



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Working to increase supply chain responsiveness

A case study of Swedish fashion firms

International Business

Bachelor Thesis

Spring 2018

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Abstract

The increasingly demanding customer is putting higher pressure on firms and their supply chains to become more responsive to customer demand. This development is especially evident in the fashion industry, characterised by a fast-changing environment and high level of demand uncertainty. Furthermore, implementing digitalization within the supply chain is said to improve visibility and information sharing between actors, which is of increased importance for supply chains that seek to become more responsive. However, retailers have not advanced so far and challenges seem to exist when implementing new technology. Thus, the aim of this report was to study how firms work to create a more responsive supply chain and what challenges are found when implementing digitalization within the supply chain. To address these matters, a multiple case study of five firms within the fashion industry was conducted, including five in-depth interviews, resulting in several findings. One of the main findings conclude that firms identify key functions in order to improve responsiveness, for example, firms with a higher number of physical stores perceived logistical functions as important. Our findings also suggest that manufacturers are often reluctant to implementing digital systems and services since they lack necessary resources. Lastly, as different attitudes towards digitalization exists, this creates the need to educate personnel in IT.

Keywords: Supply chain responsiveness, Digitalization, Fashion industry

Acknowledgements

This thesis would not have been completed without the help and support from the people involved, providing helpful insights and knowledge.

Thereby, we would like to express our sincere gratitude towards our supervisor Marissa Ekdahl who helped us to get in contact with relevant firms as well providing excellent support and input throughout the entire process. We could not have done it without her.

Furthermore, we would like to express our gratitude for all the valuable and constructive comments from all interviewed employees from Nudie Jeans, Dress AB, Coat AB, Jacket AB and Broken Bird Bootmakers.

Gothenburg, 2018-06-03

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List of abbreviations

BTO - Built-to-Order

CEO - Chief Executive Officer

CIO - Chief Information Officer

COO - Chief of Operations

DSC - Digital Supply Chain

FTP - File Transfer Protocol-servers

ICT - Information and Communication Technologies

SCR - Supply Chain Responsiveness

1 Introduction

1.1 Background

The introduction of internet and new technologies have in many ways transformed the retail sector (Blázquez, 2014; Piotrowicz & Cuthbertson, 2014) and provided retailers with the opportunity to transform both their customers' shopping experience together with their own competitive positions (Doherty & Ellis-Chadwick, 2010). It has enabled and transformed the way websites are used with functions such as purchasing and paying for merchandise, promoting goods and services and tracking orders (Doherty & Ellis-Chadwick, 2010), which in turn has resulted in a significant growth in e-commerce over the past few years (Blázquez, 2014). Advanced information and communication technologies (ICT) have also made it easier for both large and small firms to communicate, collaborate and conduct business with greater flexibility (Čiarnienė & Stankevičiūtė, 2015).

Traditionally, retailing has been conducted with a single- or multi-channel structure where in the latter, online channels and brick and mortar stores are treated as separate silos, with little or no interaction with each other (Beck & Rygl, 2015). However, the fast development of interactive technologies such as smartphones, tablets and social media, has changed the way consumers interact with retailers (Cao & Li, 2014; Verhoef et al., 2015) driving development towards omni-channel retailing (Beck & Rygl, 2015).

Consequently, in an omni-channel world consumers expect a consistent, integrated or “seamless” shopping experience where they can swiftly move across different channels regardless of shopping online or in offline stores (Brynjolfsson et al., 2013; Piotrowicz & Cuthbertson, 2014; Cao & Li, 2014). At the same time, digitalization is facilitating for consumers to obtain information in their decision process and to make purchases anywhere at anytime (Bell et al., 2014). This development has led to customers being well-informed, expect short lead-times and great variety of products (Reichhart & Holweg, 2007).

Moreover, in order for retailers to meet increasingly demanding customers, supply chain investments are perceived as a key issue (Piotrowicz & Cuthbertson, 2014). As a result of this, the term supply chain responsiveness has emerged, that stresses the need for firms to

change their supply chains in order to become more responsive to changes in demand (Reichhart & Holweg, 2007). Among the concerns of supply chain responsiveness are the challenges of correctly anticipating demand, handling manufacturing flexibility and creating more efficient information integration within supply chains (Reichhart & Holweg, 2007). In order to improve supply chain responsiveness, digitalization is an important tool which allows for cost-effective information flows between supply chain partners, supports collaboration and coordination in supply chains and can be used for decision support (Auramo et al., 2005). Inditex provides an example of a firm that has started to adapt digitalization in its supply chain (Amed & Abnett, 2015). Inditex base their decisions on real time data collected from stores, which allows them to plan only about 15 percent in advance and to make the rest in response to customer feedback, i.e. producing to demand. However, most retailers still have to plan about 60 percent in advance (Amed & Abnett, 2015), thus retailers are working to transform their chains with the help of digitalization but have not advanced so far (PwC, 2014). Thus, it is relevant to examine how firms within the fashion industry operate in order to integrate digitalization in, and between their supply chain functions and how they work to create a more responsive supply chain.

1.2 Problem discussion

Digitalization is described as one of the most important transformations taking place in today's society affecting both everyday life and businesses (Hagberg et al., 2016). Despite this, the literature regarding digitalization has so far to a large extent addressed the term e-commerce (Hagberg et al., 2016). Blázquez (2014) describes how more and more retailers have moved into e-commerce as a way of seeking greater profitability, and Salmeron & Hurtado (2006) discuss how e-commerce offers new opportunities to extend and increase the market value for firms traditionally engaging in brick-and-mortar activities.

On the other hand, digitalization has greatly affected supply chain processes (Büyükozkan & Göçer, 2018). Büyükozkan & Göçer (2018) argue that digitalization has a disruptive transformation effect across industries, generating value and network effects. Although the digital supply chain started developing quite recently, it has set supply chains and the logistics industry into a rapid change. Xu (2014) discusses issues and success factors of digital supply chain management and the importance of measuring the performance of digital supply chains.

Despite its growing importance, there is still a limited number of studies regarding digital supply chains (Büyüközkan & Göçer, 2018). Furthermore, digitalization is of critical importance to fashion firms worldwide, especially since they are operating in a volatile, fast-changing environment along with increased competition and informed customers, needing greater efficiency and flexibility in their supply chains (McKinsey & firm, 2017).

In response to this, the concept of supply chain responsiveness is receiving increased attention (Reichhart & Holweg, 2007). Christopher (2000) describes time as a competitive weapon where the importance of agility capabilities include all organizational structures, information systems, logistics processes and mindsets. Reichhart & Holweg (2007) argue that there is a lack of a joint definition of responsiveness, with different terms used in previous research such as flexibility (Vickery et al., 1999; Wadhwa & Rao, 2004), agility (Naylor et al. 1999; Yusuf et al. 2004) and responsiveness (Lau & Lee, 2000 ; Randall et al., 2003). In addition, in previous literature much focus has been directed towards flexibility in manufacturing (Lummus et al., 2003).

However, there still seems to be a theoretical gap in literature addressing supply chain responsiveness within the fashion industry and digitalization of the supply chain. Although these capabilities are argued to be a “must” in the future, few in-depth studies treating the questions of how firms actually work towards a responsive supply chain have been encountered. Consequently, there is a need to further study this area.

1.3 Purpose and research question

The purpose of this study is to contribute with knowledge to the area of supply chain responsiveness and digitalization of the supply chain within the fashion industry. Firstly, by examining how firms within the fashion industry work to improve supply chain responsiveness, we hope to contribute with a deeper understanding as to where responsiveness can be improved within a supply chain and in what ways. Thus, the first research question addressed in this thesis is:

How do firms within the fashion industry work to create a more responsive supply chain?

Secondly, digitalization may improve visibility within a supply chain and is described as an important tool to enhance information integration between supply chain actors (Bagchi & Skjoett Larsen, 2003) which may improve responsiveness (Reichhart & Holweg, 2007). Retailers are in comparison to other industries considered to be less advanced regarding digitalization of the supply chain (PwC, 2014). Therefore, by investigating what challenges firms perceive with integrating digitalization in the supply chain, we hope to provide a deeper understanding of why retailers within the fashion industry are less advanced regarding digitalization within supply chains. Consequently, the second research question is:

What are the challenges of integrating digitalization in the supply chain?

We believe that a greater knowledge in this recent subject may help managers and professionals better understand how firms within the fashion industry work to create a more responsive supply chain and assess the challenges when integrating digitalization within supply chains.

1.4 Limitations

In order to allow depth in our thesis, some limitations were made, which might affect the reliability and validity of the study. To be able to provide a better understanding of supply chain responsiveness, that is a core part of our study, we chose to focus on certain aspects relating to determining the potential of a supply chain's responsiveness (see figure 1, chapter 2). Furthermore, to be able to better analyze challenges of integrating digitalization within the supply chain, we have decided to limit the term digitalization to aspects regarding visibility and communication in and between supply chain functions. Consequently, this may have resulted in neglecting parts regarding the studied phenomenon. Also, when referring to the term "market", the Swedish and European market is intended.

Another limitation relates to the choice to focus on Swedish firms, as this may imply a lower degree of generalisability. Nonetheless, our aim is that other firms within the same industry might to some degree benefit from this study as well. The number of firms included in this study could also be regarded as a limitation. However, we considered five firms sufficient in order to obtain the information that was needed to fulfil the purpose of our study. Lastly, since interviews were conducted with one or two respondents from a certain department, this

might not reflect the thoughts or opinions of the entire firm. However, the respondents were chosen on the basis that they would possess sufficient knowledge of supply chain responsiveness, which is the research focus of this thesis.

2 Literature review

2.1 Supply Chain Management

Intense competition in markets all over the world, high consumer expectations along with the fact that product life cycles are becoming shorter and shorter have for long made firms realise that they need to focus on, and invest in, their supply chains (Sell, 1999). Furthermore, the continuous development of transportation and communication technologies, forces a persistent evolution of the supply chain and methods to manage it adequately (Law, 2016).

