaches. In conclusion, the characteristics of the logistical consequences emphasizes the importance of strategic planning and resource allocation to ensure smooth operations and good performance in various scenarios.

9 Synthesis of Logistical Consequences

The following sections aim to answer research question 4, where a compilation and synthesis of the logistical consequences found in the demand management- and order fulfilment process is presented. Firstly, a categorization of the different logistical consequences is presented followed by a relative assessment of the found gaps and logistical consequences.

In chapter 7 and 0, fourteen logistical consequences have been found in the demand management- and order fulfilment process when realising the 15-minute logistics vision. The type of logistical consequences does not differ much between the four scenarios investigated throughout the study. However, it is the scale of the logistical consequences that differ between the scenarios. Furthermore, many of the logistical consequences have shown to be system-related, strategic, and operational. The system-related logistical consequences foremost relate to the systems used or required to use by The Company. The strategic logistical consequences on the other hand primarily relate to strategical long-term improvements that can give the right prerequisite to handle the daily operational work in all four scenarios. In contrast to the strategical logistical consequences, the operational consequences foremost relate to the operational parts and thus the physical flows of The Company. In the following chapters, a more detailed description of the characteristics of the logistical consequences and the differences between the scenarios will be presented. All logistical consequences that were identified applies to the designed logistical system presented in Figure 51 below.

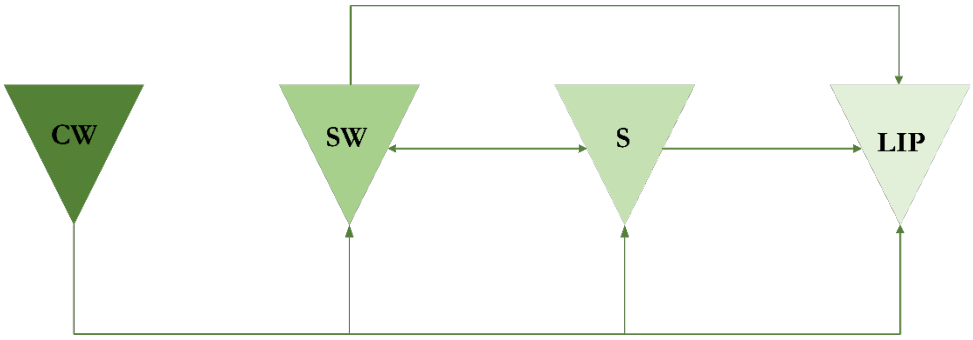

Figure 51: The designed logistical system for The Company which all logistical consequences apply to.

9.1 Categorization of Logistical Consequences

According to Croxton et al. (2001) integration between supply chain processes has become more important, where the demand management process and order fulfilment process cross-functionally interface with each other. This is something noted in this study as well, where there foremost is an interface that many of the logistical consequences found address the same problem from different points of view in the processes. Hence, some of the consequences affect each other and thus the processes affect each other. As a result, three main categories of logistical consequences were identified: *system-related, strategic, and operational.* These three categories can be seen as areas to improve for enabling 15-minute deliveries for The Company. In Figure 52 below is the complete set of all 14

logistical consequences presented, which have been clustered into the three main categories identified. In Figure 52, all categories include logistical consequences from both supply chain processes, thus it indicates that the two processes interface with each other and address similar areas, gaps, and logistical consequences. Thus, integration between the two processes is important.

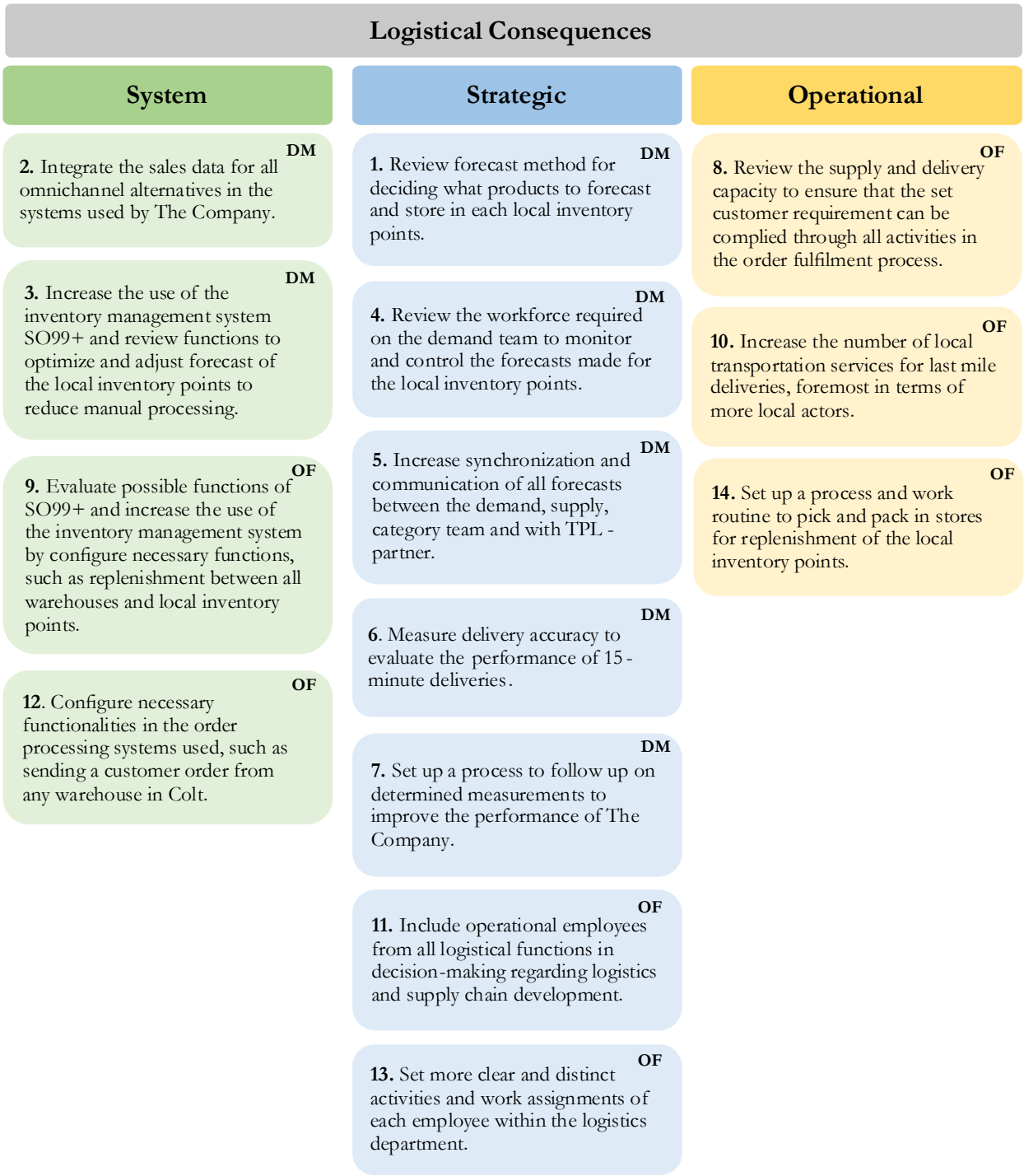

Figure 52: Categorization of all logistical consequences made in this study, DM=Demand Management process, OF=Order Fulfilment process.

System

The *system-related* logistical consequences are presented in Figure 53, mostly related to the use of different IT systems, both in operational activities and when processing an order. For instance, both processes address the need to increase the use of SO99+ and configurate it to handle both forecasting and inventory of the local inventory points (no. 3 and no. 9). Thus, both processes indicate on the importance of well-functioning IT-systems which can help improve both forecasting and inventory management. Hence, the processes interface with each other since they both address the same problem but require different specific functions in the systems. Consequently, it is important regardless of process.

