UNIVERSITY OF GOTHENBURG

SCHOOL OF BUSINESS, ECONOMICS AND LAW

Global Supply Chains at a Crossroads

A multiple case study investigating the process of Volvo Cars' & H&M Group's reconfiguration of their global supply chains

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Authors: Axel Garå & Jacob Elander

Supervisor: Roger Schweizer

Abstract

Globalization and falling barriers to international trade have incentivized firms to relocate activities to foreign markets in pursuit of greater returns. MNCs today often have global supply chains with high degrees of interdependence where a disruption at one end of the supply chain often affects the whole network. Recent disruptions, such as the Covid-19 pandemic have illustrated the vulnerability of such global supply chains. Both academia and business are evaluating how to best proceed in this volatile environment. Recent survey data indicates that firms are choosing different measures, with everything from relocating activities closer to the home market for greater control, to contracting more foreign suppliers in different markets to hedge against disruptions. A research gap is identified as to how this process of reconfiguration unfolds within MNCs. Therefore, this thesis investigates the underlying process of global supply chain reconfiguration following severe disruptions by employing a multiple case study of Volvo Cars and H&M Group. We find that the reconfiguration process unfolds in a continuous iterative pattern, where the role of experience is emphasized. Measures are weighed against the erosion of profits, as investments into resilience and capabilities are costly endeavors. Indications of MNCs shifting towards proactive reconfigurations through technological advancements, as opposed to reactive, are identified. Several limitations regarding the business-viability of measures to build resilience are discussed, alongside a wider discussion on the role of external stakeholders and the comfort zone of individual managers. We conclude by discussing opportunities for future research and implications for managers.

Keywords: Global Supply Chains, Volvo Cars, H&M Group, Risk Management, Reconfiguration, Zone of Balanced Resilience, Capabilities, Global Value Chains, Disruptions, Covid-19, International Business, Resilience.

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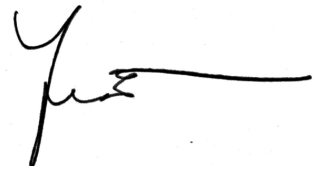


Jacob Elander

Axel Garå

Table of Contents

List of figures, tables and equations

List of abbreviations

EBIT - Earnings before interest and taxes

FDI - Foreign Direct Investment

FTA - Free Trade Agreement

GDP - Gross Domestic Product

GSC - Global Supply Chain

GVC - Global Value Chain

IB - International Business

JIBS - Journal of International Business Studies

JIT - Just-in-Time (short for "Just-in-Time Manufacturing Systems")

KPI - Key Performance Indicators

M&A - Mergers and Acquisitions

MNC - Multinational Corporation

R&D - Research & Development

SCRM - Supply Chain Risk Management

SMEs - Small & Medium Enterprises

TEU - Twenty foot equivalent unit (commonly referred to as '*a container'*)

UNCTAD - United Nations Conference on Trade and Development

1. Introduction

In this chapter, we introduce readers to our research topic by providing a background of the theoretical context. In addition, we present our identified research gap and our research question, as well as delimitations of our research.

1.1 Background

Organizing activities across country borders is not a new phenomenon. Historical accounts show how the Florence (Firenze) based Medici bank of the 15th century had branches in both Lyon and London. Similarly, the Hanseatic League in the Baltic region has been referred to by scholars as an early version of the modern multinational corporation (MNC) (Chandler & Mazlish, 2005). Management practices of international businesses stem as far back as the chartered trading companies, such as the Dutch East India Company and the East India Company of the 17th century. These organizations were among the first to separate ownership from management and introduced salaried managers who led the international operations. Historians argue that the increasing complexity of cross-border trade had caused the need for meritocracy, where more skilled staff were rewarded based on performance (Carlos & Nicholas, 1988).

The complexity of cross border trade is still valid as of today. Since the 1970s, the value of total world trade has been growing faster than the world gross domestic product (GDP), indicating that the global economy has become more interconnected (Porter, 1986; United Nations Conference on Trade and Development (UNCTAD), 2013). The rise of MNCs serve as an illustration of this development, as firms have relocated or outsourced their activities to foreign markets, made possible by factors such as falling costs of transportation and the liberalization of international trade (Dicken, 2015). Recent estimates show that as much as 60% of world trade is now composed of inputs and components, commonly from contract manufacturing or the outsourcing of IT-services (UNCTAD, 2013).