In a classic example of a supply chain, raw materials are obtained and components produced at one or more manufacturers, then transported to be stored in warehouses before being transported to consumers or retailers (Sell, 1999). For firms it is important to make these chains work as effective as possible in order to achieve strategic advantage (Law, 2016). Sells (1999) defines supply chain management as follows: “*Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize systemwide costs while satisfying service level requirements*”. Thus, supply chain management defines the integration of the mentioned activities into a seamless process (Lummus et al., 2003). As the global economy has become more consumer driven, as opposed to previously production driven (Dicken, 2015), the consumers are now setting the standards which forces supply chains to become more responsive (Reichhart & Holweg, 2007).

2.2 Supply Chain Responsiveness (SCR)

It has been argued that modern day markets are characterized by an increasing level of competition, high volatility of demand and short product life cycles (Storey et al., 2005). For retailers, this implies a low degree of predictability and a requirement to constantly switch product portfolio (Bruce & Daly, 2010), two factors that are especially evident within the fashion industry (Jones, 2002; Fernie & Sparks, 2004; Storey et al., 2005). Furthermore, the

world economy has experienced a shift from mass-production systems, with a less sophisticated provision of product variety, towards so called BTO-strategies (built-to-order), which include a higher degree of customization (Fisher et al., 1994; Gilmore et al., 1997). Thus, there is a pressure on these firms to develop efficient supply chains (Bruce & Daly, 2010).

Reichhart and Holweg (2007, p.1149) defines the concept of supply chain responsiveness as follows: “*The responsiveness of a manufacturing or supply chain system is defined by the speed with which the system can adjust its output within the available range of the four external flexibility types: product, mix, volume and delivery, in response to an external stimulus, e.g a customer order*”. Thus, responsiveness refers to how fast supply chains can respond to customer demands (Reichhart & Holweg, 2007).

Furthermore, the responsiveness can be different at different nodes within a supply chain, i.e. the responsiveness can increase or decrease depending on where a product or service is located within a supply network (Reichhart & Holweg, 2007).

2.2.1 External requirements

Harrison (1996) describes what he considers as external requirements, i.e. factors that require responsiveness. These are factors that firms do not control but rather have to respond to. As an example, the responsiveness of a supply chain is not improved or impaired by removing external requirements such as demand variability. Instead, external requirements rather stresses the importance of supply chains to be responsive (Reichhart & Holweg, 2007). Prior studies pinpoints three different fields of external requirements; demand uncertainty and variability, lead-time and product variety, which are described below.

Demand uncertainty and demand variability is discussed by Gupta and Maranas (2003), where they state that the ambition to adequately meet customer demand is the most important factor for driving supply chain planning initiatives forward. If information regarding demand was predictable, the need for being responsive would decrease if not disappear (Matson & Mcfarlane, 1999). Thus, the requirement to be responsive emerges from the unpredictable changes in customer demand of product mix and volume. Moreover, Randall et al. (2003) recognize demand uncertainty as the principal reason for being responsive.

Singh (2015) defines lead-time as the time it takes from refining raw material to delivering finished goods to the customer. This includes supplier lead-time, manufacturing lead-time, distribution lead-time and logistics lead-time. Moreover, Reichhart and Holweg (2007) describe how lead-times, if handled right, can become an important comparative advantage as customers are becoming more sensitive towards long delivery-times for services and products.

Um et al., (2017) discuss how a high level of product variety can have a positive impact on firm performance, since it can influence factors such as customer satisfaction and market share. Furthermore, a greater variety of products is said to attract variety-seeking customers (Wan et al., 2012). However, too many choices may on the other hand lead to reduced marginal benefits from variety, due to selection confusion for customers. In addition, a higher level of variety creates challenges regarding inventory management and makes it more difficult to accurately forecast demand (Wan et al., 2012).

2.2.2 Internal Determinants

Reichhart and Holweg (2007) have identified a number of factors which they refer to as internal determinants. These are factors that enable responsiveness and are in turn subdivided into operational factors and supply chain integration. Operational factors focus primarily on individual nodes within the supply chain, whereas supply chain integration deals with the integration of partners within the supply chain (Reichhart & Holweg, 2007).

Operational factors

One operational factor is demand anticipation, which according to Reichhart and Holweg (2007) is one of the most indisputable enablers for a supply chain to be responsive towards changes in customer demand and being able to foresee the actual output. Christopher (2000) discusses the “agile supply chain” and the need to be market sensitive. As most firms make sales-forecasts based on earlier years sales figures or shipment, they are forecast-driven rather than demand-driven. In contrast, being market sensitive means that supply chains should respond to changes in market demand based on real time information from e.g. sales in stores. Furthermore, he argues that within a firm’s mixed portfolio of products and markets, products should be treated differently, as certain products have more stable demand than others. In addition, Fisher et al. (1994) argues that firms can develop “accurate response” systems by

dividing products based on how accurate demand can be forecasted. Fisher (1997) argues that for innovative products with an unpredictable demand, a market responsive or flexible supply chain is the most fitting strategy.

More critical to traditional forecasting methods are the professional service firm PwC (2014), who touches on the subject of forecasting. They argue forecasting is still an inaccurate science and the data used is often outdated and incomplete. In addition, supply chain functions generally work separated from each other and often experience a lack of transparency, making it difficult to understand what everyone else is doing. Both Lasi et. al., (2014) and PwC (2014) argue how new technology can automate and improve forecasting, enabling for a network structure within supply chains, where information is shared much more rapidly and to all partners simultaneously. As soon as e.g. manufacturers realise they have low levels of raw material or a sudden increase in demand, signals should be sent to the rest of the network whom then can adjust planning automatically. Even more so, simulation-strategies for different “what if” scenarios can develop within networks (Lasi et. al., 2014). This could enable firms to work proactively, anticipating disruptions and changes in demand and to adjust their supply-chain accordingly (PwC, 2014).

Another operational factor discussed is manufacturing flexibility, which can be achieved in various ways (Reichhart & Holweg, 2007). Lummus et al. (2003) discuss different dimensions of manufacturing flexibility such as automation, i.e. the degree of flexibility within the automation of manufacturing technologies, the product dimension, meaning the time it takes to add or change parts in the system, and delivery, referring to the capability of the system to respond to changes in delivery requests. Besides factors directly linked to manufacturing flexibility, Hines (1998) uses Mather’s P:D ratio (Mather, 1988) to describe how a decrease in the system’s throughput time implies a higher degree of responsiveness. The P represents a systems response time and the D stands for the customers willingness to wait. The reason why it should be considered a determinant is because it enables products to be delivered to consumers without the requirement of costly inventories or need for market anticipation (Hines, 1998).

Lastly, inventory is an operational factor that can affect responsiveness (Reichhart et al., 2006) Just-in-time systems have placed pressure on inventory turns, and in order to answer to the customer demand driven environment, flexibility needs to exist in all functions connected

to the warehouse, such as receiving, picking and sorting, shipping and packaging (Lummus et al., 2003). Hübner et. al., (2016) argue that in order for retailers to enable a flexible and demand driven inventory allocation, channels such as online- and offline divisions must be integrated.

Supply chain integration

An example of a supply chain integration-factor is information integration. Lee et al., (1997) describe how information flows are directly influencing the production scheduling, inventory control and delivery plans in all parts of the supply chain. Furthermore, to improve information integration, Christopher (2000) suggest a “virtual supply chain” or “supply chain collaboration” which intends to create transparency and openness of both demand and capacity information while trying to minimize time delays. Bagchi and Skjoett Larsen (2003) argue that to improve these factors, information technology is often the tool used, or, a closer integration among partners within a supply chain to improve two-way communication.

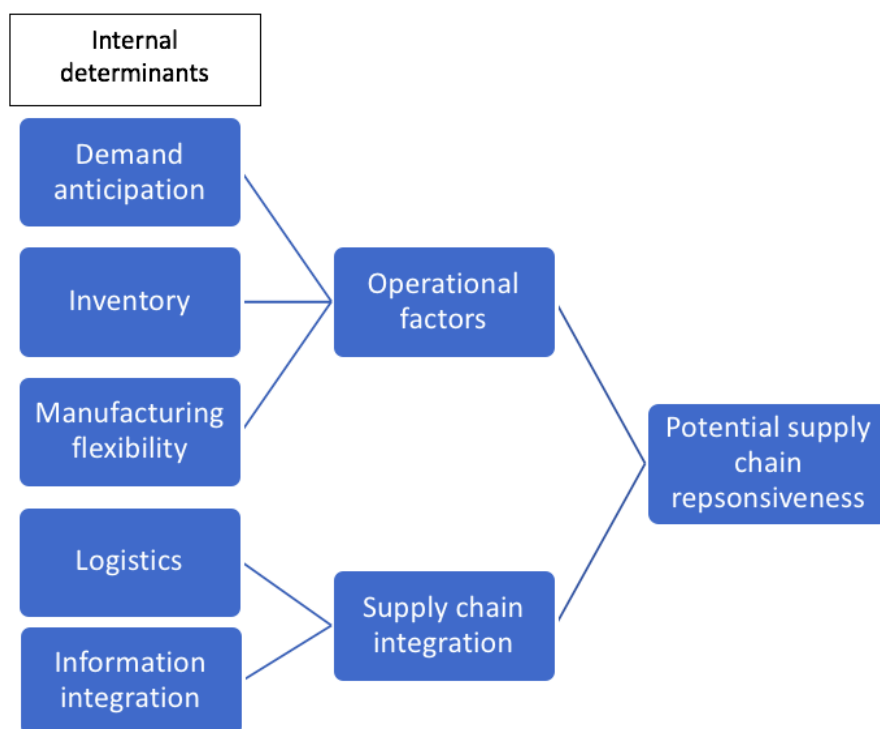
Akkermans et al. (2004) argue that since competition is increasingly taking place between supply chains rather than between separate firms, transparency between different supply chain partners is of increased importance. However, they state that transparency is not something that simply happens, but is rather a result of trust between supply chain partners. Furthermore, an insufficient level of trust between buyers and sellers in volatile markets could lead to distortion in demand information (Lee et al., 1997). This is illustrated by the tendency of buyers to order more than needed during industry upturns, assuming they will be getting less in any case. As suppliers in general are aware of this, they in turn tend to decrease all incoming demand levels (Lee et al., 1997).