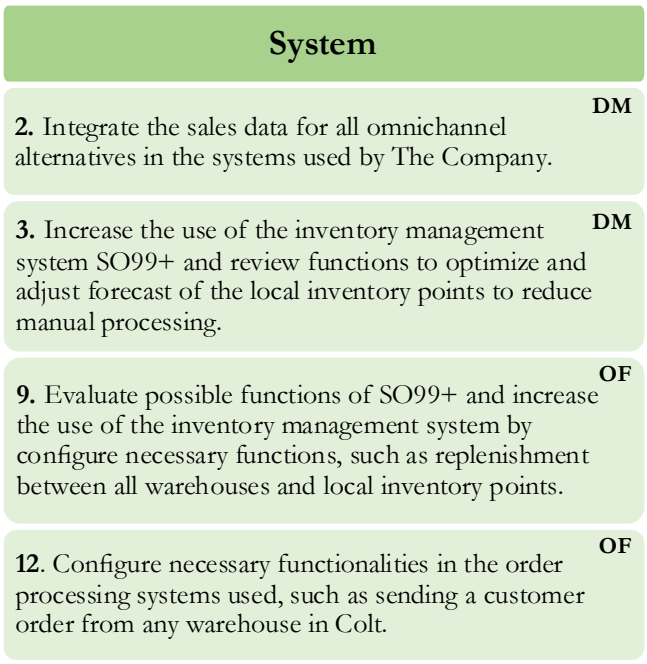

Figure 53: The system-related logistical consequences. DM=Demand Management process, OF=Order Fulfilment process.

Furthermore, implementing more configurations, for instance being able to send products between any of the warehouses or local inventory points in Colt (no. 12), is very similar to the two logistical consequences mentioned above (no. 3 and 9). In contrast, these configurations focus more on the order processing systems (Colt, Duco, Siebel and OPT), than the operational systems handling forecast and inventory directly. However, these systems interact with each other and once again it is therefore shown that the processes interface with each other and address the same logistical consequences. However, they also might affect each other in terms of having to address one logistical consequence to facilitate for another logistical consequence. For instance, The Company might need to start focusing on forecasting and inventory systems (no. 3 and 9) to even make it possible to configurate necessary functionalities in the order processing systems, such as sending an order from any warehouse (no. 12).

Moreover, to integrate the sales data for all omnichannel alternatives (no. 2) require that the systems used have the right functions to do this to give accurate forecasts without manual processing (no. 3). Further, this could be enabled by not only increase the use of SO99+ when forecasting, but also evaluate what functions that are possible and configurate the necessary ones (no. 9), such as being able to integrate the sales data for all omnichannel alternatives in the systems used (no. 2). Thus, the three logistical consequences have a connection and addressing one could enable the other two.

In other words, the conclusion can be drawn that The Company needs to oversee the IT-systems used to handle deliveries within 15 minutes. Often, many companies fail to fully understand the importance of an integrated IT-infrastructure (Lewis et al., 2014). Yet, it can take a long time building an integrated and well-functioning IT-infrastructure (Larke et al., 2018), which is why it is importance for The

Company to focus on. In addition, Solem et al. (2023) states that to succeed with omnichannel retailing it is important to have developed and integrated IT-systems as well as good integration and collaboration between different business functions which further emphasize that it is important.

Strategic

The *strategic* logistical consequences, presented in Figure 54, mostly focus on what is needed to ensure that The Company has the right prerequisites in terms of work capacity and work assignments to forecast and provide deliveries within 15 minutes. The strategic logistical consequences arise from both supply chain processes, thus once again showing that the processes cross-functionally interface with each other, addressing similar gaps and logistical consequences.

Strategic	
1. Review forecast method for deciding what products to forecast and store in each local inventory points.	DM
4. Review the workforce required on the demand team to monitor and control the forecasts made for the local inventory points.	DM
5. Increase synchronization and communication of all forecasts between the demand, supply, category team and with TPL-partner.	DM
6. Measure delivery accuracy to evaluate the performance of 15-minute deliveries.	DM
7. Set up a process to follow up on determined measurements to improve the performance of The Company.	DM
11. Include operational employees from all logistical functions in decision-making regarding logistics and supply chain development.	OF
13. Set more clear and distinct activities and work assignments of each employee within the logistics department.	OF

Figure 54: The strategic-related logistical consequences. DM=Demand Management process, OF=Order Fulfilment process.

Firstly, it is found that The Company needs more workforce related to the demand management team to control both the stock and the forecast accuracy in the local inventory points (no. 4). If The Company does not have the workforce needed, it will be hard to fulfil deliveries within 15 minutes because of inaccurate stock levels and forecasts. However, it is not only important to have more employees at The Company, but it has also been found important that each employee has clear and distinct work assignments (no. 13) to avoid inefficiency.

Furthermore, this goes hand in hand with increasing synchronization and communication of forecasts both internally and externally (no. 5), which may be easier as all employees know their work tasks and responsibilities (no. 13) and as The Company have the right workforce to create accurate forecasts (no. 4). Thus, focusing on number 4 and 13 might be a prerequisite to the logistical consequence number 5, while it also can go the other way around where good communication and synchronization might generate more distinct work activities.

Lastly, the strategic consequences also include logistical consequences aiming to evaluate the performance of 15-minute deliveries (no. 6) and setting up a process for following up on measurements determined (no. 7). These two logistical consequences both derive from the demand management process but are interfacing in a way that no. 7 is a way of evaluating no.6. Hence, the logistical consequences are dependent on each other to be successful, and thus interface with each other.

Operational

The *operational* logistical consequences, presented in Figure 55, are mainly related to the warehouse structure and distribution flows of The Company, thus the physical flows. The informational flows are not included in this category since most of the informational flows relates to the previous two categories. This might be why all consequences within the category arise from the order fulfilment process. Reviewing the supply and delivery capacity (no. 8) affects both distribution flows and the set warehouse structure with local inventory points. For instance, increasing the delivery capacity in terms of number of deliveries will in turn result in more frequent distribution flows. To meet the set customer requirement of deliveries within 15 minutes, a prerequisite is to have the right supply and delivery capacity (no. 8) to fulfil this. If not, it will be difficult to provide as rapid deliveries as 15 minutes in all scenarios. Consequently, it will be important to further communicate and collaborate with the TPL-partner to reassure the supply and delivery capacity. Therefore, this logistical consequence is considered physical.

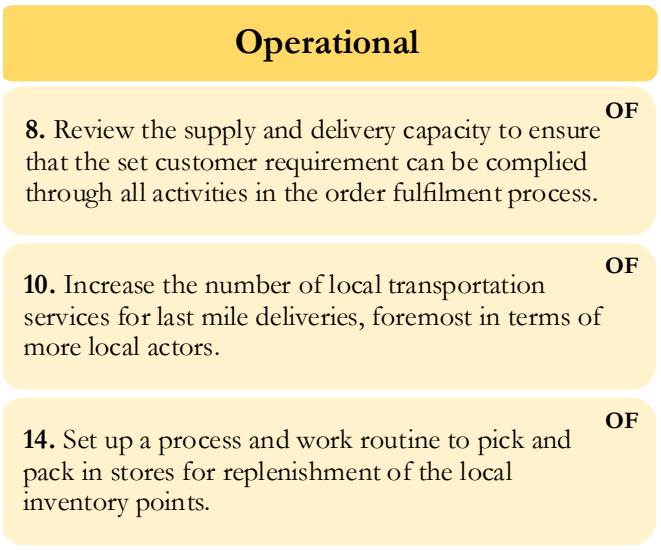

Figure 55: The physical logistical consequences. DM=Demand Management process, OF=Order Fulfilment process.

Another consequence also connected to the operational work at The Company is to pick and pack at the stores (no 14). The local transport services (no. 10) can be used to transport and deliver the packages picked and packed at the stores. Furthermore, the need for more local transport services (no. 10) in densely populated areas could be a way of handling this and thus will more local transportation services affect the distribution flows. Consequently, this shows that the three logistical consequences in this category are related to each other and to the operational work, and even more so might affect each other.

