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Reshoring in the Fashion Industry – An Actual Trend or Industry Window Dressing?

Implications on Supply Chain Management and Sustainability

by

Svante Rune Harry Gummesson

svante.gummesson@gmail.com

Abstract: The research aims to determine whether there is a trend of reshoring among major fashion conglomerates and whether supply chain resilience and sustainable manufacturing may contribute to understanding this trend. The study takes a quantitative approach, using a combination of inference statistics and descriptive statistics. To uncover patterns in the manufacturing locations of these conglomerates, the quantitative part of the study first collects information on manufacturing locations from primary sources of the most well-known fashion conglomerates; and comprehends the sustainability issues and supply chain management choices underlying reshoring in the fashion sector. Conclusions from the literature and the data are combined to offer a thorough knowledge of the reshoring trend in the fashion sector and the variables influencing it. The research results add to the understanding of manufacturing location decisions, specifically reshoring in the Fashion Industry. The research found no significant trend of reshoring among the five largest fashion conglomerates over the last years.

Keywords: Reshoring, Fashion industry, Fashion conglomerates, Supply Chain Management, Manufacturing Sustainability, Global supply chains, Manufacturing Location Decision, Inditex, H&M Group, GAP Inc, Fast retailing, Gap Inc., PVH

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I want to thank and highlight the fashion conglomerates who claim to be transparent in their supply chains but intentionally censor and remove published information from the internet. I am grateful to these companies for highlighting the need for real responsibility and transparency in the fashion industry. Their attempts to withhold information show the importance of activism and critical inquiry in exposing unethical practices. Together, we can work towards a more open society where transparency is not just a trend but a core value for academics and consumers.

Thank you!

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1 Introduction

1.1 Research Problem

Globalization has never been more excellent; companies and integrations are far greater than anyone could have imagined. The thought of a reversal of the globalized world appears unimaginable, and a pandemic made the world realize its idolized view of a completely integrated world. Cargo routes were restricted, borders were closed, people ended up in quarantine, and governments and companies realized how fragile their global integration was to exogenous shocks.

Reshoring of production and sourcing activities is anticipated to have become increasingly frequent within the fashion industry in recent years, especially among the most prominent fashion corporations in the world (Moore, Rothenberg, & Moser, 2018). The concept of ‘reshoring’ refers to moving production back to the origin country or area of the corporation, as opposed to offshoring and relocating production away from the origin country or region.

The growing demand for supply chain resilience has been one of the major forces behind this development (Moore, Rothenberg, & Moser, 2018). The fashion industry is known for relying on intricate worldwide supply chains; it is susceptible to interruptions brought on by natural catastrophes, political unrest, and trade conflict. Fashion firms can lessen their reliance on these vulnerable supply chains, minimize risks, and improve their capacity to respond to unforeseen interruptions by reshoring production and sourcing activities (Bode et al., 2011; Casson, 2013).

Cost is an essential aspect influencing the reshoring movement in the fashion business (Moore, Rothenberg, & Moser, 2018). Major suppliers to the fashion industry, like China, Vietnam, and Bangladesh, have seen an increase in labor and production costs in recent years (De Backer et al., 2016). As a result, it is now more expensive for businesses to produce their goods abroad, which has prompted many to think about reshoring as a method to cut costs and boost productivity (Moore, Rothenberg, & Moser, 2018).

The COVID-19 pandemic has also significantly contributed to accelerating the reshoring trend in the apparel sector. The pandemic affected production and logistics globally and revealed flaws in global supply chains. Several fashion companies reconsidered their sourcing plans to lower risks and improve supply chain resilience and considered reshoring (Moradlou, Backhouse, & Ranganathan, 2017).

Lastly, an increasing emphasis on sustainability is another factor driving the reshoring movement in the fashion business. Fashion firms are under increasing pressure to minimize their carbon footprint and enhance their operation's social and environmental effects as consumers become more environmentally aware and demand more sustainable products (Hasan, M. R., & Khan, S, 2021). Reshoring can assist businesses in achieving these objectives by minimizing the travel time of their goods and allowing for more close collaboration with suppliers and manufacturers to ensure adherence to ethical and sustainable standards (Ashby, 2016).

In conclusion, several issues, such as the requirement for supply chain resilience, growing costs, the COVID-19 pandemic, and sustainability concerns, have contributed to the reshoring trend in the fashion industry's recent growth. It will be interesting to watch how this trend develops and affects the industry in the future if the world's most prominent fashion corporations progressively implement reshoring techniques.

1.2 Aim and Scope

The purpose of this thesis is to examine the most prominent (in terms of quantity of clothes sold to the end consumers) global fashion conglomerates' reshoring practices over the past six years (2017-2022) and connect the result to the framework for Supply Chain Management and Sustainable manufacturing. The study aims to use regression analysis and descriptive statistics to determine if a statistically significant trend exists. In addition to adding to the body of knowledge on reshoring and sustainability in global supply chains, the study aims to provide a thorough understanding of the trend and its consequences for the fashion industry. To contribute to the knowledge on reshoring in the fashion industry, widen the societal debate, and increase consciousness on how the concept is applied de facto.

Research Question:

“Has there been a significant trend of reshoring practices over the last six years of major fashion conglomerates; If not, how can it be explained?”

1.2.2 Defining Concepts

Reshoring is the concept of returning business operations to the initial market or region of the firm previously transferred abroad. It is the opposite process of offshoring, a practice where firms relocate their operations to nations with reduced labor costs and other benefits, which gained popularity in recent decades (Jain, Kothari & Kumar, 2016; Liesch et al., 2011; Jahns, Hartmann & Bals, 2006). Reshoring has recently received much attention due to several causes, including growing labor costs in regions and countries previously attractive for offshoring practices, broken supply chains, intellectual property concerns, and governmental incentives (Barbieri et al., 2018). Reshoring is frequently considered a strategy to promote domestic employment growth, enhance supply chain resilience, promote economic growth, and increase sustainability in the manufacturing process (Fratocchi et al., 2014; Fratocchi & Di Stefano, 2019). Reshoring is a relatively recent phenomenon, and the actual application of the practice is relatively unknown in businesses, especially in fashion and academia (Moore, Rothenberg & Moser, 2018).

Supply Chain Management (SCM) refers to coordinating and optimizing all processes involved in manufacturing and transporting goods and services to the end customer (Jain, Kothari & Kumar, 2016). It includes a variety of tasks like manufacturing, inventory management, transportation, and procurement; close cooperation between suppliers, manufacturers, distributors, and customers is necessary for effective supply chain management, as is the application of cutting-edge technologies and analytical tools (Liesch et al., 2011; Ellram, 2013).

Sustainability Concerns of manufacturing location decision-making refer to considering environmental, social, and economic factors. The objective is to ensure that the manufacturing process is carried out to avoid detrimental environmental and societal effects while promoting

regional economic growth (Sardar, Lee & Memon, 2016; Sirilertsuwan, Hjelmgren & Ekwall, 2019).

Energy efficiency, waste management, pollution control, and resource conservation are a few examples of environmental concerns; and human rights, community relations, workplace safety, and labor regulations are a few examples of social issues (Sirilertsuwan, Hjelmgren & Ekwall, 2019). Economic concerns may include local sourcing, transportation costs, tax breaks, and access to trained workers (Foerstl, Kirchoff & Bals, 2016). Finding solutions that optimize favorable outcomes in all domains requires weighing the trade-offs between economic, social, and environmental concerns. Collaboration between firms, governments, communities, and other stakeholders is necessary to achieve sustainability in manufacturing location decision-making to generate a shared vision and a framework for decision-making that emphasizes sustainable growth (Ashby, 2016). The idea, in general, in the manufacturing business and fashion industry as well, is that the highly skilled technological countries and regions of the majority of large corporations have more significant potential in producing high quality and more sustainable goods while also shortening the transportation of those goods to the market with the end consumers (Ashby, 2016; Bals, Kirchoff & Foerstl, 2016; Barbieri et al., 2018; Casson, 2013; Foerstl, Kirchoff & Bals, 2016; Fratocchi et al., 2016; Fratocchi et al., 2014; Fratocchi & Stefano, 2019).

Fashion conglomerates are large multi-brand organizations that own and manage a variety of fashion retail brands. These businesses often operate globally and profit from selling apparel, accessories, and complementary goods (Garg, 2019). The five most prominent in terms of the number of goods sold to end consumers are INDITEX, H&M Group, GAP Inc, Fast Retailing (Uniqlo & GU), and PVH (Calvin Klein, Tommy Hilfiger) (Statista, 2023).

1.2.3 Scope and Limitations

The available data for the quantitative analysis is restricted, and the transparency of the fashion conglomerates shows a wide range of improvement areas; in recent years, the companies have begun providing data on their suppliers and manufacturers. Due to a lack of research on the topic, data only exists provided by the conglomerates themselves, and the information has the

risk of being heavily biased; however, more accurate data must be collected on the number of clothes or the quantity produced at each location. Even though the most prominent fashion retailers account for most clothing production and sales, the method excludes other fashion brands and sectors. The phenomenon of reshoring is a relatively new concept, and it is the first in recent years that the concept has arisen as a well-discussed topic. Therefore, the existing literature, to a large extent, solely covers topics of manufacturing location decision-making.

Despite the study's limitations, in the current state, the only way to research this topic requires primary data from the fashion conglomerates themselves. In addition, the concept of reshoring is generally positively viewed (Theyel, Hofmann and Gregory, 2018). Underreporting of the phenomenon appears illogical for the companies since it lies in their interest to report positively and increase their brand value. The reshoring practices in the fashion industry have yet to be statistically analyzed, and the research is breaking into new grounds. It will help further, more rigorous research on the topic.