Another key factor regarding supply chain integration is geographical integration and logistics (Reichhart & Holweg, 2007). Reichhart and Holweg (2007) argue that a higher level of logistical proximity can enhance responsiveness by cutting transportation lead-times and enabling cross-firm cost sharing. As an example, utilizing a “milk-run” approach, where a larger number of unit loads are transported together (Hanson & Finnsgård, 2014), will most probably have a positive effect on responsiveness as it implies a reduction in transport times (Reichhart & Holweg, 2007).

Furthermore, Guercini and Runfola (2004) state that firms have to make the choice between a global-, or a local supply chain. The first bringing benefits like the ability to choose suppliers all over the world, which creates opportunity to gain from economic advantages. The second alternative, has the advantage of suppliers being close to the markets which makes them more responsive to changes in e.g. demand, but at a higher cost (Guercini & Runfola, 2004). Thus, countries that are closer to the markets are more competitive regarding products with a high need for refilling (Bruce & Daly, 2010). Eastern Europe, Turkey and India are becoming increasingly popular as places of production for Western firms, in response to competition from fast fashion specialists (Bruce & Daly, 2010).

Figure 1. Internal determinants determining potential supply chain responsiveness

Source: adapted from Reichhart & Holweg, 2007, p. 1161



2.3 Digitalization of supply chains

Modern day firms are becoming increasingly aware of new technologies and the possibilities they can bring, and have therefore started to consider how digitalization can be implemented in their supply chain in order to add value to the firm (Büyüközkan & Göçer, 2018). Recent studies have highlighted the term “digital supply chains” (DSC), and in contrast to traditional supply chains consisting of several steps working in silos, DSC is turning the chain into an integrated system that runs without disruption. Innovations within the DSC include Big data,

cloud computing, Internet of things, augmented reality, robotics and more, all of which may be beneficial for supply chains and logistics (Büyüközkan & Göçer, 2018). Furthermore, Information and Communication Technologies (ICT) may facilitate efficient ordering and tracking of goods within the supply chain, particularly when it is operating on a global basis (Bruce & Daly, 2010). Retailers therefore use ICT to gain control over product development and supply chain processes (Bruce & Daly, 2010).

Within the field of DSC, the term Industry 4.0 has been discussed by several authors. It was first launched by the German government (Laasi et. al, 2014) and suggests that on the basis of advanced digitalization, Industry 4.0 will create new business models as existing business systems are combined with business application software, with the potential of optimizing production and logistics (Federal Ministry of Education and Research, n.d.). According to PwC (2014), firms succeeding to develop highly digitalized supply chains may expect increased revenue of about 3 percent annually as well as improving efficiency of about 4 percent a year. However, retailers have not progressed very far in digitalizing supply chains, as they are still liable to severe disruptions in their supply networks (PwC, 2014).

Both supply chain- and Industry 4.0 literature point to the fact that supply chains are becoming less linear and changing towards a network structure. Braziotis et al. (2013) argue how supply networks are becoming increasingly complex and that digitalization may help to improve flexibility and efficiency in these processes. Furthermore, Laasi et. al. (2014) discuss the development of cyber-physical production networks, whose existence is enabled by highly automated, digital services.

2.3.1 Digital supply networks

The components of the world economy is progressing into being interconnected. i.e. *“the world economy consists of tangled webs of production circuits that cut through, and across, all geographical scales”* (Dicken, 2015 p. 50). As a result of the increased complexity of supply structures, supply networks have become a major concept (Braziotis et al., 2013). Instead of a linear supply chain, a network structure may evolve, enabling all links within the network to receive information about the needs and challenges for the rest of the network (PwC, 2014). Technology may enable supply chains to share data directly help to probe markets and facilitate for faster responses to market change, thus, improving responsiveness.

This has the possibility to help create information-based supply chains rather than inventory-based (Christopher, 2000).

If actors within a supply chain strive to act upon the same information and figures, it requires a complete process integration (Christopher, 2000). This means that functions within a supply chain must work between buyers and suppliers, common systems, joint production development and share information. This is becoming more and more important as firms tend to outsource activities that do not cohere with their core activities, which creates an increasing reliance on suppliers and partners (Christopher, 2000). Several business networks and collective cloud-based platforms are starting to develop what aims to become the “single source of truth”, enabling supply chains to optimize under different circumstances (PwC, 2014). The cloud-based services work similar to social networks which allow for full- and quick interaction between supply chain stakeholders, monitored by a cloud-based command center. By sharing information across the supply chain, delivery lead-times may be shortened and freight and inventory management improve. The agility of a supply chain will also increase as a result of swift exchange of data (PwC, 2014).

Christopher (2000) states that we are entering the era of “network competition” where the winners will be the actors who have a better structure and organize their networks, devote to stronger, agile and more closely managed relationships with partners and the final customer. Finally he argues that in the challenging global economy of today, the key to sustainable leverage will be to take advantage of competencies and strengths of network-partners, thus obtaining a better responsiveness to changing customer demands.

3 Methodology

3.1 Research design

In line with Bryman and Bell (2011), a qualitative research approach was chosen in order to understand and analyze how the case firms, operating within the fashion industry, interpret their social world and thereby to understand how each of the firms are working to create a more responsive supply chain and what challenges they perceive with integrating digitalization in the supply chain. This builds the basis for a deeper analysis as viewed from the perspectives of the firms.

This thesis intends to answer the authors' research questions "*how do firms within the fashion industry work to create a more customer responsive supply chain?*" and "*what are the challenges of integrating digitalization in the supply chain?*", thus case study research was considered to be appropriate as Yin (2014) states that a case study is advisable for research questions involving *how* or *why* and when studying a contemporary phenomenon.

Moreover, a multiple case study design, and more specifically a comparative design was chosen to be able to compare and contrast different cases. It is argued that this type of design makes it possible to understand social phenomena better when they are compared in relation to two or more meaningfully contrasting cases or situations (Bryman & Bell, 2011). In addition, by comparing two or more cases, this gives us a better position to establish the circumstances in which a theory will or will not hold, which is said to improve theory building (Bryman & Bell, 2011). It is also argued that the evidence found in multiple case studies may be more robust than single case studies (Yin, 2014).

Additionally, a case study can be divided into three classifications depending on its approach, including exploratory, descriptive and explanatory approaches (Yin, 2014). Since theory and research regarding supply chain responsiveness and digitalization of supply chains is somewhat limited, an exploratory approach will be applied to this thesis.

Lastly, Bryman and Bell (2011) state within a deductive approach, theory guides research. In this study, the choice was to use deductive reasoning, as the questions asked were based on theory of supply chain responsiveness and digitalization rather than a concept or phenomena. Even though no formal hypothesis has been constructed, theory has guided the research process forward.

3.1.1 Selecting the multiple case study

The choice to study supply chain responsiveness and digitalization within fashion industry was a deliberate decision. Fashion industry is characterized by a high volatility of demand and short product life cycles and is therefore an industry where efficient supply chains are considered to be of great importance (Bruce & Daly, 2010). This industry has thus provided us with a context to better understand in what different parts of the supply chain firms are working to create responsiveness.

In order to find relevant samples that would help us contribute to theoretical understanding of supply chain responsiveness and digitalization, a purposive sampling was chosen. This method is often selected when researchers want to find organizations and employees that are relevant in order to understand a social phenomenon (Bryman & Bell, 2011). Since our study is focused on firms within the fashion industry, we made contact with several fashion firms over email, where contact was established with three firms.

There has also occurred convenience sampling to a certain degree, since the cases were selected partly because of their accessibility. We were able to establish contact with two of the case firms when participating at a seminar on digitalization within the fashion industry. Four out of the five firms studied also have their head offices located in the Gothenburg area. This provided us with the opportunity to get access to relevant employees working at the head offices of each case firm.

Firms of different sizes were studied in order to provide a broader view of how firms within the fashion industry work to improve supply chain responsiveness and the challenges of integrating digitalization within their supply chain. Furthermore, the case firms differs in terms of sales channels, and the number of physical stores, which may impact on how they work to improve supply chain responsiveness. It should be mentioned that this research design could also lead to the researchers focusing more on the comparison itself rather than the specific context, and could lead to a more explicit focus at the outset rather than having a more open-ended approach (Bryman & Bell, 2011). In addition, multiple-case studies require more resources and time (Yin, 2014), and since the time has been limited, the analysis might not be as profound as if a single-case design was applied. Nonetheless, the analytic benefits of having more than one case are considered to be great (Yin, 2014) and thus, we thought it to be an appropriate method for this thesis.

Five firms were chosen for the study, Nudie Jeans AB, Broken Bird Bootmakers, and three firms that wished to stay anonymous and will hereafter be referred to as Coat AB, Dress AB and Jacket AB. These firms will be presented below:

Table 2. Coat AB. Annual Report Coat AB (2017).

Firm name	Coat AB
Number of employees	2715
Turnover (tkr)	4 916
Nr of stores in Sweden	180
Nr of stores abroad	183

The logistics manager at Coat AB states that the business idea of the company was that women should have the possibility to be well-dressed at an affordable price. Within 10 years after the founding, the firm had 25 stores and also started to sell men's clothing. Since then, they have also expanded to four countries on the European market. Coat AB's targeted customer is the middle-aged woman and the firm sell their own products in wholly owned online- and offline stores. As the firm has grown, they have broadened their assortment and they are still aiming to sell products at an affordable price.

Table 3. Nudie Jeans AB. Annual Report (2016).