9.2 Assessment of Gaps and Logistical Consequences

The current activities, requirements, gaps, and logistical consequences for all four designed scenarios are presented in chapter 7 Investigating The Demand Management Process at The Company and chapter 8 Investigating The Order Fulfilment Process at The Company. Presented in Table 48 and Table 49 are a summarization and a relative assessment of the found logistical consequences of the different scenarios presented by angled arrows.

The angled arrows visualise how one gap and logistical consequence differ between the different scenarios compared relatively to each other. The horizontal arrow implies that a gap exists compared to today exists. The increased gradient of the arrows entails a bigger gap and thus a logistical consequence is identified in comparison with the other scenarios. Furthermore, the red and green

arrows illustrate between which scenarios the relative gap and logistical consequence are more significant. If there is no distinct difference between any of the scenarios no arrows are highlighted. In each logistical consequence, the scenario that implies the most significant difference from the current situation has been identified and graded first. Following, the other scenarios have been put into contrast to the extreme point using the information given from chapter 7 and chapter 8. For instance, in the first logistical consequence (no. 1) in Table 48, it was identified from the collected empirics that scenario 1 is the extreme point implying the biggest gaps and logistical consequence. This resulted in an arrow with the largest slope and highlighting that arrow with red. Furthermore, the other scenarios still imply a gap, but a lesser one than scenario 1 which is why the slope of the arrows decreases when covering scenario 2, 3, and 4. Scenario 4 implies the smallest gap, which is why the arrow is highlighted green.

It should be noticed that because there is no found relative difference between the scenarios for some logistical consequences it does not mean they are not as important as the others identified.

The Demand Management Process

Table 48 visualizes the assessment done on the gaps of the demand management process. Firstly, a result of the assessment is that most gaps of the demand management process differ when the geographical area and population characteristics change. The largest gap is in most cases found in scenario 1, whereas the slope of the arrow then decreases in correlation with the populational characteristics and geographical area.

Table 48: Relative assessment of the gaps and logistical consequences in the demand management process in the four scenarios.

Activity	Logistical consequence	Scenario			
		1: Sweden	2: County with SW	3: County without SW	4: Big city
Plan Forecast	1. Review forecast method for deciding what products to forecast and store in each local inventory points.	↑	↗	↗	→
Collect Data	2. Integrate the sales data for all omnichannel alternatives in the systems used by The Company.	↑	↗	↗	→
Forecast	3. Increase the use of the inventory management system SO99+ and review functions to optimize and adjust forecast of the local inventory points to reduce manual processing.	↑	↗	↗	→
	4. Review the workforce required on the demand team to monitor and control the forecasts made for the local inventory points.	↑	↗	↗	→
Synchronization and Communication of Forecast	5. Increase synchronization and communication of all forecasts between the demand, supply, category team and with TPL-partner.	↑	↗	↗	→
Measure Performance	6. Measure delivery accuracy to evaluate the performance of 15-minute deliveries.	→	→	→	→
	7. Set up a process to follow up on determined measurements to improve the performance of The Company.	→	→	→	→

However, three of the logistical consequences (nos. 3, 4, and 5) in Table 48 do not exactly follow this pattern. The slope for scenario 3 is greater than that for scenario 2 in the third consequence, primarily because the absence of a satellite warehouse emphasizes the significance of using SO99+ for accurate forecasting. This is because it will mainly be the stores that are responsible for supplying the local inventory points in the county. Therefore, the forecasts in the stores must be highly accurate, automated, and done by SO99+ according to the respondents. Scenario 2 benefits from having a satellite warehouse as a backup option in case the forecasts for the stores are not sufficiently accurate, which is not the case in scenario 3. Hence, using SO99+ will be more significant in scenario 3 than in scenario 2.

The fourth and fifth consequences both have the same pattern, where the gap is marked as larger in scenario 2 than in scenario 3. The presence of a satellite warehouse in scenario 2 results in an increased workload (no. 4) and a greater need for synchronization (no. 5). This is because the satellite warehouse in scenario 3 adds more warehouses to manage compared to scenario 2, which only includes stores.

Lastly, the last two consequences (nos. 6 and 7) in the activity Measure Performance are assessed in the same way. The reason for this is that Respondent H emphasized the significance of monitoring The Company's performance on 15-minute deliveries, which holds equal importance regardless of the scenario.

To summarize, the gaps and logistical consequences found in the demand management process are all the same for all consequences, independent of geographical area and number of local inventory points. However, it can be seen in Table 48 that the logistical consequences seem to be more significant in scenario 1, covering Sweden, compared to the other scenarios. Furthermore, the logistical consequences of scenario 4 are less significant than the other scenarios.

The Order Fulfilment Process

Shown in Table 49 below are seven logistical consequences due to the gaps between current and required process that have been found in the order fulfilment process. Out of four of the logistical consequences within the order fulfilment process (no. 8, 9, 11 and 13) there is no difference found between the scenarios in this study. Consequently, this means the logistical consequences are relevant but independent of geographical area or the number of local inventory points.

Table 49: Relative assessment of gaps and logistical consequences in the Order Fulfilment Process in the four scenarios.

Activity	Logistical consequence	Scenario 1: Sweden	2: County with SW	3: County without SW	4: Big city
Defining Requirements	8. Review the supply and delivery capacity to ensure that the set customer requirement can be complied through all activities in the order fulfilment process.	→	→	→	→
Evaluation of Logistics Network	9. Evaluate possible functions of SO99+ and increase the use of the inventory management system by configure necessary functions, such as replenishment between all warehouses and local inventory points.	→	→	→	→
	10. Increase the number of local transportation services for last mile deliveries, foremost in terms of more local actors.	↗	→	→	↑
Order Fulfilment Plan	11. Include operational employees from all logistical functions in decision-making regarding logistics and supply chain development.	→	→	→	→
Process Order	12. Configure necessary functionalities in the order processing systems used, such as sending a customer order from any warehouse in Colt.	↑	↗	↗	→
	13. Set more clear and distinct activities and work assignments of each employee within the logistics department.	→	→	→	→
Pick and Pack Order	14. Set up a process and work routine to pick and pack in stores for replenishment of the local inventory points.	↑	↗	↗	→

Furthermore, for some logistical consequences, where a difference between the scenarios is identified, the relative difference increases or decreases in proportion to the geographical area. For instance, as the number of local inventory points increases going from scenario 4 to scenario 1, the relative logistical consequence of implementing more configurations in the processing and operating systems used (no. 12) increases. Respondent C, F and G states there will be more manual processing as the number of local inventory points increases if these configurations are not done.

Additionally, the same arguments apply to the logistical consequence of establishing a process for in-store picking and packing (no. 14). In scenario 1, these factors are more critical compared to scenario 4 due to the increased number of local inventory points, as indicated by the arrows. The presence of a satellite warehouse has no significant impact on scenario 2 and 3, since the number of stores and local inventory points remain largely unchanged.

Finally, unlike the forementioned logistical consequences, the relative importance of increasing the number of local transportation services (no. 10) does not change proportionally with the geographical area and number of local inventory points. Respondent C suggests that local transport services will be more necessary in densely populated areas, making it relatively more critical in scenario 4. In contrast, scenarios 2 and 3 are less densely populated, and the need for local transportation services decreases accordingly. In scenario 1, including densely populated areas like scenario 4, local transportation

services may be more crucial. Therefore, based on Respondent C's input, it can be concluded that the relative significance of this logistical consequence is higher in scenario 1 compared to scenarios 2 and 3. Hence, the relative difference in importance does not increase as the geographical area decreases. Lastly, as mentioned in the previous chapter, no relevant logistical consequence of this study was found in the activity Transport and Delivery. However, it should be mentioned that other logistical consequences indirectly affect the Transport and Delivery activity such as increasing the number of local transportation services (no. 10).

To conclude, the significance of the logistical consequences in the order fulfilment process differs between the scenarios. It does not seem to be a pattern of what scenario that requires the most changes. However, in the logistical consequences 9, 11, and 13, all scenarios require the same significant changes. These logistical consequences seem to be equally important independent of scenario.