This interconnected web of flowing goods and services has been described as global value chains (GVCs), where the benefits of globalization have incentivized firms to both outsource and offshore activities (such as research & development (R&D), manufacturing, sales) to their respective optimal location, determined by local factor endowments such as resource availability and labor market characteristics (Buckley et al, 2018). R&D operations for

example, would be best suited in an environment abundant with cost-effective engineers and scientists, while primary manufacturing would be best to locate in close proximity to raw materials and sales would in theory benefit from proximity to the end customer (Porter, 1986). It is thus common to find MNCs today that have a truly global presence, and large manufacturing firms often contract several thousands of different suppliers of goods and services to serve their operations (Buckley et al, 2018).

With an increase of global interconnectedness in international business (IB), the sensitivity of these GVCs has increased. The interlinkages imply that a disruption at one end of a complex value chain quickly spreads and impacts an entire network (Buckley et al, 2018). Thus, the factor of risk has grown in interest for managers navigating this intertwined global environment. As global value chains are affected by a wide range of both internal and external forces, risk is a persistent threat in many different shapes and forms (Manuj & Mentzer, 2008). The task of identifying and mitigating potential threats to the value chain is troublesome, as some factors of disruption are difficult to recognize, which creates even more pressure on managers of multinational corporations tasked with configuring a global value chain (Fiksel et al., 2019).

Constructing a global value chain is a complex process, as there are several different approaches to configuration. Balancing aspects such as coordination, transaction costs, control, and logistics requires substantial resources, and with the threat of risk and disruptions the importance of strategic value chain configuration grows (Porter, 1986). During recent years, disruptions to global value chains have grown significantly in frequency. 94 percent of the companies listed on the Fortune 1000 experienced disruptions to their value chains due to Covid-19 pandemic (Contractor, 2021). Throughout the discourse, researchers argue on the best strategy to avoid and mitigate risk and disruptions. Approaches ranging from predicting external factors (Courtney et al 1997, Manuj & Mentzer 2008) to a heavier focus on internal capabilities are all discussed (Fiksel et al 2015a).

1.2 Problem Formulation and Research Gap

We believe that research regarding the reconfiguration of supply chains is of interest both to managers and scholars. In daily news media, the supply chain configurations and challenges to international trade have been scrutinized extensively (Wall Street Journal, 2022; Wikström,

2022) following the Covid-19 pandemic and the blockade of the Suez Canal during March 2021. These events have spurred discussion and caused a divergence of opinion amongst scholars regarding the future of global value chains, where arguments both for (Contractor, 2021) and against (Ciravegna & Michailova, 2021) globalization in the post-pandemic reality have been published in the *Journal of International Business Studies* (JIBS). Recent surveys indicate that firms are re-evaluating their supply chain configurations (Swedbank, 2022; Svenskt Näringsliv, 2020; Exportkreditnämnden, 2021) and thus we believe that this thesis would also be of value to managers in MNCs.

We identify a gap in the literature regarding how the process of reconfiguring the supply chain unfolds within the MNCs. There exists separate streams of literature regarding different branches of this topic, but few studies take the holistic view of combining different research fields. It is in this context that our main contribution lies, as insights from *Supply Chain Risk Management* (SCRM)-literature and IB-literature can be combined to investigate the process of supply chain reconfiguration. Furthermore, while there exists a rich body of survey data regarding *how* supply chains are being reconfigured, there is less availability of case studies that investigate the underlying processes behind supply chain configurations. This case study aspires to not only shed light on the efforts and actions conducted by MNCs in relation to their GVCs and the recent disruptions, but also to combine the separate streams of literature on the matter with insights from two MNCs with practical, hands-on experience. It is our firm belief that an adequate strategy needs to be constructed with acumen from both academia and industry, hence this thesis employs an abductive research methodological approach.