Firm name	Nudie Jeans AB
Number of employees	134
Turnover (tkr)	469 251
Nr of stores in Sweden	5
Nr of stores abroad	22

From the very beginning Nudie Jeans had a focus on sustainability and the notion of a circular economy. The Chief of Operations (COO), F. Stenberg describe that the firm's most important product is jeans and the targeted customer is male and not very sensitive to shifting trends. Nudie Jeans try to have a classic line of products and the firm do not consider itself to be a fast-fashion firm. In the last 10 years, they have shifted structure from relying exclusively on wholesale to opening wholly owned stores and launching their own online shop. As a result, almost 50 percent of their asset turnover last year derived from in-house sales and the rest from wholesalers. Europe is their most important market, although, overall the firm sell their products in 50 different countries, predominantly using wholesalers.

Table 4. Dress AB. Annual Report (2017).

Firm name	Dress AB
Number of employees	188
Turnover (tkr)	264 039
Nr of stores in Sweden	54
Nr of stores abroad	0

Dress AB have been operating for almost 40 years and have over 50 stores all around Sweden. They are a part of a larger group and sell their own brand as well as products from a number of other brands. Furthermore, they are focused on selling womens' clothing and accessories and their targeted customers are mainly women in mid-life. The average age of the customer is estimated to be around 54 years according to the Chief Information Officer at Dress AB. In recent years, they have worked on developing their assortment to better fit their targeted customer and strive to offer different products with an inspiring variation in quality, colours and patterns.

Table 5. Jacket AB. Annual Report (2016).

Firm name	Jacket AB
Number of employees	18
Turnover (tkr)	105 316
Nr of stores in Sweden	0
Nr of stores abroad	0

Jacket AB was founded in Gothenburg and started by selling products through distributors and agents. Later, they also started e-commerce through their own web-shop. Jacket AB's markets include Sweden, several European countries and Japan. According to the CEO, Jacket AB are best known for their jackets and aim to make clothes that are easy to wear, combine and that fits a wide range of customers. Furthermore, the firm's mission is to produce sustainable clothes of high quality that will last for many years.

Table 6. Broken Bird Bootmakers. Annual Report (2016).

Firm name	Broken Bird Bootmakers
Number of employees	0
Turnover (tkr)	274
Nr of stores in Sweden	1
Nr of stores abroad	0
Most expensive product (SKR)	5000

Michael Bergman, CEO and co-founder of the firm founded the firm 2014, inspired by Chris Anderson, author of the book "Makers: The new industrial revolution". The idea of the company is that when producing digital, you don't need to own factories and that all is possible with the digital revolution. M. Bergman founded the firm with Mats Hallman, owner of Hallmans skor and they started the business using 3D scanners to scan customers feet, matching them with existing sizes and producing unique lasts. M. Bergman state that Broken Bird Bootmakers make bespoke shoes in an exclusive segment.

3.2 Data collection

Our study mainly consists of primary data, which is the information obtained through semi-structured interviews. This allowed us to get access to accounts on how firms have worked to develop different parts of their supply chain to become more responsive, and the challenges in digitalization that was seen as difficult.

3.2.1 Secondary data

We have used secondary data in our research, gathered from electronic sources, to provide the reader with a background and context regarding the case firms. The information was retrieved from retriever business database and the purpose was to provide the reader with complementary information to the primary data.

3.2.2 Primary data

Interviews

In total, five qualitative interviews were conducted. Four of the interviews were made in person; one with the supply chain controller as well as the logistics manager at Coat AB, one

with the Chief Executive Officer (CEO) at Jacket AB, one with the Chief Information Officer (CIO) at Dress AB and one with the Chief of Operations (COO) at Nudie Jeans AB. One interview was conducted via telephone with the COO L. Astengo and CEO, M. Bergman at Broken Bird Bootmakers.

Our wish was to record the interviews since it allows the interviewer to listen carefully to what is being said in order to ask relevant follow-up questions and to not be distracted by taking notes (Bryman & Bell, 2011). This was done in four interviews. However, due to ethical reasons discussed in the previous paragraph, the wish of two firms to not be recorded had to be respected, whereby the interview was documented by taking notes. Nevertheless, not being recorded might also prove to have positive outcomes, since it could make the participants feel less self-conscious and therefore might talk more freely around the topic (Bryman & Bell, 2011). Regarding the three interviews that did get recorded, they were conducted rather late in the research process and decision was therefore made to transcribe only some parts of them that we considered most relevant for our study. It is important to note that in both cases, errors may occur when transcribing since there is also important information in how an answer is delivered, for example in intonation and hesitations (Bryman & Bell, 2011). This might apply especially to the interviews that were documented by taking notes.

Four of the interviews were conducted in Swedish since we believed it would make the participants more comfortable talking their native language and therefore give more elaborate answers. The parts of the interview that was later used in the thesis were translated by the authors and consequently it is important to point out that certain words cannot be directly translated and minor errors might occur. However, we believe that these will not affect the credibility of our study in a significant way. One interview was conducted in English since one of the participants did not speak Swedish.

Choice of interviewees

We chose to interview persons working at the head offices of the selected firms.

However, our samples are to some extent opportunistic and convenience ones (Bryman & Bell, 2011). For example, some of the interviewees were selected by individuals within the chosen firm based on the information they received on the study through our e-mail. Thus, we did not get to select all the participants ourselves. Furthermore, one cannot assume that

one single respondent knows everything about the organization (Bryman & Bell, 2011) and since the topic of responsiveness touches upon many different functions within a firm, it is therefore important to have in mind that not all aspects are taken in consideration.

Nonetheless, in order to receive relevant information, it was important that the interviewees had knowledge of their supply chain functions and to some extent the digitalization within the firm.

Interview structure

There were three main types of interviews: *structured*, *unstructured* and *semi-structured* interviews (Bryman & Bell, 2011). The structured interview is constructed to answer a clearly specified set of research questions, by using means such as standardised questionnaires (Guthrie, 2010). They usually have a large coverage compared to unstructured interviews, but tend to lack their depth (Guthrie, 2010). When conducting unstructured interviews, the researcher has only one or a few prepared questions that the respondent then may answer freely to, thus resembling a regular conversation (Bryman & Bell, 2011). In semi-structured interviews, the researcher uses a list of prepared questions on themes that he or she wishes to cover, although leaving the interviewee with a great deal of freedom in how to reply. The questions tend to follow a specific order, but with room for additional questions in order to pick up on matters discussed by the interviewee. However, generally the same questions set the basis for all interviews conducted in the study (Bryman & Bell, 2011).

We chose to base our study on semi-structured interviews as we considered those the most appropriate type for several reasons. First of all, since semi-structured interviews follow the same interview guide, it makes it possible to compare the information from different interviews (Guthrie, 2010), allowing us to notice any patterns or disparities. At the same time, having the possibility to ask follow-up questions provides flexibility that can better help understand the respondents' views (Guthrie, 2010) and allowing us to get more detailed answers. The respondents were allowed to answer relatively freely to the questions, which compared to structured interviews let us dig deeper into the topics of the questions. However, since the phenomenon being studied is rather broad, a semi-structured type was preferred over an unstructured to be able to guide the interviewees in the right direction.

Execution of qualitative interviews

The types of case study interviews used were so called shorter case study interviews, meaning that they were more focused and had the length of approximately one hour (Yin, 2014). This allowed us to keep the interviews open-ended but at the same time follow or case study protocol more closely.

A mix of interviews were used, where four were conducted in person and one over telephone. After selecting relevant firms for our study, contact was made through e-mail. In the preparations before the meetings, certain ethical aspects were considered referring to the the four main areas of ethical principles defined by Diener and Crandall (1978): *harm to participants, lack of informed consent, invasion of privacy and deception*. According to Bryman and Bell (2011) people should be well informed about the research process in advance, which relates to the principle of informed consent. Thus, we informed the participants of the purpose of our study and gave a description of the topic being researched. We asked the participants if they would allow us to record the interviews, where two firms chose not to be recorded. In those cases, this was respected and notes were taken instead. In order not to break the principle of invasion of privacy, the participants were not forced to answer any questions and they got to decide for themselves how detailed answers they wanted to give. The interviewees were also asked if they wanted to be anonymous as is recommended to not cause harm to the participants (Bryman & Bell, 2011). Three firms wished to stay anonymous and thus, this was respected because of the reasons just mentioned. In addition, anonymity may affect the credibility of the study negatively, however, it might also lead to participants talking more freely regarding the topic.

The same interview guide was used for all firms to ensure cross-case comparability. However, as the authors received increased information about the studied phenomenon as time went by, some small changes in the form of additional follow-up questions were added, as well as being better equipped to ask relevant follow-up questions during the interviews. We also chose to send our questions and background information about the topics being studied in advance, since it was considered to help our study. In this way, the interviewees would have a chance to reflect on the questions and discussing them with other employees of the firm, thus being better prepared when it is time for the interview. This was also done in respect to the ethical principle of informed consent, and to give the participant the chance to make any possible objections before the interview. Reviewing questions before the interview

may lead to practiced answers instead of spontaneous and honest ones. However, considering the nature of our research area, we considered well-thought answers to be more beneficial than spontaneous ones, since they would decrease the risk of forgetting to bring up a certain point of view and would likely be more extensive.

The first interview was held face-to-face with the logistics manager and supply chain controller at Coat AB at their head office in the Gothenburg area. In this interview, the participants had prepared some slides after reading our interview questions. Thus, they spoke relatively freely about the subject, although some follow up questions were asked in response to the answers. Both of the interviewees had worked at the logistics department for several years and had experienced the development within the logistics function that had started in recent years.

The second interview was also held face-to-face with the CEO at Jacket AB at their head office in Gothenburg. The questions were based on the interview guide, although some follow up questions were asked in response to her answers. Since she is the CEO for a small firm, she explained that she had the overall responsibility and worked with questions regarding the growth of the firm. Before, she had worked at several managerial positions at two different firms within the fashion industry and thus possessed a lot of knowledge about different functions.