9.3 Interface of Identified Logistical Consequences

As shown in the previous sections, the logistical consequences and the three categories created in this study interface with each other. Both in terms of addressing the same or similar logistical consequences from different perspectives or that one logistical consequence in one of the processes is a prerequisite to enable another logistical consequence in the other process. For instance, the system-related logistical consequences interact with each other and address the same main problem and include logistical consequences from both processes. Therefore, many of the logistical consequences and thus the two processes interface with each other. Hence, integrating the organisation and logistical work will be even more important than today to provide deliveries within 15 minutes.

The significance of the logistical consequence in the order fulfilment process differs in the four scenarios, while in the demand management process the consequences becomes more significant in scenario 4, covering Sweden. Although, the similarity found in both process is that all logistical consequences, in both processes, are the same regardless of geographical area or number of local inventory point. Meaning they will be relevant to address in all four scenarios, which may be why the logistical consequences interface with each other, both between the processes and categories.

Furthermore, the characteristics of supply and demand in the logistical consequences also affect each other in some way. For instance, in the logistical consequence stating that The Company needs to review the supply and delivery capacity (no. 8) could affect the logistical consequence of reviewing forecast method (no. 1). The first consequence relates to order fulfilment, while the second pertains to demand management, directly impacting each other. If there is no supply or delivery capacity available, The Company must adjust their forecast method and planning of what to store and forecast for the local inventory points.

Having more local inventory points increases the importance of well-functioning and integrated IT-infrastructure and systems. However, the complex structure of an omnichannel can make it challenging for The Company to achieve integration of channels and business functions, and adding a new channel with the local inventory points can make the structure even more complex (Hübner et

al., 2016a). A conclusion drawn is therefore that synchronization, integration, and communication within the whole organization will be a central factor focusing on to achieve the logistics vision.

The system-related logistical consequences can be seen as a prerequisite to achieve the communication, integration and synchronization mentioned in the strategic-related logistical consequences. Moreover, the operational logistical consequences are in turn the foundation to what configurations the systems should be allowed to provide. The more capacity in warehouses, stores, local inventory points and distribution flows enables for the systems to be more configurated. Hence, they depend on each other. Lastly, neither of this can be done if The Company does not have the right workforce in terms of capacity and competency. To set clear work tasks of each employee could improve the work of each employee and its tasks and therefore contribute to other positive outcomes, for instance, system configurations or better communication and synchronization. Consequently, this shows that all three categories interface, interact and affect each other. Hence, they are all important and could both enable deliveries within 15 minutes as well as they could hinder it if not assessed. A summarization of the finding is presented in Figure 56.

Logistical Consequences

The Demand Management Process

1. Review forecast method for deciding what products to forecast and store in each local inventory points.
2. Integrate the sales data for all omnichannel alternatives in the systems used by The Company.
3. Increase the use of the inventory management system SO99+ and review functions to optimize and adjust forecast of the local inventory points to reduce manual processing.
4. Review the workforce required on the demand team to monitor and control the forecasts made for the local inventory points.
5. Increase synchronization and communication of all forecasts between the demand, supply, category team and with TPL partner.
6. Measure delivery accuracy to evaluate the performance of5-minute deliveries.
7. Set up a process to follow up on determined measurements to improve the performance of The Company.

The Order Fulfilment Process

8. Review the supply and delivery capacity to ensure that the set customer requirement can be complied through all activities in the order fulfilment process.
9. Evaluate possible functions of SO99+ and increase the use of the inventory management system by configure necessary functions, such as replenishment between all warehouses and local inventory points.
10. Increase the number of local transportation services for last mile deliveries, foremost in terms of more local actors.
11. Include operational employees from all logistical functions in decision-making regarding logistics and supply chain development.
12. Configure necessary functionalities in the order processing systems used, such as sending a customer order from any warehouse in Colt.
13. Set more clear and distinct activities and work assignments of each employee within the logistics department.
14. Set up a process and work routine to pick and pack in stores for replenishment of the local inventory points.

Focus areas for enabling 15-minute deliveries

System

2. Integrate the sales data for all omnichannel alternatives in the systems used by The Company. **DM**

3. Increase the use of the inventory management system SO99+ and review functions to optimize and adjust forecast of the local inventory points to reduce manual processing. **DM**

9. Evaluate possible functions of SO99+ and increase the use of the inventory management system by configure necessary functions, such as replenishment between all warehouses and local inventory points. **OF**

12. Configure necessary functionalities in the order processing systems used, such as sending a customer order from any warehouse in Colt. **OF**

Strategic

1. Review forecast method for deciding what products to forecast and store in each local inventory points. **DM**

4. Review the workforce required on the demand team to monitor and control the forecasts made for the local inventory points. **DM**

5. Increase synchronization and communication of all forecasts between the demand, supply, category team and with TPL-partner. **DM**

6. Measure delivery accuracy to evaluate the performance of 15 -minute deliveries . **DM**

7. Set up a process to follow up on determined measurements to improve the performance of The Company. **DM**

11. Include operational employees from all logistical functions in decision - making regarding logistics and supply chain development. **OF**

13. Set more clear and distinct activities and work assignments of each employee within the logistics department. **OF**

Operational

8. Review the supply and delivery capacity to ensure that the set customer requirement can be complied through all activities in the order fulfilment process. **OF**

10. Increase the number of local transportation services for last mile deliveries, foremost in terms of more local actors. **OF**

14. Set up a process and work routine to pick and pack in stores for replenishment of the local inventory points. **OF**

Figure 56: Areas to improve to enable 15-minute deliveries for The Company.

10 Conclusion

The purpose of this study is:

The purpose is to investigate the logistical consequences for The Company if the logistics vision of 15-minute deliveries is realised.

Two supply chain processes have been investigated in this study: the demand management process and the order fulfilment process. By conducting the study's determined methodology, 14 logistical consequences were found in these processes when realising 15-minute deliveries at The Company. Thereby, the purpose of the study is fulfilled. The study's detailed methodology was based on four research questions. Firstly, designing the alternative scenarios resulted in four scenarios of different geographical sized areas. All four scenarios require a logistical system containing one central warehouse, six satellite warehouses, more than 59 stores, and additional local inventory points. Replenishment of the logistical system is available from the central, - satellite-, and store warehouses. In addition, it was conducted that the stores will play a more central role in all four designed scenarios, particularly in terms of replenishment of the local inventory points.

Furthermore, based on the four scenarios conducted, the demand management- and order fulfilment process could be investigated. Identification of gaps between the current processes and their activities and what is required in the four scenarios were made, by doing this the logistical consequences to bridge these gaps could be identified. Seven logistical consequences were found in the demand management process. The main conclusions of the consequences on the demand management process were to increase the use of automatised inventory management system for forecasting, integrate system related data, and to synchronize and communicate the forecast both internally and externally. Furthermore, seven logistical consequences were found in the order fulfilment process, where the main conclusions of the consequences on the process is to implement and configurate the systems used in the company, and to implement new working routines to handle 15-minute deliveries.

Lastly, a synthesis of the logistical consequences was done which was addressed in the last research question. The similarities between the consequences on the processes resulted in three categories: system-related, strategic, and operational. Whereas these categories can be seen as areas to improve to enable 15-minute deliveries for The Company. In Figure 57 are all logistical consequences divided into their specific category presented.