The scope of the research is to cover the majority of the fashion market, analyzing manufacturing locations of INDITEX, H&M Group, GAP Inc, Fast Retailing, and PVH are the largest Fashion Conglomerates and retailers in the world in terms of revenue and quantity of clothes sold to the end consumer; the five conglomerate accounted for 96 billion dollars of the global total for the apparel industry of 1.53 trillion dollars and an estimated market value of 122 Billion for fast fashion market (Statista, 2023). On behalf of reporting and transparency concerns of the conglomerates, the recent six years are analyzed and included in the regressions (2017-2022).

1.3 Implications

The thesis has many implications for academics, policymakers, and the fashion industry by presenting factual evidence of the pattern of reshoring among the five most significant global fashion conglomerates over the previous five years. The findings will contribute to a better understanding of the current state of reshoring in the fashion sector and its possible effects on the global supply chain by fashion firms and policymakers.

Results from the study will provide insights into the motivations behind the reshoring movement, specifically if it is primarily motivated by cost savings and supply chain resiliency or whether there is a solid link to sustainability issues, and make it easier for policymakers and fashion firms to comprehend the driving forces behind reshoring and spot opportunities to encourage more environmentally friendly business practices. The research will add to the knowledge of sustainability and reshoring in international supply chains; to better grasp these complicated difficulties and pinpoint areas that require more investigation.

Ultimately, the thesis will offer insightful information about the fashion industry's reshoring movement and how it affects sustainability, supply chain resilience, and industry competitiveness. The findings will be valuable to the fashion sector stakeholders, politicians, researchers, and other global fashion industries.

1.3 Thesis Outline

The thesis is divided into four sections. The first section discusses the relevant concepts and problems, including reshoring, fashion conglomerates, transparency, and reporting. The second section covers the current literature on reshoring in the fashion industry, supply chain management, sustainability concerns, and the theoretical framework for supply chain management and manufacturing location decision-making analysis. The data used in the analysis are discussed in the third section, which comes from the conglomerates. The section describes why this data is viable in addressing the research question. The fourth section includes a discussion of the methodology, outlining the chosen approach and data collection methods for analyzing the manufacturing location of the conglomerates. After the methodology, the results of the descriptive analysis and the regression analysis are presented. The final section explains the findings of the analysis; it connects them to the theory and theoretical framework.

2 Context

2.1 Reshoring

Reshoring has recently become popular in the fashion business, especially in the last few years (Anzolin & Aloisi, 2021). Fashion firms have begun to relocate their production activities back to their home nations as ethical and sustainable business practices become more sought after, lowering their carbon footprint and boosting local economies (Salerno-Garthwaite, 2021). Large fashion companies have taken a leading role in reshoring activities. For instance, to shorten lead times and save transportation expenses, H&M Group declared in 2013 that it would move some of its production back to Europe (H&M Group, 2014). H&M Group reaffirmed its commitment to reshoring more products as part of its 2019 pledge to become 100% circular and climate positive by 2030 (H&M Group, 2023).

Other fashion companies have also stated their commitment to reshoring and sustainability, including PVH (Calvin Klein and Tommy Hilfiger) and Fast Retailing (owner of Uniqlo). For instance, PVH has invested in local manufacturing in the United States and established a target to responsibly source 100% of its cotton by 2025 (PVH, 2023). Increasing its domestic production in Japan and other Asian nations is another commitment made by Fast Retailing (Fast Retailing, 2022). Overall, the trend of reshoring in the fashion sector has gained traction because of the growing emphasis on sustainability, supply chain resilience, and local economic development (McKinsey & Company, 2022). Many fashion conglomerates have taken action to promote this trend after seeing the value of reshoring.

2.2 The Fashion Conglomerates

The stated and communicated business models, supply networks, and manufacturing facilities of the fashion conglomerates INDITEX, H&M Group, Fast Retailing, PVH, and Gap Inc. have seen substantial changes over the past years.

INDITEX is a global Spanish clothing firm headquartered in Arteixo of northern Spain, with approximately 8,000 retail locations operating under Stradivarius, Pull & Bear, Massimo Dutti, Zara, and Bershka (Inditex, 2022a). It is also recognized for its fast-fashion business strategy, which places a premium on rapid turnaround times and regular product changes (Aftab et al., 2018). The European market accounts for roughly 50% of the firm's retail sales (Inditex Group, 2023).

H&M Group is a Swedish international fashion corporation with over 5,000 stores in 74 countries under the Weekday, COS, & Other Stories, Monki, and H&M brands (H&M Group, 2022). H&M says it is committed to operating sustainably and is well known for its fast-fashion business style (Galicja, 2022).

Fast Retailing is a Japanese holding corporation that owns companies including Theory, Comptoir des Cotonniers, Uniqlo, and J Brand. The company claims it is renowned for emphasizing high-quality, reasonably priced essentials and its dedication to innovation and sustainability (Kumar & Majumdarr, 2022).

PVH: A multinational company based in the United States that owns brands like Calvin Klein, Tommy Hilfiger, and Heritage Brands. It is renowned for its extensive reach, dedication to sustainability, and sense of civic duty (PVH, 2023a).

Gap Inc. is a multinational company based in the United States that runs over 3,000 stores under the Gap, Old Navy, Banana Republic, and Athleta brands. Gap Inc. claims they are renowned for its emphasis on informal, traditional fashions and its initiatives to increase social responsibility and the sustainability of the supply chain (Gap Inc., 2021).

The growing focus on sustainability and ethical business practices in the fashion industry has been one of the major forces behind the transformation; as a result, many of these businesses have switched to more ethical and sustainable business practices (Bringé, 2023). For instance, the H&M Group has chosen a "circular and climate-positive" strategy for using recycled products, waste reduction, and investment in renewable energy sources (H&M Group, 2022a).

Inditex has also prioritized sustainability, emphasizing recycled and organic materials, lowering water use, and putting money into renewable energy sources (Inditex, 2022).

These businesses have worked to boost transparency in their supply chains and enhance factory working conditions (Garcia-Torres et al., 2021). For instance, Fast Retailing has implemented a program called "Human Rights Principles" to guarantee that workers' rights are upheld across its supply chain (Fast Retailing, 2019). The data compiled for this research shows that Inditex has also taken measures to improve supply chain openness. Since 2017 they have provided a list of its suppliers and the locations of its factories. H&M Group adopted a policy to increase supply chain transparency by stating their supplier and factories in 2013 with an increased engagement in 2017, PVH committed to publishing their factories and suppliers in 2019, and Gap Inc and Fast Retailing revealed their factories and suppliers in 2017.

For these enterprises, changing manufacturing locations has also been a top priority. Several of them have begun to relocate their manufacturing activities closer to their customers to cut transportation costs and improve supply chain resilience to cut transportation costs and improve supply chain resilience. For instance, The H&M Group states they have doubled their European production and intend to build a new facility in Sweden (H&M Group, 2022c). Additionally, Inditex states that they have grown its domestic production in nations like Portugal and Spain (Inditex, 2022).

In conclusion, over the past years, the fashion conglomerates INDITEX, H&M Group, Fast Retailing, PVH, and Gap Inc have communicated substantial changes in their business models, supply chains, and manufacturing facilities. These reforms have spurred a rising understanding of sustainability and moral behavior in the fashion business and a requirement for greater transparency and supply chain resilience.

2.3 Reporting Transparency and Data Publishing of Fashion Conglomerates

When reporting and publicizing data on their manufacturing activities, transparency has become a crucial issue for fashion corporations. Customers are requesting more thorough information on the locations and working conditions of the factories that make their clothing (Garcia-Torres et al., 2021). As a result, many fashion businesses have started to reveal information about their manufacturing facilities and supplier databases (Fast Retailing, 2020; Gap Inc., 2021; H&M Group, 2022c; Inditex, 2022; PVH, 2023b).

Supplier and factory listings have received much attention. These records give specific information regarding a business's manufacturers and suppliers, such as names, addresses, and production capacities. By providing this information, fashion companies may provide greater openness to their customers and stakeholders about their manufacturing procedures (Garcia-Torres et al., 2021).

However, disseminating this data still presents some difficulties. For instance, some businesses might be reluctant to divulge details about their production facilities and supplier lists because they fear losing a competitive edge or risking intellectual property theft (Muratore & Marques, 2021). Additionally, if the information is self-reported by the businesses, there can be questions regarding its veracity (Garcia-Torres et al., 2021; Muratore & Marques, 2021).

Fashion conglomerates now emphasize transparency in reporting and publicizing data on manufacturing sites and supplier names. Despite the difficulties, industry-wide initiatives foster greater transparency and sustainability in the fashion sector (Garcia-Torres et al., 2021).

3 Theory and Previous Research

3.1 Theoretical Framework

3.1.1 Supply Chain Management

Supply Chain Management (SCM) aims to improve efficiency and decrease costs for a company while providing value to consumers. SCM involves coordinating investments, production, inventory management, logistics, transport, and customer support. The supply chain comprises various companies working together to deliver goods and services to the end customer (Bui et al., 2021; Carter & Rehman Khan et al., 2020; Zekhnini et al., 2020).

The definition of SCM by Mentzer et al. (2001) is "the systemic, strategic coordination of the traditional business functions and tactics across these business functions within a particular company and across businesses within the supply chain, to improve the long-term performance of the individual companies and the supply chain as a whole." The definition by Mentzer et al. highlights the importance of cooperation, coordination, and communication among all parties involved in the supply chain, including suppliers, manufacturers, distributors, and customers. Cooperation, coordination, and communication are affected by the supply chain's rigidity and the transportation chain's security, meaning effective, adaptive, and fast transportation and logistics are necessary, and the cost of the transportation is as important. A coordinated supply chain integration between suppliers, factories, and retailers also requires efficient communication and adaptiveness.