The third interview was conducted through telephone with COO, Laureano Astengo (hereafter referred to as L. Astengo) and the CEO and co-founder, Michael Bergman (hereafter referred to as M. Bergman) at Broken Bird Bootmakers. The questions followed the interview guide but some follow up questions were asked in response to their answers. M. Bergman founded the firm in 2014 and L. Astengo joined the firm in 2015 and started the firm's operation. Thus, they possess information that concerns every part of the firm.

The fourth interview was held in person with the chief of operations at Nudie Jeans AB, Finn Stenberg (hereafter referred to as F. Stenberg), at their head office in Gothenburg. Some modifications were made in the interview guide in response to previous interviews in order to better help answering our research questions. Follow up questions were also asked in response to his answers and based on previous interviews. F. Stenberg have a long experience

of working at the firm and has worked at every divisions except design, and thus his experiences from different departments were beneficial when answering our questions.

The last interview was held face-to-face with the chief of informations (CIO) at Dress AB, at their head office in Gothenburg. The updated interview guide was used as a base for the questions and follow up questions were asked in response to her answers. The CIO was the right person to talk to since she had a long experience of working at the firm and had previously worked as the logistics manager. She later got an education in IT and worked within both logistics and IT for a while, before starting as the CIO. Thus, she possessed a great deal of knowledge, relevant to our study.

After the interview, the answers were sent to the respondents as to give them the opportunity to correct any eventual errors in the information. This was done in order with the ethical principles as to not give any harm to the interviewees.

3.3 Analysis of the data

The interviews were all transcribed within one or two days, in order to give as accurate transcription of the data as possible. The data analysis process began after the first interview was carried out, in such a way that the data was thoroughly examined in order to identify findings relevant to our research questions. The same method was applied to all collected data i.e. after each conducted interview.

After the last interview, the coding of data began and classifications of the empirical findings were made. The empirical data was presented in line with the internal determinants introduced in figure 1, chapter 2. Subcategories were based on our main findings within each category. This was done in order to create a structure which would help us answer our research questions.

The analysis discusses how firms within the fashion industry are working with supply chain integration and operational factors in order to become responsive, seen through the lens of the theoretical chapter. The data collected was processed in order to find patterns, similarities and differences, providing insights in what parts of the supply chain firms are working with to

increase responsiveness and what challenges they face when integrating digitalization in their supply chain.

3.4 Quality of the study

3.4.1 Credibility

In order to ensure a higher degree of credibility, a respondent validation was made, meaning that the empirical findings were submitted to the participants of the study. This is important since it allows the interviewees to confirm if the researcher has correctly understood their social world (Bryman & Bell, 2011). In this study, only one interview was conducted with each case firm, with one or two interviewees. Thus, it is important to have in mind that other interpretations and perspectives of the studied phenomenon might exist in other parts of the firms that is not accounted for in our study. However, to ensure that the interviewees of the different firms perceived the studied phenomenon in similar ways, the same questions laid the basis for the interviews, and repeating- and follow-up questions were asked.

3.4.2 Transferability

Qualitative research is typically associated with depth and the understanding of a phenomena as seen from the perspective of a small group or of individuals who shares particular characteristics (Bryman & Bell, 2011). Since we have conducted qualitative research, it is not possible to generalize our findings. Instead the aim was to build a description that would allow others to make judgements about the transferability of the findings to other contexts. This was accomplished by giving a description of the studied firms and their market positions. It is also argued that multiple case studies can contribute to a more robust set of findings (Yin, 2014).

3.4.3 Dependability

Dependability is often paralleled with reliability in quantitative research and the concept of consistency (Golafshani, 2003). Thus, some measures were taken in order to achieve a higher level of dependability. Firstly, a thorough picture of the research design was presented, including the data collection methods. Records were kept which include interview transcripts, recordings and selection of research participants. Furthermore, a description of the analytical process was presented in order to provide the reader with insights as to what data analysis

decisions were made. In this way, an examination following the completion of the study can be done (Bryman & Bell, 2011) and there is an increased possibility to execute the same study at another point in time.

3.4.4 Confirmability

Confirmability, which is in line with objectivity, relates to the degree to which the researcher has allowed his or her values to intrude in the study (Bryman & Bell, 2011). A qualitative approach results in a more subjective perspective in comparison to a quantitative method, and complete objectivity is therefore impossible in business research (Bryman & Bell, 2011). Thus, certain measures have been taken in order to achieve a higher degree of confirmability. Three of the interviews were tape recorded, in order to avoid reproducing a false picture that could be influenced by the authors own values. The remaining two wished not to be recorded, which was respected due to ethical reasons and instead notes were taken, which may have resulted in less detailed answers. Furthermore, transcriptions and written notes from all interviews were preserved in order for the authors to have the possibility to return to them and inspect the answers at later stages in the study.

4 Empirical data

4.1 Supply chain integration

4.1.1 Information integration and digitalization

Regarding information integration within supply chains, F. Stenberg at Nudie Jeans argues that systems are becoming more accessible: *“A lot of systems have been abstract but products and systems are starting to develop that are more understandable and easier to integrate”*. The firm thought they could outsource functions not directly linked to their core activities, as stated by F. Stenberg: *“Earlier we said that we were not an IT-firm or logistics firm and thought we could outsource these functions until the system evolved that could solve everything”*. However, Nudie Jeans realised they needed several systems that were specified on different supply chain functions which had to be connected to get an overview of all activities. Thus, different functions are now connected and able to share information while using different systems, monitored by the IT-division. The increasingly advanced system has led to new challenges, as the need to educate employees becomes more obvious. F. Stenberg

expressed: *“Since we are not able to hire a hundred IT-employees, every business area has to include this (IT) in their day-to-day work”*. He also describes how demand for high IT-knowledge is more common when hiring new personnel, as well as stressing the need for divisions within their supply chain to develop the correct mentality when integrating these systems. Certain individuals within different divisions have been pushing for integrating new systems and have a more positive attitude towards IT. Consequently, there is a difference between divisions to which extent information sharing systems are used correctly.

Integrating manufacturers in digital information sharing systems has proved to be the hardest part. For example, in the case of delays from the factory in Italy, Nudie Jeans would be informed over email or phone call. F. Stenberg mentions: *“The biggest hinder is that a lot of manufacturers are more introvert, often they are engineers or fabricants, distant from the consumer. They are also quite small and do not have the resources and are acting in a business that is under heavy pressure”*. Manufacturers are external partners and therefore Nudie Jeans cannot force them to invest in information integrating systems. Instead, it is Nudie Jeans who has to offer them solutions that are easily applicable to their operations.

According to F. Stenberg, the benefits when different functions and divisions are connected and when a positive mentality regarding IT is established are, most importantly, that it creates new possibilities. As different functions within the supply chain become more connected and visibility is improved, employees can report insights and ideas regarding other functions, which may improve efficiency as well as the customer experience. This was stated by F. Stenberg: *“Along with the development of new technologies such as Artificial Intelligence and Big Data, we can include and spread more data and information through the supply chain”*. To conclude, he points to the fact that Nudie Jeans can afford to make essential investments whereas most firms in their business are experiencing tougher conditions and cannot afford to make necessary investments.

The CIO at Dress AB states that the firm has not developed systems for enhanced information integration. The existing systems are slow and hard to integrate with new ones and she describes the firm in terms of: *“...a large ship where it takes time to change course”*. In many cases, information is not shared automatically within the supply chain, e.g. when something unexpected occurs with their suppliers, information is spread through their buyers or purchasing manager, using telephone or e-mail. When information has reached the

purchasing manager, information is quickly spread due to the facts that their supply chain is rather small and most functions are located at their head office. Furthermore, the CIO stresses the fact that they have previously invested in systems in this area that, in the end, turned out to be more of a trend that no other actor used: *“In the end it is very difficult to know which system to choose, and how fast we need to be. It takes time to develop these systems because there are so many processes involved in every step, we have systems that only our suppliers can program”*. The function within the supply chain where information integration is most developed is with their logistical partner. However, Dress AB does not share or connect systems, but information is shared through File Transfer Protocol-servers (FTP). When products arrive at their warehouse, which is managed by their logistical partner, a file is sent to Dress AB who registers the information and allocates the different products to their stores or the online-shop. The logistical partner handles all the packaging and stock inventory and systems are separated between the logistical partner and the firm. Consequently, all information is manually transferred between them.

Cloud computing and Big data

F. Stenberg points out how processes have become more complex and interconnected, forcing Nudie Jeans to work cross- functions, divisions, and individuals. He expresses how: *“The mastermind who solves all problems on his own does not exist anymore”*. As a result, teamwork cross functions are constantly occurring and therefore it has been a great challenge to develop reliable flows of information. Nudie Jeans has integrated the cloud-computing and management tool-program Asana for this purpose. The program collects information regarding all ongoing projects, making them transparent between functions. Also, it enables personnel to create joint checklists and receive automatic notifications whenever a change is made in an ongoing project. As a result, information management has become more efficient and qualitative and has created a greater sense of participation and consciousness among employees. which was mentioned by F. Stenberg: *“Everyone is more conscious regarding what we are supposed to do, why we do it and where responsibility lies”*. The information is shared within the Nudie Jeans group but external actors may also be connected to Asana. As an example, external vendors and suppliers may gain access to information considered relevant to them.

F. Stenberg describes how Nudie Jeans has a desire to connect all functions and partners within their supply chain to their system, aspiring to ensure that: *“If the information is not in*

the joint system, it does not exist, the truth is there". If achieved, he envisions how every order can be tracked and commented in a completely different way. Consequently, it would give them a better overview on their status in different operations and suggestions for future developments. This will also trigger engagement among employees and new ideas from unexpected sources. Another gain is faster decision making and clarity as to where responsibility lies and who is accountable. He explains how today's communication over email is problematic and creates uncertainty regarding accountability. F. Stenberg gives an example of when a person receives a copy of an email: *"...how should I act then? what does it mean?"*. When information is shared through emails, there is a risk that correct information does not reach the intended person.