The issues discussed in this thesis are focused on recent events, and it is evident that academia is yet to catch up with latest developments. Hence, we find an opportunity to contribute to academia with contemporary examples. Further, a call for case studies within the IB research field has been expressed in recent years (Welch et al., 2011; 2022; Fiksel et al, 2019). More specifically, Fiksel et al (2019) requests an integration of contemporary global developments and resilience efforts to SCRM literature. Considering the calls from earlier research, we hope that our contribution will be both relevant and interesting.

1.3 Formulation of Research Question

The issues discussed in the previous section offer us the purpose of our research question: "*How does the process of reconfiguring global supply chains of MNCs unfold following severe disruptions?"*. Naturally, investigating the underlying process of the reconfiguration of supply chains also acknowledges that supply chains have been reconfigured. Thus, an element of *why* is added to the research question, prompting us to investigate *why* MNCs reconfigure their supply chains.

For our multiple-case study, we compare two Swedish MNCS, automotive manufacturer Volvo Cars and retailing company H&M. We believe that the two companies make for an interesting comparison since they operate in two different industries. By observing companies from two different industries, a greater theoretical understanding can be achieved. The companies are similar in the sense that they both manage complex GVCs and that the aspect of risk is highly prevalent for both companies. The choice of companies is based both on academic relevance and availability as this thesis is conducted in Gothenburg, Sweden. Both firms have been impacted severely by recent waves of disruptions to international trade (H&M Group, 2022a; Volvo Cars, 2022a), which combined with survey insights from Baur & Flach (2022) who finds that firms that have been impacted by disruptions are more likely to adjust their global supply chains (GSCs) make for an interesting case to study.

1.4 Delimitations

The thesis is delimited to two MNCs, one in the automotive industry and one in the retailing industry. The limited timeframe and scope of a master thesis creates a natural delimitation. Consequently, we have elected to solely examine Swedish MNCs in our multiple case study, a choice which is based on factors such as availability and access.

Since our thesis has the purpose of examining the behavior and decision making of MNCs following the past years of extensive disruption, a natural cut-off time period was decided to be the outbreak of the Covid-19 pandemic. Although academic literature and the problem formulation itself stems from years prior to the pandemic, the gathering of secondary data and the focus during interviews will be based on events occurring from February 1st 2020, to May 1st 2022.

As we are primarily interested in the underlying factors of the decision-making process, we aspire to interview and retrieve information from individuals who possess a great deal of information, as well as an overarching perspective of their organization. Hence, we delimit our study to few, but highly informed managers for our data gathering process. Through this approach, we favor the understanding of *how* and *why* decisions have been made.

1.5 Outline of the Thesis

Below, the six different chapters of this thesis will be briefly described.

Introduction: In this chapter, we introduce readers to our research topic by providing a background of the theoretical context. In addition, we present our research question and our identified research gap, as well as delimitations of our research.

Literature review: In this chapter, we review existing literature and guide the reader to our specific research setting through a review of historical works. The chapter starts with theories of the firm, and continues by discussing how globalization has affected the firm's location of activities. Recent disruptions to international trade, such as the Covid-19 pandemic, has spurred great academic interest which we review together with recent empirical surveys. In the end of the chapter, we present our conceptual framework which is based on the literature.

Methodology: In this chapter, we present our methodological choices, and the implications thereof. A description of how the data was collected is included. Measures taken to improve the quality of the thesis are discussed.

Findings: In this chapter, we present findings from both secondary- and primary sources of data. A brief introduction to our case companies is included. The chapter is structured according to the logic of our conceptual framework.

Analysis: In this chapter, we analyze our empirical findings through the lens of our conceptual framework. Several streams of past research are related to our observations, and observations from our two case companies are related to each other. In the end of the chapter, a revised conceptual framework based on insights from our empirical observations is presented.

Conclusion: In this chapter, we summarize key findings from our thesis. Limitations, as well as suggestions for future research are included. The chapter ends with implications for managers.

2. Literature Review

In this chapter, we review existing literature and guide the reader to our specific research setting through a review of historical works. The chapter starts with theories of the firm and continues by discussing how globalization has affected the firm's location of activities. Recent disruptions to international trade, such as the Covid-19 pandemic, has spurred great academic interest, which we review together with recent empirical surveys. In the end of the chapter, we present our conceptual framework which is based on the literature.