Customer relationship management, customer service management, demand management, order fulfillment, manufacturing flow management, supplier relationship management, product development and commercialization, and returns management are the eight interconnected processes that comprise a more detailed version of the framework (Croxtton et al., 2001). These procedures aim to reduce inventory costs and increase customer satisfaction while ensuring that the appropriate product is available to the right consumer in the right market at the right time with the correct and competitive pricing (Carter & Rogers, 2008; Croxtton et al., 2001; Casson,

2013). The evolution of resilience in SCM is essential to the theoretical framework, and it highlights the need for supply chains to adapt to disruptions and environmental changes. Pettit et al. (2019) describe how resilience has evolved from focusing on risk management to a more proactive approach emphasizing the need for flexibility, redundancy, and agility in the supply chain.

A historical perspective on the development of SCM, which has shifted from a concentration on transactional interactions to a more collaborative and strategic approach, is offered by Min et al. (2019). This strategy aims to create value through innovation, agility, sustainability, and the application of technology to increase productivity and visibility. Artificial intelligence (AI) in the supply chain is put forth by Zekhnini et al. (2020). This framework strongly emphasizes using advanced analytics to improve supply chain performance and the necessity of real-time data, visibility, and transparency.

In general, the theoretical underpinnings of SCM strongly emphasize the necessity of collaboration, coordination, and integration among supply chain participants and the significance of adaptability, innovation, and digital transformation. This framework offers a foundation for comprehending the crucial SCM procedures, difficulties, and possibilities and formulating plans to enhance supply chain performance. The SCM framework is important when understanding the underlying factors and mechanisms at hand following the decision to reshoring and movement of manufacturing for individual firms and industries.

3.1.2 Manufacturing Location Decision

Choosing the best site for a manufacturing facility requires considering several factors, such as costs, technical requirements, and strategic objectives. This decision-making process is essential for the long-term performance of businesses since the choice of a manufacturing location affects various business operations, such as supply chain management, logistics, and distribution. The decision-making process for industrial locations is governed by several theoretical frameworks that academics have put forth.

The transaction cost and capacity perspectives provide one framework for comprehending decisions about where to locate industrial facilities. According to McIvor (2013), businesses must consider the transaction costs of placing manufacturing plants in various areas and the potential locations' abilities regarding access to suppliers, labor markets, and other considerations. According to this approach, businesses must weigh the advantages of cost savings against the dangers of handling transactions in several places.

Another framework emphasizes the need to balance configuration and coordinating aspects. Meijboom and Vos (1997) contend that businesses must consider both the coordination of supply chain operations and the configuration of the industrial facility. According to this paradigm, companies should consider their supply chain and overall business strategies when determining where to locate their manufacturing operations.

According to Brush et al. (1999), businesses should consider their strategic objectives and the competitive advantages of various manufacturing locations. According to this concept, businesses should consider market access, infrastructure, and labor availability when locating their factories and coordinate those decisions with their overall company plan.

A fourth framework emphasizes the significance of sustainability in manufacturing location selections. Sirilertsuwan and Lantz (2020), state that businesses should consider environmental, social, and economic concerns when deciding where to locate their factories. In this paradigm, businesses should analyze their production location decisions over the long term and how they will affect other stakeholders, such as the environment and nearby communities.

The conditions of worldwide competition form a fifth dimension of the framework. According to Tate et al. (2014), businesses should consider regional competitive conditions when locating their factories. Companies should consider various locations' competitive advantages and disadvantages and coordinate their decisions regarding manufacturing location with the global business climate. Understanding manufacturing site decision-making also entails examining the justifications for hybrid, offshore, reshoring, and retention strategies. According to a paradigm proposed by Theyel et al. (2018), businesses should assess the advantages of cost reductions and

market access against the hazards associated with handling transactions across different locations.

These theoretical frameworks offer insights into the intricate manufacturing location decision process. They enable businesses to assess potential sites based on various factors and match their manufacturing location choices to meet their strategic objectives and market competition. To understand reshoring, the decision-making process of relocating manufacturing is essential to analyze pattern changes and observe general and firm-specific trends.

3.1.3 Sustainable Supply Chain Management

Sustainable supply chain management (SSCM) has recently gained popularity because it reduces adverse environmental effects, promotes social circumstances, and increases financial gains. Seuring and Müller (2008) and Carter and Rogers (2008), two studies emphasizing the necessity of integrating environmental, social, and economic aspects of sustainability into the supply chain management process, helped build the theoretical framework of SSCM.

Three dimensions of mechanisms, strategic, operational, and stakeholder, comprise Seuring and Müller's (2008) conceptual framework for SSCM. The alignment of SSCM with the entire business plan forms the strategic dimension for business operations. The operational dimension deals with the supply chain implementation of SSCM practices, and the involvement and engagement of stakeholders in the SSCM process is the focus of the stakeholder dimension.

Similarly, Carter and Rogers (2008) propose a paradigm with three essential components: eco-design, green procurement, and end-of-life management. While eco-design focuses on creating products and procedures with the least adverse environmental effects, green procurement entails choosing suppliers based on their environmental performance. End-of-life management is concerned with the product's disposal and recycling.

SSCM must address disruptions and organizational ambidexterity, or the capacity to take advantage of current opportunities while pursuing new ones. They suggest a data-driven analysis methodology to pinpoint the main SSCM contributors and their effects on organizational

ambidexterity (Brandenburg et al., 2014; Bui et al., 2021). In order to increase transparency, traceability, and accountability in SSCM, particularly in developing nations, the procedure is combined with blockchain technology (Kshetri, 2021).

In conclusion, the supply chain management process must incorporate the environmental, social, and economic facets of sustainability according to the theoretical underpinnings of SSCM. Its three main components are strategic alignment, operational implementation, and stakeholder engagement. Green purchasing, eco-design, end-of-life management, and technology like blockchain to improve transparency and accountability are other significant facets of SSCM.

In order to analyze and identify drivers and explanations behind reshoring decisions, it is vital to understand the framework and the factors that affect sustainable supply chain management and what effect other factors have that results in a lower focus on sustainable supply chain management.

3.2 Previous Research

This literature review aims to provide an overview of the existing research on reshoring in the fashion industry and its implications on sustainability and supply chain resilience. This review will examine the key themes and findings from previous studies and identify gaps in the research this thesis aims to address.

Key Themes and Findings

The main themes and ideas relevant to the thesis and the topic of manufacturing decision-making (location-based) are; *Reshoring Trends and Drivers*, *Reshoring and Supply Chain Management*, *Reshoring*, and *Technological Enablers*, *Factors for reshoring Decisions*, and *Reshoring and Sustainability*.

The current body of literature covers the main ideas and themes that affect manufacturing location decisions, and it thoroughly investigates and explains responses to disruption caused by

endogenous factors, such as rising labor costs, and exogenous factors as supply chain disruptions caused by trade sanctions or transportation bottlenecks following shortages and pandemics.

The literature and research discussed in this section conclude that reshoring is an actual concept and a phenomenon that arises following several events and mechanic changes to an extensive list of factors. However, the current literature does not statistically confirm whether the communicated reshoring trend is actual and statistically significant. The following passage covers ideas and conclusions from relevant existing literature.

3.2.1 Reshoring Trends and Drivers

Moore et al. (2018) investigate the motivating forces and backup plans underlying reshoring in the textile and apparel sector. They discover that quality concerns, pricing increases, and intellectual property protection significantly influence reshoring. There are different ways to analyze the process of bringing manufacturing back to a country, such as strategically, operationally, or organizationally. Each perspective provides valuable insights into reshoring (Fratocchi et al., 2014). It is vital to understand the trade-offs when deciding to reshore production. The authors emphasize the costs of reshoring versus the benefits of increased control and flexibility (Fratocchi et al., 2014). According to Foerster, Kirchoff, and Bals (2016), their empirical study identified four clusters of motives for reshoring and insourcing: strategic, financial, operational, and political. Additionally, cost reduction is an important reason for reshoring, and quality control is cited as the most common justification in the industry (Fratocchi et al., 2016).

There are several reasons why reshoring is of increasing importance. These include labor and transportation cost fluctuations and a growing preference for greater control and higher quality in the supply chain (Pourhejazy & Ashby, 2021). It is essential for businesses to regularly evaluate and adjust their supply chains to adapt to market changes (Pourhejazy & Ashby, 2021).

According to Moradlou et al. (2017) analysis of the UK manufacturing sector, responsiveness is the primary driver of reshoring. They discover that businesses are reshoring to shorten lead

times, enhance quality control, and react swiftly to demand changes. In their 2017 investigation of the Polish garment and footwear industry, Stpie and Mody explore the issue of reshoring and discuss whether it is a step in economic development or a false nationalistic anthem. They discover that while there is some reshoring activity within the fashion industry and primarily so in the luxury apparel industry, it is limited, with the proximity of production to the market being the main factor or driver behind the decision to reshore production. On the contrary, Stpień & Młody (2017) state that the main reasons for bringing operations back to the home country are to save costs and enhance the quality and efficiency of the supply chain.

According to Ellram (2013), the main reasons for reshoring include rising labor costs, concerns about the quality of the products, the need to be closer to their customers, as well as government incentives that encourage outsourcing, like lower labor costs, access to new markets, and the availability of specific skills. Additionally, the decision to reshoring is often driven by the desire to have greater flexibility in operations, reduce supply chain risks, and improve their products' quality (Barbieri et al., 2018). According to Moradlou, Backhouse & Ranganathan (2017), the main reason for the reshoring movement is a company's ability to respond quickly to market conditions and customer demand changes.