The CIO at Dress AB describes how the firm do not use a joint cloud computing service but states that some sort of joint systems where e.g. inventory balance could be visualized is desirable. She questions however, if it is necessary for all data to be visible and shared, by stating: *"This thing about how all information should be visible does not really work and I do not think it needs to be (visible) either. Every process is unique and it is really only certain individuals that needs to know, not the whole chain"*. The CIO adds that it is mostly the headquarter that is in need of information as they link all functions together. She explains: *"Some firms seem to gather information for the sake of gathering information and not to produce, if information is to be gathered it must be of use"*. Furthermore, she questions if it is even possible to share all information within the supply chain. Since the firm is publicly traded, legal aspects limit the ability of Dress AB to share information to all actors within their supply chain.

Broken Bird Bootmaker uses a shared Dropbox folder with their producers, which contains excel documents with codes for every characteristic of models (e.g. difference in color). When an order is placed, a PDF-file is sent to the shared Dropbox folder and every Monday the excel file is updated as of the whereabouts of a certain shoe and expected time of arrival.

4.1.2 Logistics

Mode of transport from manufacturers

According to F. Stenberg, Nudie Jeans have 95 percent of their production in, or close to Europe. He describes how a large part of their clothing is transported by truck and train, but also by air freight when the articles are going outside of Europe. Italy is one of the firm's

main countries of production which is beneficial regarding lead-times. He mentions: *“Our lead-times from Italy are fairly short, most often we send products from Italy on Fridays, arriving to Sweden the Monday after and are then delivered to our inventory on Tuesday”*.

In contrast, The CIO at states that Dress AB avoids transporting their goods by air freight to all costs: *“Basically, we do not transport anything by air freight. If the goods are extremely delayed it might be used, but if that is the case the supplier will pay for it. However, it is not environmentally friendly, therefore we prefer to avoid it”*. The majority of Dress AB’s production is located in China and the firm transport their goods by boat where the lead-time often is four to five weeks.

Coat AB who has a majority of their production in Asia, has also chosen boat freight as their primary mode of transport. In line with Dress AB, the choice is based on environmental reasons, and since the shipping firms have slowed their pace due to environmental and cost reasons, the lead-time from China to Sweden is about 40 days.

Frequent deliveries to stores

Coat AB has changed their logistics in order to achieve a more efficient refill in stores by introducing a new systems change. Before the change, they did deliveries two times per week to their different stores. Nowadays, the deliveries can be much more frequent, as expressed by the logistics manager: *“Today we have a central warehouse in Gothenburg, providing the entire Nordic market with daily deliveries”*. This development has in turn made it possible to decrease the inventories in the stores, leading to a more efficient refill distribution.

Dress AB acts in a similar way where the firm has the ability to make deliveries up to five days a week, but only deliver one time a week to some stores. The choice is based on the turnover, inventory and size of the stores. The CIO points out that the distribution lead-time when transporting goods has not really changed since she started to work at the firm in 2001, but rather the approach to how and when the goods are arriving has changed: *“Before, basically all goods were arriving at the beginning of the season, instead of coming in at different occasions during the season. That part has changed a lot”*. Furthermore, she explains how the firm has developed different “order points” to make their logistics more efficient: *“We have adjusted the order points to prevent the distribution of excessive flows of goods to stores. The order points can be corrected if for example something is selling better*

somewhere of reasons such as new location, a larger customer flow or new personnel”.

Lastly, she discusses the example of the fashion group, Inditex, and their fast logistics flow from manufacturer to stores: *“the logistics function of Inditex is desirable, apart from the somewhat extreme destruction of the environment. One wishes to have this speed in logistics in these flows, but in order to achieve this you need to have factories of your own”.*

Deliveries to customers

Regarding deliveries directly to customers that has ordered through Dress AB’s webshop, the firm is picking the different orders from their warehouse in Gothenburg every morning, in order to send them as soon as possible. This was stated by the CIO: *“There are daily deliveries to the webshop, it is important directly towards the customer”.* At the same time, the CIO means they do not have the most demanding customers regarding fast deliveries: *“We do not have the most demanding customer, I believe the younger consumer is more picky regarding these fast deliveries”.*

The CEO at Jacket AB emphasizes how their customers rather are concerned with factors other than speed: *“Our customers are primarily interested in environmental issues and quality, but also how the products are produced. I would say quality is more important than fast deliveries”.*

F. Stenberg, adds that in the future Nudie Jeans aim to merge the two business areas of online and physical stores which may increase the responsiveness towards the customer: *“Imagine if we have 100 jackets at our warehouse which are connected to our e-commerce and 20 jackets in our stores worldwide. Then all of our 100 jackets run out at our webshops but 80 remain out in our stores. We will develop algorithms to make it possible to send the jacket to a British customer from one of our shops in Shoreditch instead of our central warehouse”.*

4.2 Operational factors

4.2.1 Inventory

Four years ago, Coat AB decided they wanted to achieve a more efficient level of distribution, since inventories in stores were considered too large. The firm also wanted to keep a central warehouse to be able to deliver to customers online. These function have since then developed and inventories in stores are being refilled in response to sales, regarding

sizes etc. The supply chain controller at Coat AB describes that: *“Since the markets can receive refills every day of sizes and products that have run out, you have to make a well-considered decision regarding a certain product or size that needs to be refilled. At the same time as you do not want anything to run out, it is also unwanted to have excessive inventories in stores”*. The allocation of the different goods can be changed up until two days before it arrives at the warehouse. Similarly, at Dress AB they have so called “order points” at every article and size level, to make sure that each store have a certain amount of every product. This is explained by the CIO: *“If a store sells a lot of one product, it is automatically refilled”*. Broken Bird Bootmakers on the other hand, do not have any inventory at all: *“We have zero stock, zero inventory as customers always orders shoes from our shop and never leaves the shop with a pair of shoes”*.

Integrating online and offline inventories

Coat AB have a central warehouse from where all clothes and accessories that are going to their different stores in the Nordic market and online customers, are sent. The firm is working to integrate their e-commerce inventory with their “regular” inventory, which are currently treated as two separate ones. The logistics manager says: *“The inventory for e-commerce is today inaccessible to stores, but by integrating the two inventories into one, the aim is to be able to move between e-commerce and physical stores”*. At Dress AB, all the garments are sent to the central warehouse in Gothenburg, which in turn provides the physical stores and the webshop with products. The firm has an integrated online- and offline inventory where the inventory balance is being reserved in the system, which is something that their external partners who manages the warehouse do not see when picking the orders, as expressed by the CIO: *“They only have the list of the total amount of products in the warehouse. We know what belongs to each part”*.

Coat AB and Dress AB have implemented the service Click and collect, where customers can pick up, or return products ordered online in their physical stores. The CIO at Dress AB explains: *“People like getting their garments delivered to the store. It is free delivery and returns and as a bonus it is environmentally friendly since it is transported with the existing flow”*.

4.2.2 Demand anticipation

In order to anticipate demand, Dress AB uses forecasting methods based on previous years sales figures. The CIO describes how the firm does not use the same forecasting methods for all products, since not all products are equally demanding to forecast: *“We have certain basic range products that are ordered all year around, for example basic garments, like t-shirts and so on. That type of orders are made all the time because you are always supposed to have them in store”*. Lead-times are at least 6 months and orders are usually made about one year in advance for products that require more resources to forecast. Apart from the above mentioned forecasting methods, Dress AB attends fashion fairs and make assumptions on what trends their targeted customer will want to buy. Similarly, the logistics manager at Coat AB describes that basic garments such as t-shirts, jeans etc. are frequently ordered, which requires less resources when forecasting demand.

Nudie Jeans uses a combination of methods to anticipate demand according to F. Stenberg. Local salespersons are involved to make forecasts on different markets, as Nudie Jeans operates in several different countries and has different targeted customers. One large purchase is made in the beginning of each season and allocated to stores based on previous years sales figures and basic assortments are ordered regularly. In some cases the firm uses the same jeans model but with different washes, so what remains to be decided is the wash customers demand. F. Stenberg argues this is not possible with all manufacturers by saying: *“However, to what extent we can use this type of method depends on the relation with the manufacturer”*. Another way Nudie Jeans forecasts demand is attending fashion- and fabric fairs to discover new trends and developments within the industry. F. Stenberg explains how it is difficult to plan one year ahead and that they wish to make orders as late as possible in order to ensure relevance. He continues by explaining how the firm uses an algorithm that connects social media channels such as Facebook, Instagram and Twitter, understands 30 different languages and is able to identify different sets of emotions and slang expressions. Using this tool Nudie Jeans can analyze what reach different campaigns received on social media and what sales figures it generated both online and offline. The algorithm then makes suggestions on what types of campaigns should be carried out, when, and on which market. F. Stenberg explains: *“It (the Algorithm) might suggest that a girl in bikini works well in Australia and then depending on how much money we spend on the campaign it simulates what reach we will receive and what sales figures it would generate”*. The algorithm

becomes more sophisticated over time, as more data can be used for better simulations and Nudie Jeans' goal is to order products and then simply allocate them because they rely on adequate data. However, F. Stenberg also states: *"We are not a fast-fashion firm. Jeans, which is our main product, is a classic garment and trends do not shift as fast as for other garments"*.

M. Bergman at Broken Bird Bootmakers describe how they try to anticipate demand by having popular models already produced, customizing only the color of the shoe as an order is made. They attend fashion fairs, analyze different markets and different seasons as a method of anticipating demand. The CEO at Jacket AB states that in order to understand what models to continue selling, statistics from previous seasons are used. The firm is also looking ahead trying to identify trends in order to develop the right products.

The CIO at Dress AB argues that ultimately, it is always the customer that decides what the trend will be, regardless of forecasted trends at fashion fairs: *"Therefore, it is important to stay alert as clothes are distributed to stores and try to probe what will be a success and what is not"*. The firm also inspects competitors to make sure they are not missing important seasonal trends.