2.1 Theories of the Firm

Nobel laureate Ronald Coase's works "The Nature of the Firm" (Coase, 1937) and "The Problem of Social Cost" (Coase, 1960) are commonly referred to as cornerstones in the theories establishing that there are significant differences between organizing activities through the open market and under the umbrella of a firm. This notion was a significant factor for Coase's Nobel Prize in 1991. The line of thought, commonly referred nowadays to as 'Coase's Theorem' suggests that even under free market conditions, contracts can be too costly to negotiate and there are significant transaction costs, such as bargaining and asymmetric objectives. Therefore, it can be more efficient to organize activities within a firm. Within the firm, transaction costs and externalities can be mitigated, and actors are instead compensated by wages or provisions set at a different rate. This allows the firm to operate more efficiently than the open market, and profits can thus be generated (Taleb, 2016).

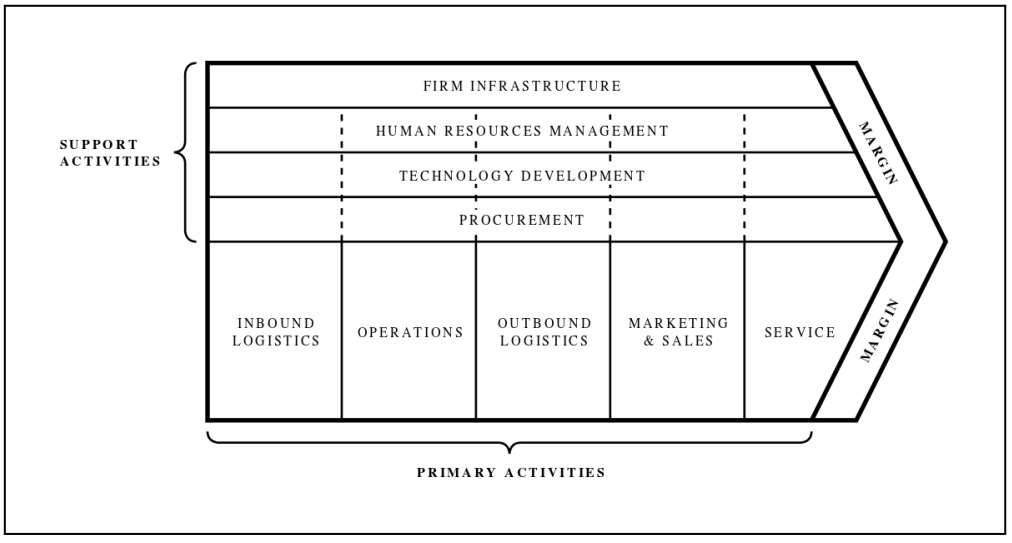
Having established the theoretical foundation of the *firm*, we turn to *international firms*. According to Buckley et al (2018), the academic field of international business was founded by Stephen Hymer in *International Operations of National Firms* (Hymer, 1976). One of Hymer's key ideas was that through foreign direct investments (FDIs), resources were transferred, and not just currency. This implies that skills, knowledge, and human capital may be transferred by firms to other markets to reap greater benefits (Buckley et al, 2018). These transfers of resources explain how a foreign firm can outcompete a domestic firm in its home market, despite what is referred to as the *liability of foreignness,* which refers to the hurdles that foreign firms face by being less familiar with the local context (Zaheer, 1995). Additional explanations for the existence of FDIs can be found in the 'Hymer-Kindleberger Theory' which states that domestic firms may be unable to carry out the same operations as foreign ones, since they lack the specific knowledge required (Buckley, 2018). A modern

illustration of this theory can be seen by observing MNCs from economically advanced markets, entering less developed countries and bringing technology and patents with them. In essence, the competitive advantage of international firms arises by leveraging unique portfolios of resources in different markets (Barney, 1986). Several influential works have been published in this field, such as Vernons (1966) theories of a products life cycle explaining patterns in international trade, and Vernons (1971) findings of positive correlation between financial indicators such as return on investment (ROI) and the degree of multinationality.