According to De Backer et al. (2016), who investigate this question, reshoring is either a myth or reality. They conclude that evidence of some reshoring is limited due to the lack of firm-specific data and quantitative research and varies among industries and nations. They contend that not all businesses and nations will find reshoring an effective strategy. Barbieri et al. (2018) conclude that bringing manufacturing back to a country is complex and influenced by various political, economic, and strategic considerations.

Fratocchi and Di Stefano (2019) analyze the importance of sustainability and reshoring in the fashion business. They discover that reshoring may be an opportunity to promote sustainable practices, such as lower emissions during transportation, more excellent waste management, and greater integration with workers and communities, and that corporations should consider sustainability when deciding whether to reshore.

Overall, the studies indicate that reshoring is a complex and diverse phenomenon influenced by several variables, including quality issues, cost increases, intellectual property protection, responsiveness, sustainability, and proximity to the market. Despite some evidence of reshoring activity, it is limited, varies among industries and nations, and might not be a practical choice for many businesses and nations.

3.2.2 Reshoring and Supply Chain Management

Studies highlight the significance of efficient communication and coordination between supply chain members to manage the supply chain successfully. Casson (2013) and Bode et al. (2011) stress the importance of managing supply chain interdependence through information processing or governance modalities. Additionally, Fine (2013) emphasizes the significance of openness in supply chain management, which helps businesses decide more wisely on where to get their supplies and how to manage their supply networks.

These studies indicate that careful consideration of coordination and communication channels, controlling interdependence, and transparency are necessary for effective supply chain management. Establishing a company culture that aligns with the global strategy is crucial. This involves prioritizing diversity and inclusion and being open to adapting behavior to fit regional customs and cultures, as stated by Liesch et al. (2011). These elements can help businesses optimize their supply chain management. This proper way of managing the supply chain is called by Joubioux and Vanpoucke (2016) "right-shoring," It implies finding a balance between low-cost production and easy access to important markets and suppliers. Reshoring can be challenging due to various factors, such as the need for new investments, the availability of skilled personnel, and potential conflicts with suppliers and customers (Stentoft et al., 2016).

3.2.3 Reshoring and Technological Enablers

Robinson and Hsieh (2016) argued that reshoring is a strategic renewal of luxury clothing supply chains that can have advantages such as improved quality, quicker response times, and shorter lead times, Pourhejazy and Ashby (2021) conducted a case study and found that the COVID-19 pandemic has disrupted supply chains and increased the importance of local sourcing. These

studies demonstrate that outside events, the desire for more excellent supply chain performance, and strategic considerations might affect reshoring decisions; and the importance of developing a global mindset, building a network of connections, and using technology to enhance communication and coordination (Liesch et al., 2011).

Changes in consumer preferences and increasing labor costs in developing countries have led to increased automation in the textile and clothing industry. (Moore, Rothenberg & Moser, 2018). However, the researcher Butollo (2020) discusses the impact of digitalization on different areas and stakeholders, including businesses, labor, and customers. The conclusion suggests that although there may be some reshoring of manufacturing, it is more probable that there will be increased regional competitiveness and fragmentation of global production networks due to the changes brought about by digitalization and new technology.

3.2.4 Factors for Reshoring Decisions

According to Foerstl, Kirchoff, & Bals (2016), Robinson & Hsieh (2016) and reshoring in the garment sector, decisions may be motivated by several factors, including the need for improved supply chain performance, the effects of exogenous events such as the COVID-19 pandemic, and strategic reasons. The growing significance of reshoring as a strategic option for businesses looking to improve their supply chain resilience, lower risk, and accomplish other strategic goals is highlighted by studies, some of which concentrate on particular industries or geographical areas (Robinson & Hsieh, 2016; Pourhejazy & Ashby, 2021).

When choosing a location, research has traditionally focused on economic and financial factors like taxes, infrastructure, and labor costs. However, authors argue that social, cultural, and environmental considerations should also be considered (Jain, Kothari, & Kumar, 2016). Fratocchi and Di Stefano (2019) provide a paradigm for incorporating sustainability into reshoring plans and argue that sustainability should be considered when making reshoring decisions. Sardar, Lee & Memon (2016) argue that when evaluating outsourcing solutions using a framework, it is essential to consider their sustainability, cost-effectiveness, and risk levels.

Alternatively, outsourcing tactics may be more appropriate depending on the specific circumstances of the firm or the nation. It is essential to balance cost, capacity flexibility, and risk considerations to make informed decisions, and further research is required on the effect it has on sustainability.

3.2.5 Reshoring and Sustainability

Globalization has led to various environmental and social problems. These include the negative impact of long-distance travel on the environment, the exploitation of workers in developing countries, and the depletion of natural resources (Ashby, 2016). According to Fratocchi & Di Stefano (2019), sustainability is often considered when bringing production back to a country, but there may be other factors; these factors include, as mentioned earlier, labor cost, transportation costs, quality control, and inventory control. They also found that the relationship between sustainability and reshoring is complex and influenced by factors such as the industry sector, economic development, and required investment.

Bals, Kirchoff & Foerstl (2016) argue that using a framework helps the firm effectively evaluate outsourcing or reshoring options based on sustainability, cost-effectiveness, and risk levels. The decision-making process should consider the situation's specifics, as alternative outsourcing tactics may be more suitable, and balancing cost, capacity flexibility, and risk considerations are vital to make the best decision. Reshoring can help solve environmental and social problems by reducing the carbon footprint of supply chains, improving labor standards, and promoting the use of local resources (Ashby, 2016). The authors Sirilertsuwan, Hjelmgren, & Ekwall (2019) argue that sustainable proximity manufacturing can make the fashion industry more eco-friendly by reducing carbon emissions and supporting local communities. Governments, fashion firms, and other stakeholders must collaborate and address barriers to achieve sustainable proximity manufacturing while promoting its key drivers. However, reshoring can positively and negatively impact sustainability, depending on the environment. It can lead to beneficial outcomes such as reducing the carbon footprint of supply chains, improving labor standards, and promoting the use of local resources. However, negative implications may arise, such as increased resource consumption and the need for capital investment in new production facilities (Fratocchi & Di

Stefano, 2019), and the connection firm's or the nation's specific circumstances for reshoring, like cost reduction, quality improvement, flexibility, and environmental and social sustainability enhancement (Martínez-Mora & Merino, 2020).

When businesses consider bringing their operations back to their home country (reshoring), they should consider sustainable technologies that can help them save money, improve quality and flexibility, and promote social and environmental sustainability. According to the authors, incorporating sustainable advances into reshoring strategies can benefit businesses by making them more competitive and meeting the growing demand for sustainable practices and products. (Martínez-Mora & Merino, 2020).

Henninger, Alevizou & Oates (2016) argue for four aspects of sustainable fashion: sustainable materials and waste reduction in production, ethical and sustainable production methods, environmentally-friendly transportation and logistics, and promoting sustainable consumption habits and extending the life of products. Consumers are highly concerned with sustainability, which leads to a greater willingness to purchase domestically-made products. (Gillani, Kutaula, & Budhwar, 2022). Bringing production back to the local level can encourage consumers to make more responsible and sustainable purchasing decisions by increasing their awareness of sustainability issues. The study also found that consumers have a strong emotional attachment to locally made products and that their perception of quality and reliability plays a significant role in their preference for domestic goods. (Gillani, Kutaula, & Budhwar, 2022). The fashion industry faces several challenges in achieving sustainability, including the complicated nature of global supply chains, the prevalence of fast fashion, and the need for more transparency and traceability in the sector. (Henninger, Alevizou & Oates, 2016).

According to Cosimato and Vona (2021), who explore how digital innovation supports sustainable reshoring, industrial processes can be made more effective and sustainable with the help of digital technologies. The potential of additive manufacturing to improve sustainability and social responsibility in the garment supply chain is examined by Hohn and Durach (2021). Jain, Kothari, & Kumar (2016) developed a framework for researching location choice that considers the interaction of multiple aspects and the feedback loops between location choice and

company strategy. Better location choices increase their competitiveness and accomplish their strategic goals. It may be more advantageous to communicate a company's sustainability policies before making a purchase decision rather than afterward (Reck et al., 2022).

The research findings collectively imply that reshoring can present chances to enhance sustainability in the apparel industry. However, doing so necessitates careful consideration of sustainability concerns in reshoring decisions and implementing cutting-edge technology and processes. Reshoring can assist in lowering emissions associated with transportation and enhances the local area's social and economic climate. However, sustainability should be a guiding principle all along the way (Martínez-Mora & Merino, 2020; Alevizou & Oates, 2016; Gillani, Kutaula, & Budhwar, 2022). Digital innovation, mainly additive manufacturing, can support sustainable reshoring, making industrial processes more effective and environmentally benign.

The Gap in the Literature

The research and literature on reshoring and the causes and concepts that explain the decision-making behind reshoring and manufacturing locations exist. However, there is no widely accessible research on whether the 'trend' of reshoring is statistically proven or whether a 'buzz' has arisen following the uncertainty in supply chains and trade in recent years.

4 Data

4.1 Source Material and Evaluation

The research uses a secondary database collected and compiled by the author, which contains data from primary sources. The primary source of data analyzed comes from five fashion conglomerates, and data was also sampled from other sources or independent organizations to supplement this.