4.2.3 Manufacturing flexibility

Choice of manufacturers

When Coat AB chooses what manufacturers to produce their garments, the supply chain controller describes how their goal is to find good quality to a reasonable price. The firm has production sites in e.g. China, Bangladesh and Turkey. Manufacturers in China are used most frequently due to quality and price factors. If certain products need to be delivered fast to the market, manufacturers in Europe, mainly Turkey, are used. In contrast, Nudie Jeans produces jeans in Italy and Tunisia, uses fabrics made of ecological cotton from Turkey, produces tricot in Portugal and t-shirts in India. The reason for having a considerable production in Europe is mainly because EU law makes it easier to trust the terms and conditions of the producers and that the firm considers the Italians to be the best at producing jeans. When choosing manufacturers outside of Europe, these are thoroughly controlled to ensure fair labor conditions and that they have made production more environmentally friendly. The CEO at Jacket AB also highlights the importance of quality and environmental consciousness, which the firm has developed with their manufacturers in China. Products that

are not jackets, are mostly produced in Europe, in countries such as Portugal and Turkey. She argues that garments such as jackets need to be produced in China due to quality reasons.

Manufacturing is hard to affect

F. Stenberg says that: *“When it comes to responsiveness, the manufacturing is the hardest part to have an impact on”*. He continues by saying their manufacturers are often producing for other firms as well, thus Nudie Jeans are not always the first to be prioritised. However, he points to the fact that relationships are important by saying: *“When we have had long-term relations with manufacturers we are able to be more flexible than with new ones”*. Since the firm does not own any factories, they depend on the manufacturers to have the capacity to produce in the way the firm wishes. He also mentions the difficulty of communicating with smaller producers, where communication occurs mainly over e-mail since they do not have necessary resources to invest in more advanced systems. The fact that some manufacturers are operating in different time zones can also contribute to a delay in receiving information.

The CIO at Dress AB also highlights the fact that manufacturing is hard to affect since they do not control any factories. However, she too mentions the advantages long-term relationships can bring by saying: *“The location of suppliers and manufacturers does not matter as much as the relationship with them. Long relations are important as it gives you better treatment and prioritization”*. She brings up Inditex as an example of a firm that is famous for having an extreme speed, and can have a lead-time of two weeks from order to store, but also points out the fact that Inditex has their own factories. However, she does not believe that Inditex’ methods are neither eco-friendly nor sustainable. The logistics manager at Coat AB also comments on the productions methods of Inditex and the fact that they are a large player and can control their own manufacturing, thus being able to control the entire supply chain and achieving a greater flexibility. He points out that in order to run your own factories, it requires greater levels of volumes, competence, commitment and local knowledge, which may be difficult in an industry exposed to extreme competition.

Repeat orders from manufacturers closer to the market

The CIO at Dress AB describes that occasionally when certain products are quickly sold out, there is a need to make repeat orders: *“The buyers check the sales daily to be able to make the reorders as fast as possible, before the garment runs out completely and you won’t be able to profit on it”*. Since it is important that these products get delivered with great speed, the order is sent to a manufacturer in Europe, where it is possible to receive it in about four weeks. In

similar fashion, when Coat AB discovers a need to refill their stocks, the reorders are sent to Turkey in order to achieve greater speed to the market.

Production centers as a way to ensure quality

Coat AB has production centers close to the manufacturers as a way of ensuring quality and enhancing relations with manufacturers. This is described by the logistics manager as essential to prevent the arrival of defect products to their central warehouse. As an example, he explained how they once had to retrieve personnel from a newly opened production center because of armed conflicts in the country. As a result, the logistics manager explains: *“The garments were completely wrong, we could not use anything and it took a long time to sort everything out”*. Dress AB has in a similar way access to personnel through their corporate group, who are able to monitor manufacturers. Although the reason is not primarily to control the products or orders, but rather to make sure CSR-obligations are fulfilled. Nudie Jeans also uses production units to ensure factories have achieved certain standards concerning environment- and CSR aspects.

5 Analysis

5.1 Different responsiveness at different nodes

One main finding is in line with Reichhart and Holweg (2007), stating that responsiveness can be different at different nodes within a supply chain, meaning that the responsiveness can increase or decrease depending on where a product or service is located within a supply network. Functions within the supply chain were prioritized differently among the case firms depending on e.g. the possibility of improving responsiveness, sales channels used and targeted customer.

Coat AB and Dress AB identified their logistics functions and inventory as key functions in order to increase responsiveness. Among the case firms, these two have the highest number of physical stores. In order to rapidly refill products and sizes that have sold out, as well as decreasing the inventories in stores, both firms have started to make almost daily deliveries to stores and customers.

Nudie Jeans on the other hand, was found to be more responsive in creating flexibility through innovations in technologies and anticipating demand, for example by developing a

joint cloud platform incorporating both internal and external functions. This is in line with Bruce and Daly's (2010) discussion on how ICT can facilitate information sharing, especially in supply chains working on a global basis. Broken Bird Bootmaker also focused on technology as a way to increase responsiveness by using a shared Dropbox folder with their manufacturer, receiving continuous information regarding e.g. delayed delivery times.

A common finding for all interviewed firms was the inability to affect responsiveness in manufacturing. According to Reichhart and Holweg (2007) and Lummus et al. (2003), one way to achieve responsiveness is through flexibility directly linked to manufacturing, e.g. the capability to respond to changes in delivery requests. This was found difficult to affect, according to all interviewed firms, as none of them controlled their own factories. However, methods discovered to improve responsiveness in relation to manufacturing was to locate parts of production closer to market and to establish production centers to better control production as well as maintaining relationships with manufacturers. Lee et al., (1997) describe how insufficient trust can lead to uncertainties between buyers and sellers, which may result in distortion in demand information. One firm gave an example of how personnel once had to leave a newly opened production center, and as a result, the garments were different from what they had ordered, which created many problems. Thus, production centers seem to have a positive impact on manufacturing flexibility since it may improve trust between the firm and the manufacturer. Some firms also described how long-term relations with manufacturers seem to affect flexibility in a positive manner as it gives you a higher priority and greater flexibility to make changes. According to Hines (1998), a decrease in a system's throughput time implies a higher degree of responsiveness. Since, a higher priority and greater flexibility towards manufacturers may decrease a system's throughput time, a higher degree of responsiveness may be achieved. However, as long as external manufacturers were used, the case firms argued there would always be limitations as to how much responsiveness could be improved.

5.2 Forecasting methods

In the case of forecasting, we found that the interviewed firms in most cases use traditional forecasting methods, however one case firm had developed more innovative methods. In all case firms, basic range products were constantly ordered as they are not as hard to forecast as seasonal garments, which require more resources when anticipating demand. In line with

Christopher (2000) our empirical findings therefore confirm that within a firm's mixed portfolio of products and markets, products are handled differently as demand uncertainty varies.

All of the interviewed firms attend fashion fairs in order to discover new trends and use previous years sales figures to make forecasts for upcoming seasons. These are however methods that deviates from Christopher's (2000) notion of a market sensitive supply chain and PwC's (2014) concept of Industry 4.0. PwC (2014) argues that data is often outdated and incomplete, and Christopher (2000) explains how using real-time data for forecasting change in market demand, improves responsiveness. Thus, both theories emphasize how retailers should be using real-time data to make forecasts. The interviewees at Coat AB and Dress AB argued that in order to base forecasts on real-time data, firms need to own manufacturing sites in order for products to reach the market in time, addressing the example of Inditex who can achieve a lead-time of two weeks.

Nudie Jeans have in addition to earlier mentioned forecasting methods developed an algorithm which is able to analyze impacts of marketing campaigns on social media platforms, and is also able to simulate different scenarios and what sales figures campaigns would generate. Developing the algorithm, Nudie Jeans aspire to rely on such qualitative data that they simply order and allocate products. The algorithm is somewhat resembling to how Christopher (2000) argues that technology, if used effectively, can increase a supply chain's responsiveness, as it facilitates for faster market response and better forecasting of demand in different markets. Furthermore, Lasi et. al., (2014) argue that cloud based services can be used to simulate different scenarios. Nudie's algorithm contains features that are in line with above mentioned theory, as it enables the simulation of different scenarios, as well as helping to forecast demand. However, the systems described in theory are much more advanced, as Nudie's algorithm only simulates scenarios in response to campaigns on social media platforms and the impact on sales. Neither does the algorithm share this information to other stakeholders within the supply chain with the help of cloud computing systems.

5.3 Logistical lead-times

Our findings show that in order to better respond to customer demand, firms with physical stores are developing Click and collect functions, as well as more frequent deliveries to

stores. This is in line with Reichhart and Holweg (2007) who describe how cross-firm cost sharing methods such as “milk-run” approach (Hanson & Finnsgård, 2014) may cut transportation lead-times and costs, i.e. improving responsiveness. Our findings also demonstrate the case firms with a higher number of physical stores are working to incorporate online and offline channels, which requires an integrated inventory. Hübner et al., (2016) argue that in order for retailers to enable a flexible inventory, channels such as online- and offline divisions must be integrated. Thus, integrating the online inventory with offline inventory, and being able to transport clothing from the online shop with the transport going out to stores is a way for those firms to increase their responsiveness.

According to our data, all firms that have been studied, have some parts of their production located in Europe or in countries close to the European market. This conforms with the factor of logistical proximity discussed by Reichhart and Holweg (2007) and its positive impact on responsiveness. Our findings suggest Coat AB and Dress AB have most of their production in Asia because of price, but also for quality reasons. When it is of high importance that the garments can be produced and transported rapidly to the market, both firms use manufacturers in or close to Europe. These types of products are typically seasonally based of the simpler model or design. This is in line with Guercini and Runfola (2004) who argues that being close to market makes supply chains more responsive to changes in e.g. demand although at a higher cost. However, our findings also suggest that all firms do not choose the place of production for the same reasons. Nudie Jeans have 95 percent of their production in or close to Europe since manufacturers are restricted to EU-law and can guarantee a higher quality. Similarly, Broken Bird Bootmakers have chosen manufacturers in Europe for quality reasons.