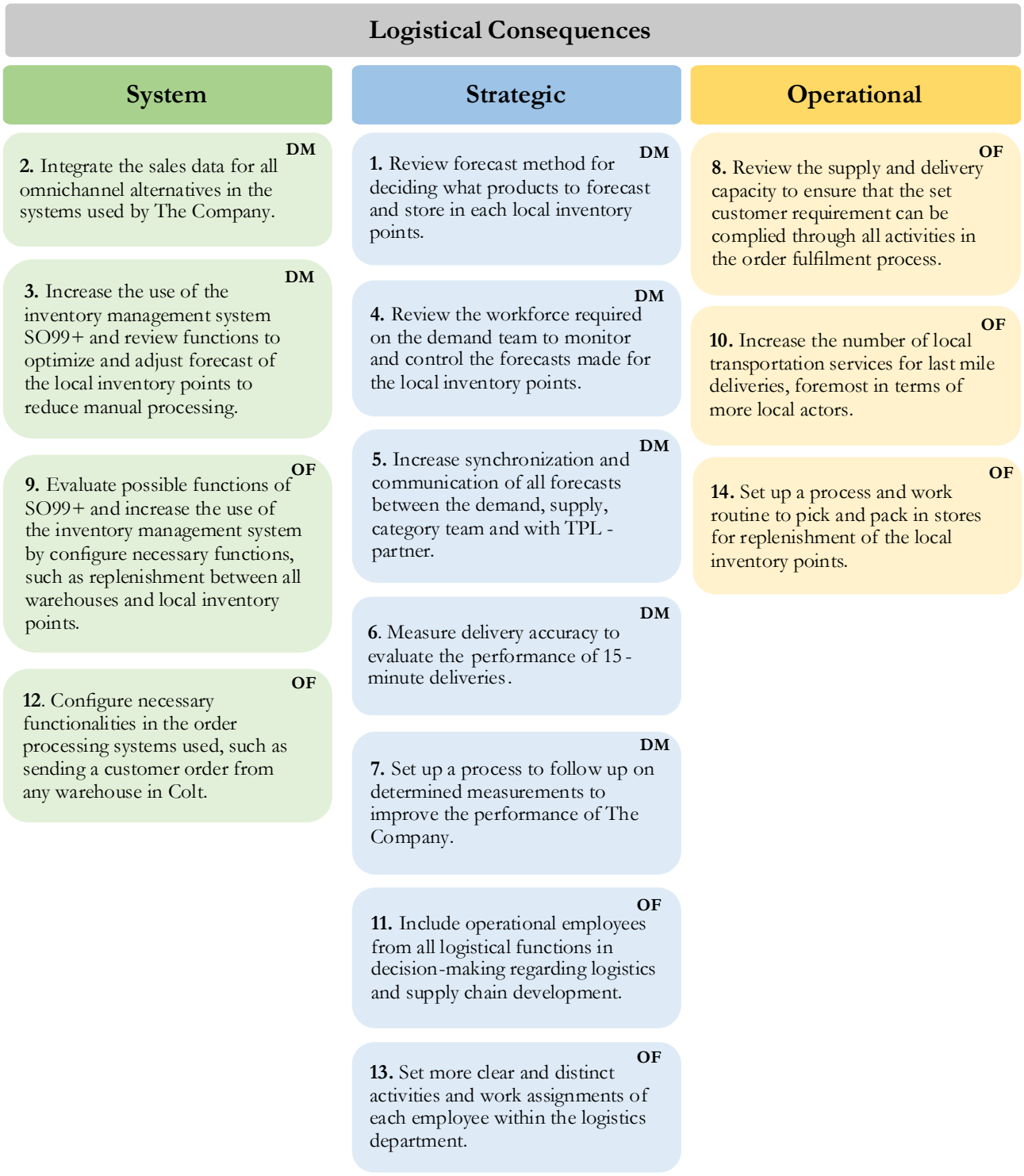

Figure 57: Logistical consequences of the demand management- and order fulfilment process.

Four scenarios have been investigated throughout the study: scenario 1 (covering whole Sweden), scenario 2 (a county with a satellite warehouse), scenario 3 (a county without a satellite warehouse), and scenario 4 (a big city). The assessment of the consequences shows that it is the scale of the

logistical consequence that will differ between the scenarios, where the covering of whole Sweden will require more from The Company than solely covering a big city in most of the logistical consequences. The study demonstrates that most of the consequences are related to aspects regarding systems and capacity constraints in both processes and scenarios. Moreover, it has been demonstrated that there is an interface between both processes, where many consequences address the same challenge but from different perspectives, mainly by the categorization that could be done on the found logistical consequences.

In the scenarios, the stores have been a focal point when offering 15-minute deliveries. The stores are an important asset to use when having an omnichannel and expanding geographically (Buldeo Rai et al., 2019), which is the case for The Company. To implement working routines and configurations in the systems used at The Company is of great importance to be able to replenish the local inventory points from the stores. This is a way of utilising the infrastructure of stores in Sweden that The Company has built up throughout the years.

The study's result indicates that rapid deliveries require the same changes regardless of geographical area and number of local inventory points for The Company. Despite the difference of the four scenarios, many of the respondents have expressed the challenging future that is ahead when offering 15-minute deliveries. However, the logistical consequences emphasise the importance of having configurated and automatised systems in an integrated omnichannel. For all logistical consequences The Company is responsible for acting, however, for a great part of the logistical consequences the importance of great collaboration with the TPL-partner will increase.

Finally, to fulfil the logistics vision and achieve deliveries within 15 minutes to all customers The Company must focus on the logistical consequences identified in this study. Moreover, The Company is recommended to prioritize these consequences and then actively address them.

11 Discussion

In the following chapter a discussion regarding the found results is made, followed by a generalization of the study where the result is discussed in a broader context beyond the studied company. Lastly, suggestions for future studies and investigation within the area of deliveries within 15-minutes are given.

11.1 Discussion of the Results

Today, the number of warehouses is manageable for The Company. However, they do not have the capacity or systems to deliver within 15 minutes to more than a random customer who happens to be 15 minutes from a store with the product available. Hence, the stores will have a bigger and more important role in all the scenarios and thus this affects the characteristics of the logistical consequences found.

Initially, the aim was to set up two processes with clearly defined activities on the part of The Company. Setting up clearly defined activities proved to be more difficult than expected, as many of the interviewees and participants in the study responded according to their specific job roles, which were not formed based on such activities found in literature. Furthermore, it has not always been clear what should be mapped to which activity. This was especially the case for the more strategic activities in the order fulfilment process since it was difficult to state clearly defined questions to answer what was found in the literature and make the respondents understand the question as well. Therefore, there might be more information regarding the strategic activities than what was revealed during the interviews. However, the consequences that have been found are on a high-level within the organization. Therefore, it is not believed that this has affected the validity of the study, since it does not really matter for the results in which activity that the consequence is placed. The consequences still stay the same.

Furthermore, several strategic employees at The Company work with the logistics vision and are always thinking ahead, which has sometimes made it challenging to know concretely what The Company is doing today and not what they want to do. If more respondents were interviewed and if there was a greater spread of respondents' experiences, a more nuanced result could have been obtained. In addition, one factor may also be that the questions related to the scenarios were very hypothetical and that many respondents found it challenging to interpretate the scenarios in the belief that there is a right and wrong answer, which was not the case. Moreover, providing deliveries within 15 minutes to anyone in Sweden is not done by any company before. Therefore, it may seem unrealistic to fulfil and difficult to answer what it would require in the two processes.

Finally, by the thorough process of conducting four designed scenarios and interviewing multiple employees at The Company, the authors of this study assert that the study demonstrates good reliability and validity. If the study were to be conducted again, the authors believe that obtaining the same results would be likely due to interviewing employees who have a strong investment in the logistics vision. Many high-level logistical consequences were identified, which are applicable to The

Company regardless of the scenario. Moreover, the validity has been strengthened through the solid frame of reference that was conducted in the initial phase of this study.

11.2 Generalizing the Study

This study is based on the idea that rapid deliveries can be utilized to gain a competitive advantage, as customers require more rapid, flexible, and sustainable deliveries. This study's resulting logistical consequences could be split up into three categories: system, strategic, and operational. These categories are specific to this study. Although, the methodology of generating the logistical consequences and categories could be generalized to a certain extent. The two supply chain business processes: demand management- and order fulfilment are both processes that exist in companies. Furthermore, the methodology of mapping the current activities in the processes compared to what is required in a hypothetical scenario where a company can provide 15-minute deliveries is doable. Thereby, this study provides a methodological way of investigating how a vision of very rapid deliveries could be realised in an omnichannel company and how it would affect the demand management- and order fulfilment process.