Table 1: Reports used as sources for the database (each report is published by respective Conglomerate)

<u>INDITEX</u>	<u>H&M Group</u>	<u>Fast Retailing</u>	<u>Gap Inc.</u>	<u>PVH</u>
Sustainability Balance Sheet 2017	Supplier List March 2017	Uniqlo/GU Core Manufacturing 2017	Gap Inc. Factory List 2017	N/A
Sustainability in Figures 2018	Supplier List March 2018	Uniqlo/GU Core Manufacturing 2018	Gap Inc. Factory List 2018	N/A
Our Sustainability Model Indicators 2019	Supplier List March 2019	FR Core Sewing Factory List 2019	Gap Inc. Factory List 2019	Factory List Disclosure 2019
Annual Report 2020	Supplier List March 2020	FR Core Sewing Factory List 2020	Gap Inc. Factory List 2020	Factory List Disclosure 2020
Statement of Non-Financial Information 2021	Supplier List March 2021	FR Core Sewing Factory List 2021	Gap Inc. Factory List 2021	Our Factory Disclosure list 2021
Statement of Non-Financial Information-2022	Supplier List March 2022	FR Core Sewing Factory List 2022	Gap Inc. Factory List 2022	Factory Disclosure list 2022

The gathering of data relies on reports and supplier lists published by the primary sources (conglomerates) in PDF and Excel formats in combination with their yearly report and audits. Excel is used to collect, organize, and compile the data, which is manually inputted. The collection process involves obtaining one yearly report or list of factories and suppliers from one of the five conglomerates. Data on the number of factories of the conglomerates, their locations, and their suppliers, and using addresses and geographical locations of the factories to determine additional variables, such as the distance between the factories and the conglomerate's headquarters in kilometers. Sorting the factories by regions, countries, and cities allows for testing of other proximity factors beyond just being located in the same country as the headquarters.

Various methods are used to analyze the data, including using Stata software to analyze, generate variables, and visually present findings and trends. Descriptive statistics are used to present the

findings, while regression analysis is used to determine the significance of potential trends. The dependent variable is whether production is situated in the home region of the Conglomerate (Sweden and Scandinavia for H&M Group, Southern Europe, and Spain for INDITEX, North America and the United States for PVH and Gap Inc., Japan, and South Korea for Fast Retailing), which is represented by a formatted binary value of "Reshored" or "Not Reshored." Another dependent variable is the total distance of the supply chain, accounting for discrepancies in the binary value if they have still decreased the overall distance. The distance is measured from the Head Quarter of the Conglomerate to its factories.

One of the most significant limitations of the data is its need for more reliability, as the information comes solely from fashion conglomerates. Due to transparency issues, the conglomerates might inhabit bias towards presenting skewed figures that need more accuracy. However, in recent years, transparency has improved, as previously mentioned, among these companies, and the data published by the conglomerates themselves is the only available source. Further, the data only includes the location and quantity of production factories, not the actual volume of garments produced at each location. However, whether a general trend exists is observed by considering the distance of the supply chain and the number of manufacturing locations. Some conglomerates, like H&M, periodically release new data and remove old data, making it more challenging to collect their information than Inditex, which keeps all its data on its website. However, compiling the data into a common database has limitations because each conglomerate may measure or transcribe its data differently, introducing a risk of inconsistency. However, no available dataset applies to this subject, and this study aims to look at current trends using the currently available data.

5 Methodology

5.1 Model of Research

A quantitative approach has been selected to pursue the research goal. The quantitative study aims to identify if there exists a statistically significant trend of reshoring in the fashion sector by analyzing data from major conglomerates using primary sources and creating a secondary database of their manufacturing locations. Due to the thesis's scope, data collection will be restricted to the five largest conglomerates with accessible and available data in panel data format. The analysis is conducted by using the panel data variables so that time series regression analysis is used.

5.1.1 Data Collection and Formatting

Firstly, primary data on manufacturing location is collected from the “Suppliers list” and “Yearly Reports” from the conglomerates, and the accessibility of the data and potential limitations are identified (Currently, complete data is found for Inditex and Gap Inc.)

Secondly, the data is combined into a file displaying conglomerates, brands, and suppliers over 2017-2021, ordered by manufacturing country and addresses. The data displays the number of factories and suppliers in any region over the years to identify trends and use relevant descriptive statistics to display the findings.

CONGLOMERATE	YEAR	COUNTRY	REGION	MILLS	SUPPLIERS	FACTORIES	S+F	DISTANCE FROM HQ	SUPPLY CHAIN DISTANCE
INDITEX	2017	Spain	South Europe		198	447	645	511.25	228528.75
INDITEX	2017	Portugal	South Europe		161	1344	1505	514.51	691501.44
INDITEX	2017	Morocco	North Africa		130	310	440	1138.37	352894.7
INDITEX	2017	Turkey	East Europe / West Asia		177	777	954	3699.47	2874488.19
INDITEX	2017	India	South Asia		131	382	513	7518.93	2872231.26
INDITEX	2017	Bangladesh	South Asia		114	296	410	8655.41	2562001.36
INDITEX	2017	Vietnam	South East Asia		5	145	150	12222.14	1772210.3
INDITEX	2017	Cambodia	South East Asia		2	127	129	10692.32	1357924.64
INDITEX	2017	China	South East Asia		425	1866	2291	10287.62	19196698.92
INDITEX	2017	Pakistan	South Asia		45	107	152	7005.86	749627.02
INDITEX	2017	Argentina	South America		37	67	104	10045.12	673023.04
INDITEX	2017	Brazil	South America		12	44	56	8385.02	368940.88

Figure 1: Picture of the Database compiled and used in the thesis. The picture is a clipping of Inditex in 2017 and is for illustrative purposes of the construction of the database

5.1.2 Descriptive Statistical Analysis

Following the regression analysis, the constructed database is analyzed in Stata to produce and export descriptive statistics that illustrate and aid in explaining the findings of the analysis. Figures include an illustration of the number of factories reshored for each conglomerate over the studied period, the share of factories reshored to the total number of factories, and the supply chain distance of the conglomerates over the studied period. All graphs are produced in Stata using the constructed database.

5.1.3 Regression Analysis

Lastly, the data is analyzed to determine the trend of reshoring among these conglomerates over the last six years. The data is compared to general industry trends to determine if the trend is unique to these five conglomerates or reflects a more significant industry trend.

The formula for Ordinary Least Squares $y_i = \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_i + \varepsilon_i$

The regression analysis includes analytical methods and tools typical for time series analysis. The data is a panel data series; however, one variable is analyzed over time in each regression, so time series analysis is used. The variables are the *Number of Reshored Factories* (for rigidity, two categories of this variable are tested). The variable describes the number of factories of the respective conglomerate in the home market country or home region (For H&M Nordics, Inditex Southern Europe, Fast Retailing South Korea, Taiwan, Japan, Gap Inc. North America, and PVH North America). The variable over time illustrates whether there exists a trend of reshoring over time.

Model: Number of Reshored Factories = $\beta_1 + \beta_2 \times \text{Year}$

The second Variable regressed is the *Supply Chain Distance* of the respective conglomerates. The variable consists of the sum of the distance to each factory in kilometers from the Headquarter of the respective conglomerate (H&M in Stockholm, Sweden, Inditex in Arteixo Spain, Fast Retailing Yamaguchi Japan, Gap Inc. San Francisco, United States, and PVH New

York, United States). Suppose the number of factories Reshored is “binary” in character. In that case, the total distance of the supply chains of the conglomerates aids in illustrating if production is relocated and with more excellent proximity to headquarters. The regression does not precisely illustrate whether reshoring is taking place; however, it indicates the general direction of the phenomenon amongst the conglomerates.

Model: Supply Chain Distance = $\beta_1 + \beta_2 \times \text{Year}$

Tests for violating Gauss Markov assumptions are used to evaluate statistical significance. First, a test for Stationary is conducted on both variables, the ‘Augmented Dickey-Fuller’, to evaluate if stationarity or non-stationarity exists in the time series. However, contrary to the assumptions in this specific case, a trend over time is what is tested for. Therefore, a violation of stationarity indicates that the variables depend on time and are, thereby, still of relevance, and it confirms that it lies within the theory of the thesis. Secondly, a test for Autocorrelation using a Breusch-Godfrey test is conducted to evaluate if the time series suffers from autocorrelation, residuals, or error terms are endogenous (follow a pattern or are dependent on each other). Thirdly, a Breusch-Pagan test for Heteroscedasticity is performed to evaluate if the time series suffers from heteroscedasticity, meaning the variance of the residuals varies over time, indicating endogeneity. If the time series are stationary, have no autocorrelated error terms, and are homoscedastic, then the Gauss-Markov assumptions are not violated (Under mild conditions). The typical fourth test for time series, multicollinearity, is not as significant for this research since it tests for a high correlation between explanatory variables. Since only time is used in this case, it is impossible to conduct and of no relevance.

6 Results

This section presents and explains the results of the quantitative study performed in pursuit of the research question.