5.4 The need for responsiveness

Our findings prove that the need for responsiveness also depends on the profile of the firm and the relation to its targeted customer, which are factors that have not been encountered in previous literature. As firms such as Nudie Jeans and Jacket AB have developed sustainable profiles, one could assume customers do not have the same expectations regarding fast lead-times or wide product ranges, as it could be contradictory to the desire of being sustainable. In addition, both of the firms focus on more classic garments, thus the need for greater product variations seems to be less relevant for Nudie Jeans and Jacket AB. The notion that

these firms are producing classic garments could however be argued to correspond to what Fisher (1997) says about certain products having more stable demand than others and that innovative products with unpredictable demand requires a more flexible supply chain strategy. Since a large part of Coat AB's and Dress AB's assortment is made up of seasonal garments, which implies a more unpredictable demand. This increases the need for a more flexible supply chain strategy.

5.4.1 Environmental aspects

One of our findings shows how environmental aspects are criterias when firms take decisions, which in turn can affect their ability to be responsive. As an example, Coat AB and Dress AB use boat freight as transport from Asia because of sustainability reasons as well as price. Furthermore, Dress AB actively chooses not to use air-freight even though it is a faster mode of transport. One can discuss as to what extent decisions really are made based on sustainability and not on price. However, as consumers become increasingly conscious and demanding it is reasonable to believe firms need to take sustainability into account when taking decisions. In the theory examined within the area of supply chain responsiveness, we have not seen sustainability issues being taken into account. As supply chain responsiveness is directly linked to speed (Reichhart & Holweg, 2007), air freight may contribute to a higher degree of responsiveness than cargo shipping. Thus, sustainable measures ought to be taken into consideration when assessing responsiveness, as it especially in the area of logistics, can limit a supply chain's responsiveness.

5.5 Differences in attitudes towards digitalization of supply chains

The interviewees have expressed different possibilities, challenges as well as attitudes regarding information integration with the aid of digitalization within the supply chain. From our interviews, Nudie Jeans stood out as being the most innovative firm regarding information integration within the supply chain. In line with Reichhart and Holwegs' (2007) description of a virtual supply chain as well as Christopher's (2000) depiction of being market sensitive, Nudie Jeans uses technology to enhance transparency and openness as well as striving for actors within the supply chain to rely on the same information. One finding that relates to the challenge of enhancing information integration with the help of digitalization, is the need to train employees in IT. As attitudes towards new technology and systems were different between Nudie Jeans' divisions, not all divisions used the system in

the correct way. The solutions have been to better educate staff as well as require IT-knowledge when recruiting new personnel.

Nudie Jeans uses cloud-based services to share information within its own organisation as well as enabling external actors to connect, giving them access to relevant information. The use of cloud-based services does to some extent confirm Büyüközkan and Göçers (2018) discussion on how innovations within the digital supply chain such as cloud computing and big data can be beneficial for supply chains. F. Stenberg describes how their goal with the cloud platform is that *“if the information is not in the joint system, it does not exist, the truth is there”*. However, the firm has not been able to connect all actors to its cloud as particularly manufacturers are reluctant to make necessary investments. Nudie Jeans thus use cloud computing systems that are fairly similar to PwCs (2014) notion of a supply chain network, where connected actors within a network are able to fully- and quickly interact with each other, striving for the cloud to be the single source of truth.

However, our findings show that firms are not equally enthusiastic about developing systems for information integration in the supply chain. The CIO at Dress AB mentions how new systems develop all the time and it is difficult to know which system will be useful across supply chain functions. In addition, another challenge in implementing new systems are the considerable investments necessary as well as legal restrictions, in order to integrate cloud computing systems. This is somewhat reflecting of PwC's (2014) description of how retailers have not progressed in digitalizing supply chains. However, while the mentioned theory argues for disruptions in the supply- and distribution networks to be the main challenge, our findings rather highlights that the initial investment is seen as risky.

6 Conclusions

To answer the first research question, ***How do firms within the fashion industry work to create a more responsive supply chain?*** the study reveals that firms identify key-functions within their supply chain where they focus on improving responsiveness. For all of the interviewed firms, manufacturing was found to be the most difficult function to affect since they did not control it themselves. However, in order to shorten lead-times, some firms improved responsiveness by placing parts of production closer to markets. Two firms also placed production centers near manufacturers in order to better control production which had

positive effects on responsiveness. Long term relations was also mentioned as important, since it enables better priority and creates greater opportunities to adjust orders.

Our findings also demonstrated that firms with a higher number of physical stores identified logistics and inventory as key functions in order to improve responsiveness. Increasing the number of deliveries to stores and customers, integrating online- and offline inventory, developing Click and collect functions as well as transporting garments between stores were ways to improve responsiveness in logistics- and inventory functions.

Regarding demand anticipation, our findings suggest that the case firms stick to traditional forecasting methods where old sales figures are used and inspiration is found at fashion fairs. However, one firm had also integrated and was working to improve an algorithm, that could simulate sales impacts of marketing campaigns on social medias to help improve responsiveness.

To improve responsiveness concerning information integration, two firms had integrated different digital services to enhance visibility and the speed of information sharing within the supply chain. However, our study discovered most retailers did not prioritize this area, since new technologies to enhance information sharing had not been integrated and no plans existed to do so.

Our study showed that some firms had implemented digitalization to a higher degree within their supply chain, helping them to become more responsive. However, most of the case firms had not advanced far. This was addressed when answering our second research question: *What are the challenges of integrating digitalization in the supply chain?*

One challenge with integrating digitalization pointed out by one of the case firms, was that legal factors can limit a firm's ability to share information to all actors within the supply chain. Furthermore, large investments were necessary in order to acquire and implement systems, and there was an uncertainty regarding which systems to invest in.

Since none of the case firms owned any factories, our findings also showed that the manufacturing function within supply chains may be difficult to affect when integrating digitalization. The manufacturers are often small and lack necessary resources to invest in

digital systems and services. Furthermore, manufacturers seem reluctant to adjust to one firm's system, as they often have multiple clients.

Lastly, our findings suggest one challenge when integrating digital systems within the supply chain, is the need to change attitudes and educate personnel in IT, otherwise there is a risk that work procedures evolve differently between divisions.

6.1 Theoretical contributions

This study has highlighted in detail where firms within the fashion industry are working to create responsiveness within their supply chain. Firstly, the study contributes to prior research on how responsiveness is increasing in importance as a way to meet customer demand and that firms perceive different nodes as important in order to reach responsiveness. However, as opposed to theory stating that factors directly linked to manufacturing flexibility may improve a firm's responsiveness, our findings show that firms experience difficulties affecting manufacturing when not owning the factories themselves.

One contribution relates to the factor of logistics and that firms find it difficult to affect the lead-time from manufacturer to warehouse. Instead, the case firms perceived a greater possibility of improving responsiveness in the logistical function from warehouse to customer or store. Another contribution regarding logistics, relates to how firms are striving to become responsive while still taking environmental aspects into account. While theory highlights the importance of speed in order to be responsive, the case firms also considered environmental aspects, which limited their possibilities to shorten transport times from manufacturers.

This thesis has also highlighted the challenges for firms within the fashion industry, of integrating digitalization within the supply chain. Our findings show that manufacturers often are small and lack the necessary means to invest in systems regarding information sharing, which has not been encountered in previous literature. Another theoretical contribution concerns the resistance in some firms to invest in new systems since it is considered an uncertain investment.

6.2 Limitations and future outlook

Because the thesis' findings are based on five semi-structured interviews from five different firms within the fashion industry, there is need for further in-depth studies in the same industry. Since the size of the case firms in this study varies from small to large, there is a need to conduct more specific studies regarding each size category of firms. Also, since the firms interviewed were located in the Gothenburg area, future research should include firms outside of Sweden. Additionally, since this thesis has focused on the fashion industry, a broader study connecting supply chain responsiveness and the impact of digitalization in other industries is proposed, in order to test if similar conclusions can be drawn.

In addition, our findings showed that none of the studied firms control the manufacturing function within their supply chains. Thus, in future research it would be of relevance to include firms owning their factories. One finding, that was also not discussed in theory, concerns sustainability factors' impact on the firms' decision making. Since choices regarding transports were limited when sustainability aspects were taken into account, we recommend further research on supply chain responsiveness in relation to sustainable- and environmental aspects. Lastly, a finding connected to the implementation of digitalization, is the perceived improvement of accountability it may bring. Thus, we suggest that future research investigate how digitalization can improve accountability within firms.

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Appendix 1

Interview guide

Introduction

- When did you start working on?
- What are your roles / services at the company?
- What is your professional background / education?

Supply chain processes

- Can you describe your process flows?
 - Process behind idea and design?
 - Purchasing process?
 - Manufacturing/production process?
 - Distribution process?
 - Sales process?

Responsive supply chain:

- Has the digital consumer affected your supply chain and in what ways? What challenges has the digital consumer brought along?
- What changes have you made? How have you integrated digitalization within your supply chain?
- Have you changes the structure of your supply chain in response to this development?
- Customers today expect greater varieties of products/more seasonal products, how have you experienced this development?
 - How have you dealt with this?
 - How has it affected the relation to your manufacturers?
 - Have you experienced increased demand for quick communication with your manufacturers?
 - Has it affected the volumes being ordered from your manufacturers?
- Customers are also expecting short lead-times, have you noticed this development?
 - Has it affected your logistical solutions and in what ways?

- Is your flexibility affected depending on where in the world your manufacturers are located?
- How do you work to predict changes in demand?
 - Has this caused any difficulties in relation to your manufacturers? Has it changed what you demand from your manufacturer?
 - Do you use e.g. cloud based services where information is shared with all supply chain actors?
 - Is communication affected depending on where your suppliers are located?
- Do you know of any other firm that is working with these types of changes by trying to create a more responsive supply chain?
- To be able to quickly react to changes in demand – which part of your supply chain do you see as most important in order to increase responsiveness?