Although the resulting logistical consequences are specific for The Company, some of them could be generalized for all companies aiming for rapid deliveries. In terms of system-related consequences, these could apply to all companies and not just The Company. The growing importance of using AI and machine learning to automize processes and reduce manual processing is relevant for all kinds of companies handling inventory and forecasting. Introducing fast deliveries, such as within 15 minutes, has also shown the importance of integration of sales channels, synchronization of forecasts, and communication between different functions internally and externally. Especially has the study shown that the integration of systems is important for an omnichannel company. Integrated channels are a prerequisite for omnichannel companies to succeed with rapid deliveries.

In conclusion, the study's methodology of investigating a company's current demand management- and order fulfilment process compared to what is required when having 15-minute deliveries is generalizable for other companies. The study's result is specific to The Company, but where the category including system-related consequences could be applied to other companies, specifically omnichannel companies. Lastly, the identified logistical consequences can still be valuable for The Company, even if 15-minute deliveries are not yet fulfilled. As The Company strives for faster deliveries, the identified gaps and logistical consequences can already be beneficial for current operations to achieve more rapid deliveries.

11.3 Future Studies

In this study, the design of the local inventory point has been set to a box that can both act as an inventory point and a parcel box. There is a need for investigating the design of the local inventory points since this can affect the number of local inventory points. The delivery within 15 minutes could be designed in many possible ways, for example in a trunk of a car or using more small-scale logistic operators. In that way, no local inventory points would need to be added. This also leads to other

factors to consider in future studies, as the cost of the local inventory points. No consideration has been given to the costs of either investing in or operating these inventory points. If the design of the local inventory points would be already existing infrastructure, the costs would differ from investing in new ones. Thereby, future studies that should be considered are both the alternative designs of local inventory points but also how the costs differ from these alternatives. However, the numbers of postal boxes are increasing, meaning that The Company not necessarily need to own them and bare all costs by themselves.

Furthermore, since no costs have been considered it would be relevant for The Company to investigate the profitability of providing 15-minute deliveries. This could include considering the total cost model, whereas costs related to storage and transportation would be necessary to investigate. Further, also where the tipping point is when it is no longer profitable to add more local inventory points to provide 15-minute deliveries.

Lastly, another future study to consider when investigating 15-minute deliveries is how last mile transportation could be organised. Deliveries within 15 minutes have been stated by respondents from The Company to require a lot more replenishment of all warehouses in the structure. What kind of transportation mode, relevant transportation companies, and lead time could be relevant to include. Further, will especially the last mile transportation from the stores to the local inventory points be interesting to investigate concerning sustainability and costs. This since customers do not only require more rapid deliveries today but also more sustainable ones.

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Appendix A: Initial Literature Review

Date	Words	Search engine	Delimitations/filter	Hits	Read abstracts	Fully read articles
2023-01-18	sales AND operation AND planning	UniSearch	peer review, academic publication, full text, available at LIU'	322 494	4	2
2023-01-18	sales AND operation AND execution	UniSearch	peer review, academic publication, full text, available at LIU'	85 470	1	0
2023-01-18	sales and operations execution gartner	Google				
2023-01-18	omnichannel AND retailing	UniSearch	peer review, academic publication, full text, available at LIU'	3 118	1	1
2023-01-18	omnichannel AND retailing AND inventory	UniSearch	peer review, academic publication, full text, available at LIU'	1 035	1	
2023-01-19	sales and operations planning	Unisearch	peer review, academic publication, full text, available at LIU'	3 520	2	2
2023-01-19	sales and operation and execution	Unisearch	peer review, academic publication, full text, available at LIU'	85 470	0	0
2023-01-19	omnichannel	Unisearch	peer review, academic publication, full text, available at LIU'	5 574	1	0
2023-01-19	omnichannel AND supply	Unisearch	peer review, academic publication, full text, available at LIU'	2 619	1	2
2023-01-19	omni-channel AND supply chain	Unisearch	peer review, academic publication, full text, available at LIU'	2 011	4	1
2023-01-19	omni-channel AND lead time	Unisearch	peer review, academic publication, full text, available at LIU'	2 449	3	2
2023-01-19	SAP, ERP, SO99+	Google				
2023-01-19	SO99+ AND planning AND system	UniSearch	peer review, academic publication, full text, available at LIU'	2	0	0
2023-01-19	enterprise AND resource AND planning AND systems	UniSearch	peer review, academic publication, full text, available at LIU'	20 359	2	0
2023-01-20	enterprise resource planning systems AND function AND supply chain	Unisearch	peer review, academic publication, full text, available at LIU'	88 750	2	1
2023-01-23	SCOR	Unisearch	peer review, academic publication, full text, available at LIU'	39 287	3	2
2023-01-23	SCOR AND retail AND supply chain	Unisearch	peer review, academic publication, full text, available at LIU'	990	4	2
2023-01-23	SCOR AND supply chain	Unisearch	peer review, academic publication, full text, available at LIU'	5 083	2	1
2023-01-23	SCOR application	Google				
2023-01-23	scor AND model AND application	UniSearch	peer review, academic publication, full text, available at LIU'	14 412	2	1
2023-01-24	telecommunication	Google				
2023-01-24	warehouse AND dimension AND supply chain	UniSearch	peer review, academic publication, full text, available at LIU'	139	5	2
2023-01-24	distribution AND network AND design AND challenges	UniSearch	peer review, academic publication, full text, available at LIU'	6 772	1	0
2023-01-30	supply chain AND distribution AND challenge AND inventory	Unisearch	peer review, academic publication, full text, available at LIU'	67 478	2	1
2023-01-30	supply chain AND configuration AND flexibility	UniSearch	peer review, academic publication, full text, available at LIU'	58 477	5	1
2023-01-31	supply chain AND lead time AND short AND delivery	Unisearch	peer review, academic publication, full text, available at LIU'	499	1	
2023-01-31	supply chain AND lead time AND short AND delivery AND retail	Unisearch	peer review, academic publication, full text, available at LIU'	16	0	0
2023-01-31	delivery AND supply chain AND speed AND fast	Unisearch	peer review, academic publication, full text, available at LIU'	3	1	0
2023-01-31	delivery AND supply chain AND speed	Unisearch	peer review, academic publication, full text, available at LIU'	150	4	
2023-02-02	increased AND use AND mobile phone	UniSearch	peer review, academic publication, full text, available at LIU'	274 466	1	1