6.1 Descriptive Statistics

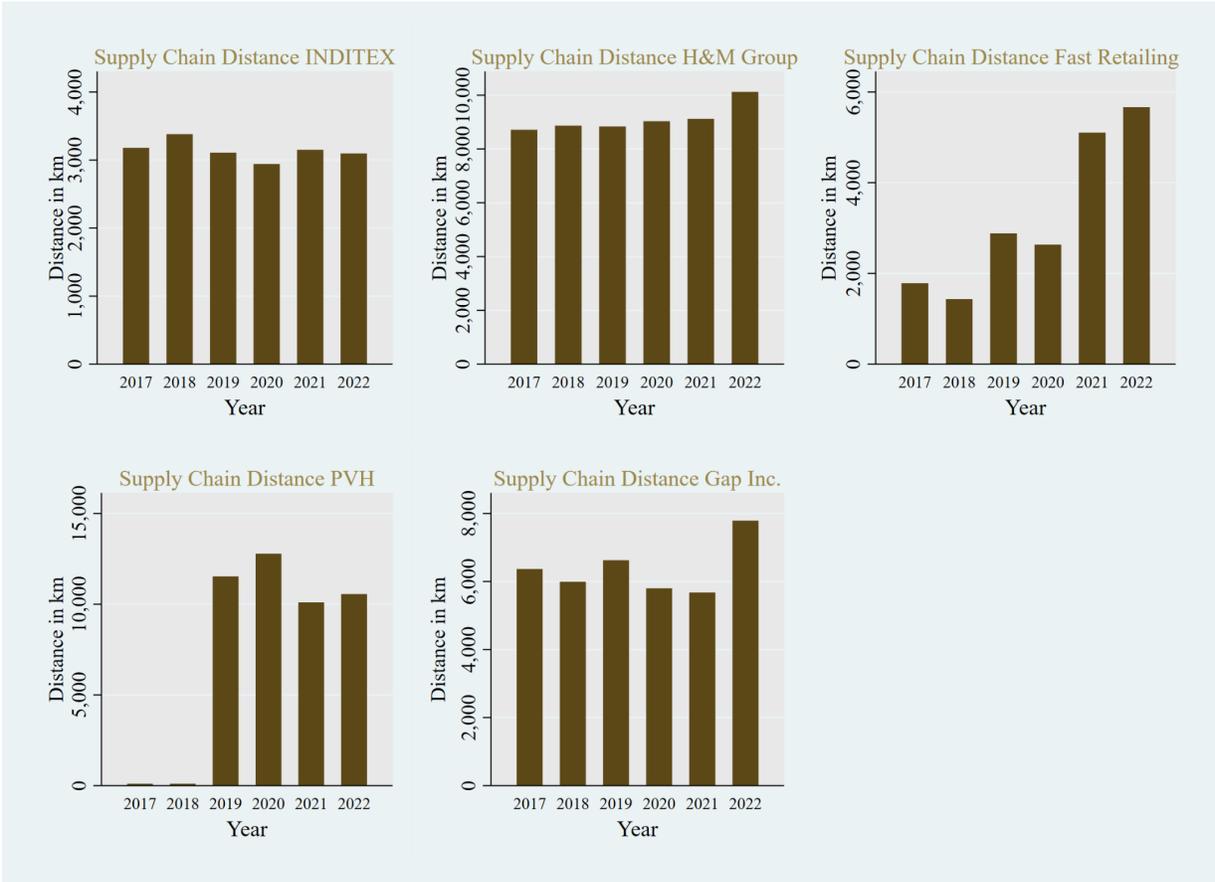


Figure 2: Multi-Graph over the Supply Chain Distance of the five largest fashion conglomerates from 2017 to 2022. Distance displayed in km

Figure 2 above illustrates the results from the data analysis over the supply chain distance of the Conglomerates. The graphs show that conglomerates have been increasing the distance between their headquarters and production facilities, as seen in the trend across all companies. This aligns with the slight negative trend in the supply chain distance regression analysis of the next part of the results section. Overall, there is no significant trend of reshoring among conglomerates based on supply chain distance. These companies have established more factories at greater distances from their headquarters than in close vicinity.

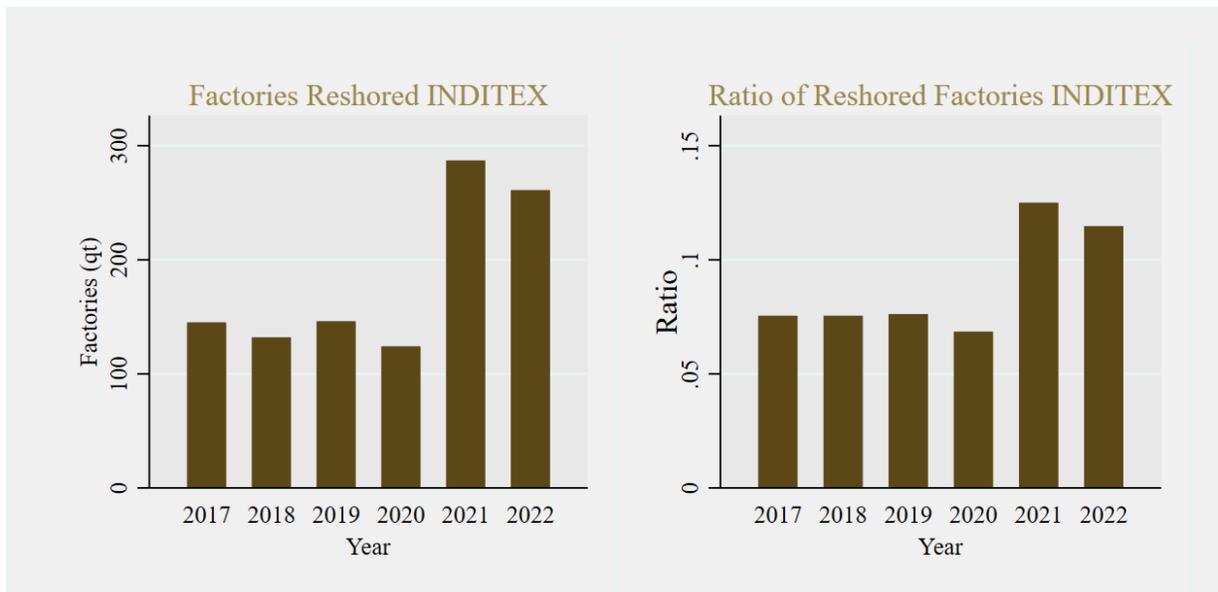


Figure 3: Combined Graph illustrating the number of Registered Factories for Inditex in quantity and a relative measure (ratio of reshored factories to total factories) from 2017 to 2022.

The number of reshored factories of Inditex has remained on the same level in relative terms and absolute terms; however, after 2021, the conglomerate has increased the number of reshored factories in absolute terms and vaguely relative terms. (Figure 4). Indicates some sort of supply chain shock or disruption affected their supply chain.; caused by, most likely, the covid-19 pandemic. This indicates that Inditex has reshored to some extent since 2021; however, the data on supply chain distance points otherwise, Implying that simultaneously when they reshore some manufacturing, they also increase manufacturing at very far distances, in China, for example. This is the case for Inditex, and it has more than doubled its number of factories in China while simultaneously increasing the number of factories in Spain and primarily Portugal (Gummesson, 2023).

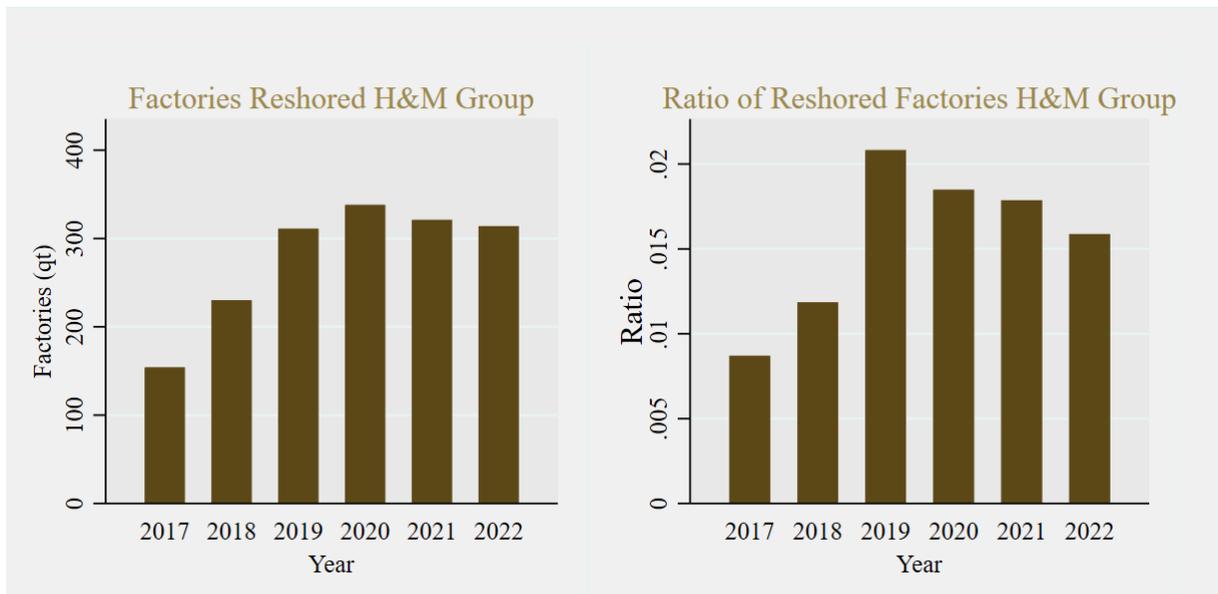


Figure 4: Combined Graph illustrating the number of Reshored Factories for H&M Group in quantity and a relative measure (ratio of reshored factories to total factories) from 2017 to 2022.

From 2017 to 2022, H&M Group's reshored factories increased, with a peak in 2020 to later decrease again. Overall, however, it appears that the conglomerate has increased its number of reshored factories; however, the numbers over their supply chain distance points to an opposite trend, as well as the results from the regression analysis in the next section. This indicates, just as with Inditex, that H&M Group has moved some of its production closer to its headquarters and home market while simultaneously increasing the number of locations far away. H&M Group has primarily increased its number of factories in Sweden, the Baltics, and Portugal while simultaneously increasing its number in Turkey, Morocco, Indonesia, and China (Gummesson, 2023).

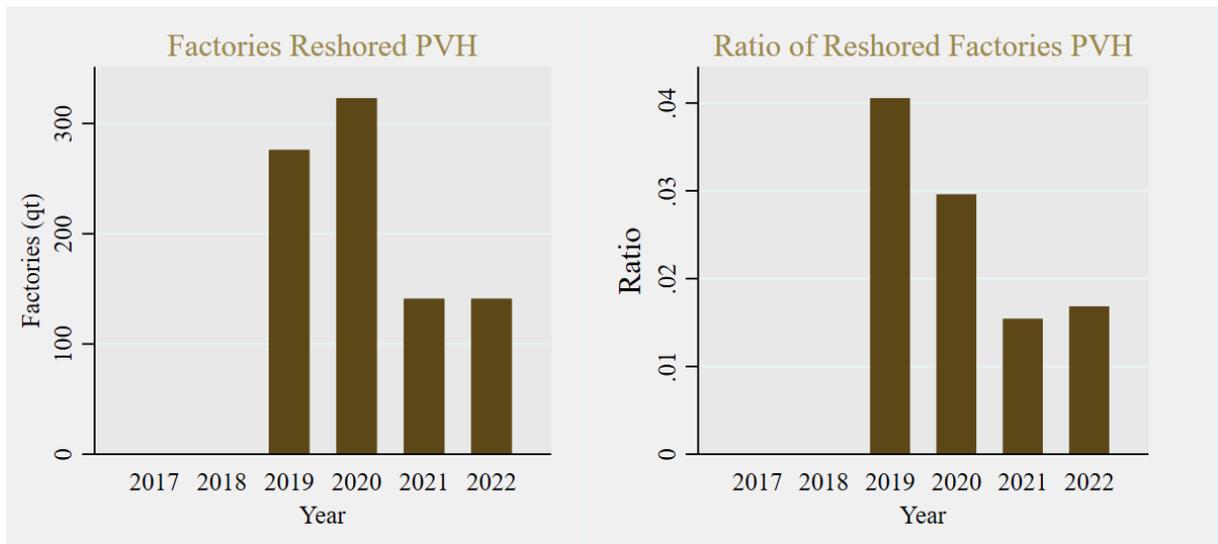


Figure 5: Combined Graph illustrating the number of Reshored Factories for PVH in quantity and in a relative measure (ratio of reshored factories to total factories) from 2017 to 2022.

The figures over PVHs' reshored factories indicate a negative reshoring trend, in alignment with the results of the supply chain distance regression and the descriptive statistics. PVH has kept its supply chain distance relatively stable over the years analyzed. However, they have decreased their ratio of reshored factories; this indicates that PVH has closed factories of a greater quantity of factories in close vicinity while moving some further away. The data of their factory sites confirm this (Gummesson, 2023).

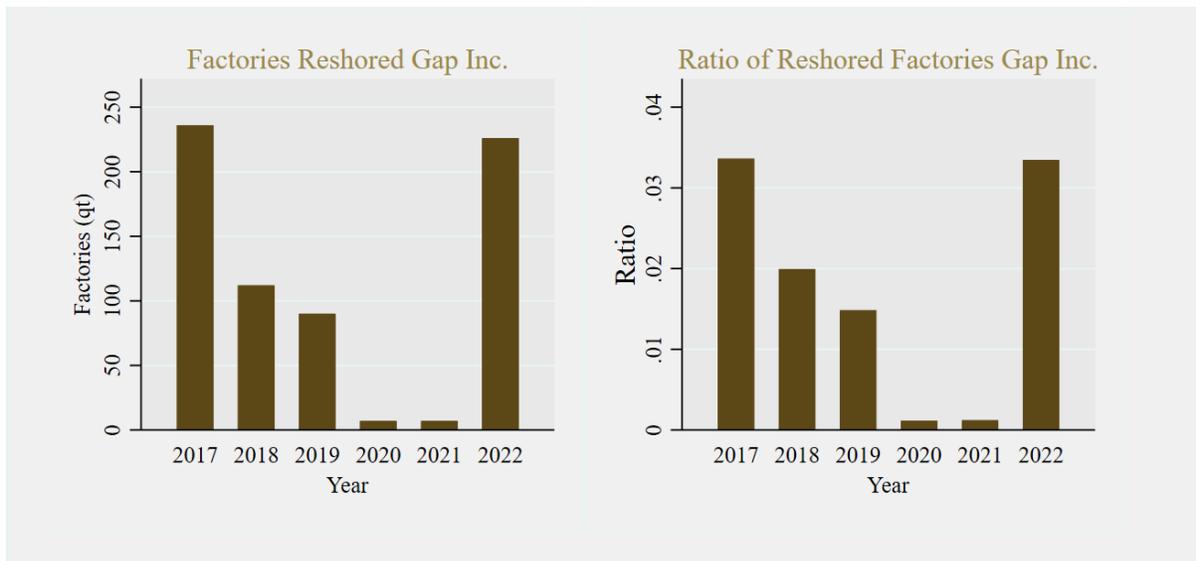


Figure 6: Combined Graph illustrating the number of Reshored Factories for Gap Inc. in quantity and a relative measure (ratio of reshored factories to the total number of factories) from 2017 to 2022

The reshored factories of Gap Inc. show tendencies to very volatile trends. The number of reshored factories in relative and absolute terms decreases significantly from 2017 until 2020, and after 2021 the number quickly increases significantly. This aligns with the uncertainty of the regressions and uncertainty in the business during shocks, in this case, most likely the covid-19 pandemic.

6.2 Regression Analysis

1. Stationary Test: Augmented Dickey-Fuller

Checking if a variable is stationary is done by performing the Augmented Dickey-Fuller (ADF) test. Stationarity is essential for linear regression because it ensures the relationship between the dependent and independent variables is stable over time (Greene, 2012), in opposition to the analysis of this research.

Regression analysis was used in this study to examine two variables: the supply chain distance of each conglomerate and the number of reshored factories for each conglomerate. The Dickey-Fuller test findings, however, revealed that neither variable was stationary and stable. However, in the scope of the regression of the thesis, non-stationary solely proves that elements indicate that the variables vary with time, meaning it follows the theory of the analysis.

The Dickey-Fuller tests indicate that the data is non-stationary in this analysis (see *Appendix 1*), indicating that the data depends on time to some extent and falls within the research theory.

2. Test for Autocorrelation

To ensure accurate coefficient estimates, it is essential to check for serial correlation in the data. This can be done through the Breusch-Godfrey test, which detects patterns in the residuals over time (known as autocorrelation). Failure to account for autocorrelation can result in biased and consistent estimates (Greene, 2012).

Based on the results of the Breusch-Godfrey test for autocorrelation on both variables, with p-values of 0.132 and 0.215, there is no significant evidence against autocorrelation at the 5% level see *Appendix 2*; indicating that the need for robust standard errors is insignificant. However, the dataset's small size could affect the test statistic's accuracy, making it more susceptible to outliers or random deviations that may bias the results. Therefore, it is vital to exercise caution when interpreting the statistical tests' outcomes, and perhaps the data needs to be more restricted for performing a Breusch-Godfrey test.

3. Test for Heteroscedasticity

To ensure accurate standard error estimates, it is essential to check for heteroscedasticity in the data. This can be done using the Breusch-Pagan test, which detects when the variance of the residuals is not consistent over time. Biased and inconsistent estimates can result from heteroscedasticity (Greene, 2012).

A test for heteroskedasticity, or the fact that the variance of the residuals varies depending on the observations, is the Breusch-Pagan test. The regression analysis results in this instance were subjected to a Breusch-Pagan test. The resulting p-value is 0.0731 and 0.0812 see *Appendix 3*. The data show evidence of heteroskedasticity, according to a p-value of 0.0731 and 0.0812, but not enough to disprove the null hypothesis of homoscedasticity at the standard level of significance (i.e., 0.05). As a result, the data inhibits no significant heteroskedasticity. Therefore, there is no need for robust standard errors in the regressions performed.

Because heteroskedasticity might impair the precision and dependability of the regression analysis results, it is crucial to check for it. The computed coefficients' standard errors and confidence intervals may be skewed if heteroskedasticity is present, and the hypothesis tests might not be accurate. In conclusion, the findings of the Breusch-Pagan test indicate that there is some indication of heteroskedasticity in the data. However, it needs to be sufficiently substantial to impair the validity of the regression analysis conclusions.

4. Test for Multicollinearity

In time series studies where only one dependent variable is used for each regression, there is no need for multicollinearity testing. This is because multicollinearity concerns the correlation between independent variables rather than the independent and dependent variables. Time series analysis mainly concerns the relationship between the dependent variable and time rather than the interactions between multiple independent variables (Greene, 2012). Therefore, the issue of multicollinearity is not applicable in this case. However, verifying other assumptions, such as stationarity, autocorrelation, and heteroscedasticity, is still essential.

Table 2: OLS Regression Results of *Number of Factories Reshored* as dependent Variable over Time

Independent Variable	Coefficient	Standard Error	t-ratio	p-value
Year	12.98	6.87	1.89	0.062
CONS	-26007	13867.75	-1.88	0.064
R ²	0.0438			
Adj. R ²	0.0315			
Number of Observations	80			

The regression analysis results suggest that the variables included in the models (2017-2022) can only partially explain the variation in the number of restored factories, as indicated by the R-squared value of 0.043. The relationship between time and the number of reshored factories is not statistically significant at the 5% level. However, it may be significant at higher levels based on the coefficient's p-value of 0.062. The regression results, with a positive coefficient and a p-value of 0.06, indicate that a slightly positive trend of reshoring may be present. It is important to note that the model's predictions may not be entirely accurate, as indicated by the standard error of 6.866. The true coefficient value of the year's variable likely falls within the 95% confidence interval between -0.69 and 26.64. However, it should be noted that this interval includes zero, which suggests that there may not be a significant correlation between the variable and the number of reshored factories.

From the regression analysis on the five largest fashion conglomerates, it is close to evident that there is no significant correlation between time and the number of reshored factories. Factors such as changing consumer preferences, competitive pressures, and economic conditions could better predict the variability in the number of restored factories.