Appendix B: Literature Review

Date	Words	Search engine	Delimitations/filter	Hits	Read abstracts	Fully read articles	Selected articles	Snowball sampling
2023-02-03	TI("omnichannel" AND "literature")	UniSearch	peer review, academic publication, full text, available at LIU'	7	4	1	1	2
2023-02-03	TI("omnichannel" AND "retail*" AND "evolution*")	UniSearch	peer review, academic publication, full text, available at LIU'	3	2	1	1	0
2023-02-03	TI("omnichannel" AND "retail*") AND AB("supply chain*")	UniSearch	peer review, academic publication, full text, available at LIU'	64	3	2	1	0
2023-02-03	TI("omni-channel" AND "distribution*") AND AB("supply chain*")	UniSearch	peer review, academic publication, full text, available at LIU'	0	0	0	0	0
2023-02-03	TI("distribution" AND "omni-channel*" AND "system*") AND AB("retail*")	UniSearch	peer review, academic publication, full text, available at LIU'	8	1	1	1	0
2023-02-03	omnichannel AND supply chain AND retailing AND challenges	UniSearch	peer review, academic publication, full text, available at LIU'	0	0	0	0	0
2023-02-03	TI("omnichannel" AND "supply chain" AND "retail*") AND AB("omnichannel" AND "supply chain" AND "retail*")	UniSearch	peer review, academic publication, full text, available at LIU'	5	3	1	1	4
2023-02-06	TI("distribution*" AND "omnichannel")	UniSearch	peer review, academic publication, full text, available at LIU'	20	3	1	1	0
2023-02-06	TI("distribution*" AND "omni-channel" AND "system*")	UniSearch	peer review, academic publication, full text, available at LIU'	14	3	2	2	4
2023-02-07	TI("customer relationship management" AND "process") AND AB("supply chain*")	UniSearch	peer review, academic publication, full text, available at LIU'	6	2	2	3	1
2023-02-07	TI("omnichannel" AND "retail*" AND "capabilities") AND AB("omnichannel" AND "retail*" AND "capabilities")	UniSearch	peer review, academic publication, full text, available at LIU'	3	1	0	0	0
2023-02-08	TI("customer service management" AND "process")	UniSearch	peer review, academic publication, full text, available at LIU'	2	1	1	1	0
2023-02-08	TI("demand management" AND "process") AND ("supply chain")	UniSearch	peer review, academic publication, full text, available at LIU'	7	4	1	1	0
2023-02-08	TI("order fulfillment" AND "process") AND AB("supply chain*")	UniSearch	peer review, academic publication, full text, available at LIU'	6	3	3	3	0
2023-02-08	TI("manufacturing flow management" AND "process")	UniSearch	peer review, academic publication, full text, available at LIU'	0	0	0	0	0
2023-02-08	TI("product development" AND "process" AND "commercialization")	UniSearch	peer review, academic publication, full text, available at LIU'	0	0	0	0	0
2023-02-08	TI("sales" AND "operations" AND "planning") AND AB("sales" AND "operations" AND "planning")	UniSearch	peer review, academic publication, full text, available at LIU'	260	11	4	3	3

2023-02-09	TI("sales" AND "operations" AND "planning" AND "maturity") AND AB("sales" AND "operations" AND "planning" AND "maturity")	UniSearch	peer review, academic publication, full text, available at LIU'	2	0	0	0	0
2023-02-09	TI("sales" AND "operations" AND "planning" AND "process*") AND AB("sales" AND "operations" AND "planning" AND "process*")	UniSearch	peer review, academic publication, full text, available at LIU'	51	9	2	1	0
2023-02-09	TI("sales" AND "operations" AND "planning" AND "retail*") AND AB("sales" AND "operations" AND "planning" AND "retail*")	UniSearch	peer review, academic publication, full text, available at LIU'	2	0	0	0	0
2023-02-09	TI("omnichannel" AND "capability*" AND "retail*") AND AB("omnichannel" AND "capability*" AND "retail*")	UniSearch	peer review, academic publication, full text, available at LIU'	1	1	0	0	3
2023-02-09	TI("omnichannel" AND "capabilities") AND AB("omnichannel" AND "capabilities")	UniSearch	peer review, academic publication, full text, available at LIU'	5	5	1	0	0
2023-02-13	TI("same day" AND "delivery")	UniSearch	peer review, academic publication, full text, available at LIU'	179	5	1	1	0
2023-02-13	TI("time" AND "delivery*") AND AB("window*" AND "supply chain*")	UniSearch	peer review, academic publication, full text, available at LIU'	29	3	1	1	0
2023-02-22	TI("demand" AND "plan*") AND AB("supply chain*")	UniSearch	peer review, academic publication, full text, available at LIU'	336	10	1	1	0
2023-02-22	TI("order" AND "process" AND "fulfillment" OR "fulfilment") AND AB("order" AND "process" AND "fulfillment" OR "fulfilment")	UniSearch	peer review, academic publication, full text, available at LIU'	871	4	0	0	0
2023-02-22	TI("order fulfillment" AND "process" AND "literature review") AND AB("supply chain*")	UniSearch	peer review, academic publication, full text, available at LIU'	0	0	0	0	0
2023-02-22	TI("order fulfillment" AND "process*") AND AB("supply chain*")	UniSearch	peer review, academic publication, full text, available at LIU'	14	2	0	0	0
2023-03-22	AB("box*" AND "supply chain*" AND ("delivery*")	UniSearch	peer review, academic publication, full text, available at LIU'	60	3	1	1	0

Appendix C: Calculation of Local Inventory Points

In below table, the four different scenarios, their input and resulting number of inventory points are presented.

Sweden	
Area	407 283 km2
Radius	4 km
Calculation	
Exact number of inventory points	8 103
Rounded number of inventory points	8 103
County with a satellite warehouse (Östergötland County)	
Area Östergötland County	10 557 km2
Radius	4 km
Calculation	
Exact number of inventory points	210
Rounded number of inventory points	211
County without a satellite warehouse (Jönköping County)	
Area Jönköping County	10 436 km2
Radius	4 km
Calculation	
Exact number of inventory points	208
Rounded number of inventory points	208
Big city, Stockholm	
Area Stockholm municipality	187 km2
Radius	4 km
Calculation	
Exact number of inventory points	4
Rounded number of inventory points	4

Appendix D: Interview Guide RQ 1.2

Structure:

1. Given the designed scenario presented to you, would any changes have to be made regarding the warehouse structure in terms of level or number of warehouses?
2. How would the structure need to change? A change in number? A change in decentralization/centralization? Or both?
3. How would the purpose of the different warehouses change? To fulfil orders? Only as inventory? As a buffer for other types of warehouses? Consolidation point?
    a. What would be the purpose of the central warehouse?
    b. What would be the purpose of the satellite warehouse?
    c. What would be the purpose of the store warehouse?

Flows:

1. Given the designed scenario presented to you, would any changes have to be made regarding distribution flows?
2. How would the distribution flows change?
3. How will the different warehouses be replenished, given the purpose of the warehouse?
    a. How will the satellite warehouse(s) be replenished?
    b. How will the stores be replenished?
    c. How will the local distribution points/warehouses be replenished?
4. What would the flows be for the different delivery options offered by The Company?
    a. From which warehouse(s) will home delivery orders be delivered?
    b. From which warehouse(s) will postal office orders be delivered?
    c. From which warehouse(s) will parcel box orders be delivered?
5. Going backwards, how will the warehouses in the above levels be fulfilled?

Others:

1. Do you think the proportions of the different omnichannel options will change?
    a. Eg., less flow to home delivery etc…

Appendix E: Interview Guide RQ 2.1

In general:

1. Describe your role at The Company.
2. How long have you been working at The Company?

To briefly get information about how The Company views their demand process today. Then it is divided partly into the steps identified in this study.

1. Can you briefly describe what the demand management process does look like at The Company?
2. What activities or steps are included in this process?
3. Who is responsible for what in the process and activities?
4. What is done in the different activities?
5. What systems are used when?

Plan forecast:

1. Can you briefly describe how you plan the forecasts?
2. Who is responsible for planning the forecasts?
3. When do you plan the forecasts?
    a. In what time frame do you plan the forecast?
    b. Is it the same time for all the products at The Company?
4. At what organizational level do you plan the forecasts?
5. At what geographical level do you plan the forecasts?
6. Does the planning of the forecast differ depending on the omnichannel alternative you are offering?
    a. If yes, in what way do they differ?
7. Can you, more in detail, describe how you plan the forecast?
    a. Are any techniques used?
    b. Are any systems used?

Collect data:

1. Do you use any data?
2. If yes, what kind of data do you use and for what?
3. Is the same data used for all products and omnichannel options?
4. From whom do you collect the data?
5. Do you have to process any of the collected data?
    a. If yes, why?
6. Who is responsible for collecting the data?

Forecast:

1. Who and what team are responsible for the forecasting?
2. Is the forecast made in any system or systems?
3. Does the forecasting differ anything from how you plan the forecasts?
    a. If yes, in what way?
4. When is the forecast made?

Synchronization:

1. Do you synchronize the forecast with any of the other teams in the organization?
    a. If yes, with who and why?
2. Do you synchronize the forecast with any external parts?
    a. If yes, with who and why?
3. Do you communicate the forecast within the company?
    a. If yes, to who and why?
4. Do you communicate the forecast with any external parts?
    a. If yes, with who and why?

Measure performance:

1. Do you have any specific KPIs connected to forecasting?
2. Do you measure how well the forecasts perform compared to the actual demand?
3. If yes, how do you measure it?
4. Who is responsible for measuring?
5. Do you work on improvements based on the KPIs?
    a. If yes, in what ways do you work with it and why?

Other:

1. Do you have the right prerequisites for the demand management process?
2. Is any activity done too late due to other circumstances?
    a. For instance, lack of data, data quality, lead times in the process, late deliveries etc.
3. Is any activity problematic due to other circumstances?
    a. For instance, lack of data, data quality, lead times in the process, late deliveries etc.

Appendix F: Interview Guide RQ 2.2

All questions were asked for the four scenarios separately and how the requirements on the different activities would differ between the four scenarios.

Plan Forecast

1. Would the total base forecast still be a method to use when planning your forecasts?
2. What time frame do you think you would have? Would you have any other prerequisites than you have today?
3. Would you still use Excel or would SO99+ be sufficient?
4. Do you see any problems using Excel or SO99+?
5. Would the planning of forecast need to be done on another level than total sales?
6. What would have to change in the planning phase?

Collect Data:

1. Would you need more data?
2. What data would you need to be able to forecast?
3. Would you need more updated data than last year's sales?
4. Would someone need to be responsible for collecting data?

Forecast:

1. What is SO99+ used for today?
    a. Safety stock, inventory levels, replenishment intervals, forecasting
2. What is the main purpose of using SO99+?
3. When was SO99+ implemented? Is it fully implemented today or what functions are missing?
4. When is SO99+ specifically used and how?
5. What are the pros with SO99?
6. What are the cons or problems with SO99+? Why don't you fully trust SO99?
7. Are there functions in SO99+ using AI and machine learning to forecast?
8. Some respondents have mentioned the need for automatized systems, what functions does that include? What needs to be automized?
9. What system/method would you use to forecast:
    i. Central warehouse
    ii. Satellite warehouse
    iii. Stores
    iv. Local inventory points
10. Is it possible to forecast the local inventory points in an efficient way if the stores are using another system than they have today?
11. Given that the stores are a distribution point sending to the local inventory points, what possibilities and problems do you see?
12. Do you need a common process for all products?
13. What do you think is required to have less manual forecasting?

Synchronization and Communication of Forecast:

a. How do you think the forecasts would need to be synchronized and communicated within the company?

b. Would it require more follow-up or meetings?
c. Would you need to share the forecast with more internal or external partners?
d. Would you need to synchronize more with supply?
e. What do you think would be the biggest obstacles?

Measure Performance:

1. Are any other key performance indicators relevant?
2. Do you need to actively follow up your KPIs?
3. What KPIs do you think are relevant to measure?

Other:

1. Does SO99+ only forecast on store level? Or for satellite and central warehouse too?
2. Do you think that the stores will be responsible for supplying the local inventory points? Why/why not?

Appendix G: Interview Guide RQ 3.1

In general:

1. Describe your role at The Company.
2. How long have you been working at The Company?

To briefly get information about how The Company views their order fulfilment process today. Then it is divided partly into the steps identified in this study.

1. Can you briefly describe what the process looks like from receiving an order to delivering it at The Company?
2. What activities or steps are included in this process?
3. Who are responsible for what in the process and activities?
4. What are done in the different activities?
5. What systems are used when?

Determining requirements:

1. Do you determine any requirements of the process beforehand?
    a. If yes, what requirements are set on the process?
2. Do you review you supply capabilities?
    a. If yes, how? And who is responsible for this?
3. Do you decide any cut-off times?
    a. If yes, based on what?
4. Do you decide any delivery times?
    a. If yes, based on what?

Evaluation of logistics network:

1. Do you determine what each distribution point/warehouse should distribute?
    a. If yes, how do you determine that?
2. Do you determine what mode of transportation is used in the distribution networks?
    a. If yes, how do you determine that?

Order fulfilment plan:

1. Do you make an order fulfilment plan for each order/omnichannel alternative?
2. Is any technology or other supporting systems used to make an order fulfilment plan?
3. Is inventory control planned?
    a. If yes, what is this based on?
    b. Do you have any safety stock?
4. Do you have a strategy for keeping stock? Do you have large inventory stock in order to keep the short delivery lead times?

Generating order:

1. How do you receive an order?
    a. In what system?

2. Do you communicate it?
    a. To what parties and through what systems do you communicate it?
3. Is the order entered?

Process order:

1. How do you process an order?
2. If you have any inventory, do you check the inventory before processing an order?
3. Do you plan the order flow?
4. How do you decide the mode of transportation for each individual order?
5. How long time does it take to process an order?

Pick order:

1. How do you pick an order?
2. How long time does it take to pick an order? In general.
    a. For example, an Iphone
3. Who picks an order?
4. Do you use any supportive system when picking orders?

Pack order:

1. How do you pack an order?
2. How long time does it take to pack an order?
    a. For example, an Iphone
3. Who packs an order?
4. Do you use any supportive system when packing an order?

Transport and delivery:

1. How often is transport departure mad from the different distribution points?
    a. Central warehouse?
    b. Satellite warehouses?
    c. (Stores?)
2. Do the online and offline orders go on the same transport?

Other:

1. Do you have the right prerequisites for the demand management process?
2. Is any activity done too late due to other circumstances?
    a. For instance, lack of data, data quality, lead times in the process, late deliveries etc.
3. Is any activity problematic due to other circumstances?
    a. For instance, lack of data, data quality, lead times in the process, late deliveries etc.
4. How do you decide the order quantities? What is it based on?
5. How do you decide the delivery frequency? What is that based on?

Appendix H: Interview Guide RQ 3.2

All questions were asked for the four scenarios separately and how the requirements on the different activities would differ between the four scenarios.

Determining requirements

1. How would the scenarios affect your supply capabilities and capacities? In terms of TPL-partner, suppliers, delivery times, cut off-times.
2. Would you need other competencies than you have today?
3. Do you have enough capacity at your TPL partner and suppliers to manage the scenario?
4. Would any other requirements on the process other than you have today be relevant in the scenarios?

Evaluation of logistics network

1. Will the order frequency and distribution flows change? In what way?
2. Will the transportation mode change in any flow?

Order fulfilment plan

1. What is the order fulfilment plan based on? How did you determine the order fulfilment process and what system to use?
    a. OPT, Sibel, Colt? Why?
    b. How do you coordinate the different steps in the processing of an order?
2. Do you make the order fulfilment plan based on any forecasts?
3. Do you think every flow of an incoming order would still look the same?
4. Would you need any other supporting system or methods? Would you need to add some services in SO99+?
5. Do you think you would have the same inventory strategy as you have today?
6. How would the order quantities and order frequency to the local inventory points be designed?
    a. How would this affect the current capacity and frequencies in the underlying warehouse structure?

Generating order

1. How would the receiving of an order to a local inventory point look like?
2. How would this affect the receiving of an order to other delivery points?
3. How would the order be communicated in the company? Would it need to change compared to today?

Process order

1. How would do you process an order?
2. How would you plan the order flow?
3. How would do you decide the mode of transportation for each individual order?
4. How long time would it take to process an order?

Pick and pack order

1. How do you pick an order?

2. How long time does it take to pick an order? In general.
3. Who picks an order?
4. Do you use any supportive system when picking orders?
5. How do you pack an order?
6. How long time does it take to pack an order?
7. Who packs an order?
8. Do you use any supportive system when packing an order?

Transport & delivery

1. How often would transport departure from the different distribution points?
2. Would online and offline orders go on the same transport?
3. Would you need more capacity to be able to handle 15-minute deliveries?

Other

1. Are there any other circumstances that would require change for the scenario to be fulfilled?
    a. For example: data quality, lead time in other processes, stock-outs, deliveries from suppliers