Table 3: OLS Regression Results of *Supply Chain Distance* as dependent variable over Time

Independent Variable	Coefficient	Standard Error	t-ratio	p-value
Year	10.293	3.44	2.98	0.003
CONS	-20594,2	6965.85	-2.96	0.003
R ²	0.0106			
Adj. R ²	0.0094			
Number of Observations	837			

The regression analysis shows a connection between the supply chain distance of the most prominent fashion conglomerates and the period from 2017 to 2022. However, the variation in time only accounts for 1.06% of the variance in supply chain distance, according to the coefficient of determination (r^2). Despite this, the p-value for the coefficient shows that time is a significant predictor of supply chain distance. The coefficient of time has a 95% confidence interval of 3.52 to 17.06, meaning the actual population value of the coefficient is within this range with 95% confidence. The model's standard error is 3.44, indicating a good fit for the data.

The data shows a correlation between the supply chain distance and time of the top five fashion conglomerates. However, the coefficient of determination indicates that time only partially accounts for the variability in distance. Further research is necessary to fully comprehend the factors that impact supply chain distance for fashion companies. Additionally, this regression is almost insignificant when considering the results from hypothesis testing.

Adding additional variables to the model could enhance the understanding of the relationship; however, that lies outside the scope of this research.

7 Conclusion

7.1 Concluding Discussion

The research results show that there has been no trend of reshoring among the five largest fashion conglomerates over the last few years. The results are purely based on locational data and not quantity or volume-based; however, some indications still provide a conclusion. The descriptive statistics from the database show that the number of reshored factories increased for conglomerates such as Inditex and H&M Group, but less in relative measure to their total factories. The other conglomerates have decreased or maintained their number of reshored factories in absolute and relative terms, indicating that an eventual industry-wide trend is not occurring. This is in accordance with the literature on manufacturing location decision-making. The process behind reshoring is complex, and many factors affect the decision to reshore production, and the decision is firm-specific (Bals, Kirchoff and Foerstl, 2016; Foerstl, Kirchoff and Bals, 2016; Sardar, Lee and Memon, 2016). With low significance, the regression analysis on the variable over the number of reshored factories indicates a slight positive relationship between all the conglomerates and the increased number of reshored factories over the years.

The descriptive statistics over the supply chain distance illustrate that the length of the conglomerates' supply chains has generally increased or stayed relatively constant. This provides support against the varying indecisive results of the analysis of the number of reshored factories of the conglomerates since this proves that even though the conglomerates make decisions to reshore some of their production, they still open more factories at greater distances. The regression analysis on the supply chain distance of the conglomerates over the years indicates that despite low explanatory power, the conglomerates' supply chain has been increasing.

The conglomerates all state they aim to increase production closer to their home market, and all are dedicated to becoming more sustainable (Fast Retailing, 2020; Gap Inc., 2021; H&M Group, 2022c; Inditex, 2022b; PVH, 2023b). The literature on reshoring and sustainability shows that the general customer views reshoring as more sustainable (Henninger, Alevizou and Oates, 2016; Martínez-Mora and Merino, 2020). Therefore, it is in favor of the conglomerates to communicate

their dedication to the process as a part of their strategic goals for sustainability. The literature also concludes that there has yet to be a known progress report on to what extent firms in fashion are reshoring their production (De Backer et al., 2016; Pourhejazy and Ashby, 2021). Further, the literature stresses that sustainability concerns are not the primary factors behind the decision to manufacture (Fratocchi and Di Stefano, 2019). The most common factors behind the decision to reshoring or not are distance and quality control, supply chain resilience, and security; secondly, focus on labor and transportation costs.

Without making extensive conclusions, the tendencies of firms show tendencies of a significant share of increased production in China and Indonesia, also in Turkey, Morocco, and Portugal. The reliance on China comes with the country's rapid development, and the increase of production in countries near the European market indicates the intricate process of manufacturing location decision-making and supply chain management. Costs and resilience affect the decisions heavily, as do proximity and transportation costs and time frames.

The drivers and decisions behind the results are identified under the perspectives and frameworks of supply chain management (SCM), Manufacturing Locations Decision, and Sustainable Supply Chain Management (SSCM), the effects of the extent of reshoring amongst the fashion conglomerates. At the same time, the increased production in distant locations such as China.

Supply Chain Management involves coordinating and managing all aspects of the flow of goods and services, from obtaining raw materials to delivering the final product (Bui et al., 2021; Carter & Rehman Khan et al., 2020; Zekhnini et al., 2020). Tactical decisions such as reshoring production to the domestic market or expanding manufacturing locations in China may improve the supply chain (Pettit, Croxton and Fiksel, 2019). By placing factories closer to domestic markets like Turkey, Morocco, and Egypt, fashion companies can save costs and time, meet client demands quickly, reduce stockouts, and enhance customer satisfaction. On the other hand, shifting production to China can lower manufacturing costs and increase profit margins due to its developed infrastructure, large labor pool, and experience in clothing manufacturing, making it an attractive location for fashion corporations.

Manufacturing Locations Decision and whether to reshore or (keep) offshore production is influenced by several variables, including price, lead times, quality, market demand, and supply chain hazards (Ellram, 2013; Tate et al., 2014; Theyel, Hofmann and Gregory, 2018). As literature in the literature review states, the cost and supply chain resilience and stability are some of the primary drivers behind manufacturing location decisions since offshoring to countries such as China leads to lowered labor and production costs, which induces financial benefits (Sardar, Lee and Memon, 2016). However, fashion conglomerates may have reevaluated the cost-effectiveness of offshore production due to growing labor prices in China and other aspects, including tariffs and geopolitical threats, as well as the increased uncertainty and transportation costs with the Covid-19 pandemic and other events and shocks. Relocating factories to domestic markets or nearshore nations like Egypt, Morocco, and Turkey can result in cost savings due to lower transportation expenses. The worldwide pandemic and supply chain disruptions increase the Risk Management focus. To reduce the dangers of relying on a single location and region, fashion companies may diversify their manufacturing locations. By dispersing output over several nations, they lessen the effects of localized disruptions such as trade disputes, natural disasters, or political instability.

Sustainable Supply Chain Management (SCCM) aims to reduce the adverse effects that the manufacture and delivery of commodities have on the environment and society. Sustainability may affect the decision to relocate some factories and expand production in nearby areas (Sirilertsuwan, Hjelmgren and Ekwall, 2019). Fashion conglomerates may reduce their carbon footprint and support environmental sustainability by reducing long-distance travel (Kshetri, 2021). Reshoring manufacturing closer to domestic or nearshore markets shortens transportation distance, lowering transportation-related emissions. Outsourcing production to nations with developing apparel sectors, such as Turkey, Morocco, and Egypt, raises questions about labor laws and long-term social stability; however, customer satisfaction and the image of clothes produced in Turkey rather than Bangladesh tend to be higher (Martínez-Mora & Merino, 2020). To maintain a sustainable and ethical supply chain, fashion conglomerates must ensure that their production sites uphold fair labor practices, safe working conditions, and compliance with local rules.

As a result, fashion corporations' strategic decision to transfer some factories back home while boosting production in distant countries like China was motivated by concerns about supply chain efficiency, manufacturing prices, closeness to markets, and sustainability. The numerous elements driving their decisions and the future effects on the overall supply chain and sustainability performance by assessing this trend through Supply Chain Management, Manufacturing Location Decisions, and Sustainable Supply Chain Management.

The research shows that the five largest conglomerates have yet to show a clear trend of reshoring in the last years, and the drivers behind this process are many and complex. However, the importance of sustainability concerns of the average customer and the statements from the conglomerates themselves shows that they are willing to portray a positive message of reshoring and sustainability goals. At the same time, the factory locations indicate that other factors most likely cause the decisions behind and that the conglomerates themselves fail to fulfill their own high aiming agendas and strategic goals.

7.2 Future Research

This thesis's research is limited, and the method is relatively unexplored. Future research for more excellent analysis with more robust results and finding should consider including the volume or quantity of clothes produced at each location to include the actual proportion of garments sold in retailing that originates from reshored or offshored manufacturing.

The most significant reshoring factor for research on this topic is the transparency and the need to reduce firm-specific production in the fashion industry. However, recent years have proven increased transparency and greater access to data; future research should consider awaiting greater transparency and do similar research when the period is more extended and an actual long-run trend is observable.

7.3 Summary

The research conducted in this thesis concludes that there is no significant trend of reshoring among the five largest fashion conglomerates, and the factors affecting the process at hand are

many, varied, and complex. The fashion conglomerates dedication to increasing production in their respective home market is a goodwill and industry window-dressing strategy to comply with the increasingly demanding customer base viewing reshoring as a positive action for greater sustainability. Most likely, the decision-making and management of their respective supply chains indicate that other factors are drivers for the location of their factories rather than purely sustainability.

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Appendices

Appendix 1

Appendix 1: Augmented Dickey-Fuller test for Stationarity testing down from 2 lags (of both dependent variables) (H_0 : $\alpha=1$, has a unit root)

Variable	<i>Number of Reshored Factories</i>	<i>Supply Distance</i>	<i>Chain</i>
Estimated value of ($\alpha-1$)	0.345	0.232	

Appendix 2

Appendix 2: Breusch-Godfrey test for first-order autocorrelation (of both dependent variables)

Variable	<i>Number of Reshored Factories</i>	<i>Supply Distance</i>	<i>Chain</i>
Test Statistic: LMF with p-value	0.215	0.132	

Appendix 3

Appendix 3: Breusch-Pagan test for Heteroscedasticity (of both dependent variables)

Variable	<i>Number of Reshored Factories</i>	<i>Supply Distance</i>	<i>Chain</i>
Test Statistic: with p-value	0.0812	0.0731	