2.2 The Value Chain

A classic example of an analysis of a firm's different activities can be found in Porters (1986) illustration of the configuration and coordination of *value chain activities*. Porter (1986) suggests that activities can be categorized into either upstream- or downstream- activities, that combined form the margin, i.e the profits. In addition, there is also the division into either primary or support type activities. See Figure 1 below for an illustration.

Figure 1: The Value Chain as illustrated by Porter (1986)



Source and illustration: Porter (1986, p14).

By breaking down a firm's activities into several subsections, a more careful analysis of the optimal approach can be made. For each of these activities a firm can then decide on the desired level of coordination and geographical concentration. As an example, consider a support activity such as 'procurement' that in theory would benefit from a centralized location due to economies of scale, serving the entire firm from one base. On the other end of the spectrum there are the downstream activities 'marketing & sales' and 'service' which in

theory would be more reasonable to locate in many different sites, to increase the proximity and responsiveness to local demand (Porter, 1986).

Each activity is also scrutinized from a market perspective, where the individual firm considers if they have an *internalization advantage* compared to the open market in said activity. If not, then the activity would preferably be outsourced to the market in order to allow for the firm to instead focus on other activities that the do hold a competitive advantage in (Dunning, 1977; Quinn & Hilmer, 1994). Competitive advantage is thus derived from the fact that there exists imperfect factor markets, which are then appropriated by the firm to reap value greater than the market does (Barney, 1986).

The decision regarding where to locate a firm's different activities has been described as one of the most important decisions that any international business can make, and the decision to pursue international operations generally concerns three different aspects: market access, resource availability, or efficiency gains (Buckley et al, 2018, p28). Mudambi (2008) provides a thorough review of the subject and argues that firms are increasingly "fine-slicing" their activities, re-locating them to their respective optimal location around the world. Consider labor intensive assembly, which would ideally be located in an environment with comparatively low wages, facilitated by the 'spatial division of labor' and the uneven development between emerging- and industrialized economies (Hymer, 1971). On the other hand, complex R&D operations would be best located in a labor market with a high supply of engineers and scientists while proximity to raw material abundance would be beneficial in primary manufacturing processes. Finally, locating an activity within a specific location can serve as a foothold into new markets and consumer bases. The idea is in essence that there is an optimal location for each activity, which is determined by the different factor endowments of each location as well as the requirements of each specific task (Buckley et al, 2018).

2.3 Globalization and the Rise of Global Value Chains

This pursuit of finding the optimal location for each activity of a firm's value chain has led to globalized value chains, which is reflected in the international trade statistics. Since the 1970s, total world trade volume has been growing faster than the total world GDP, indicating an increasing degree of interconnectedness (Porter, 1986). The United Nations Conference on Trade and Development (UNCTAD) has estimated that as much as 80% of total global trade is linked to the vast geographical production networks of MNCs (UNCTAD, 2013). Quinn &

Hilmer (1994) discuss how firms should concentrate on 'core competencies' and outsource other activities, where the firm holds no specific advantage. As an illustration, outsourced contract manufacturing grew by over 20% per year during the second half of the 90s and early 00s, and there has been a prevalent mindset amongst MNCs of "*outsource operations, internalize the control of knowledge*" (Buckley et al, 2018, p42). The industrialization of the so-called 'emerging markets' have given these countries a much more prominent role in the global economy, driven by global value chains and the desire for firms to find the optimal location for their different activities (Buckley et al, 2018).

The increasing prevalence of this approach has been facilitated by falling barriers to international trade (Dicken, 2015). These falling trade barriers can be witnessed in several different ways, such as in the form of technological breakthroughs such as 'containerization' which have drastically reduced the costs of transportation, improvements in communications, free trade agreements (FTAs), and a generally favorable business environment for international trade in the last couple of decades (Buckley et al, 2018; Dicken, 2015). Buckley et al (2018), point to the time of relative peace and stability since the Second World War, and the increasingly pro-market reforms and deregulations that have been implemented since the 1980s. By 2015, more than 3,300 FTAs had been implemented around the world, being more and more multilateral over bilateral in later years (Buckley et al, 2018).

These shifts in trade patterns can provide an explanation for the fact that over 60% of world trade is now made up by inputs and components, so called "intermediate goods and services", commonly in the shape of outsourced manufacturing and services (UNCTAD, 2013). A common way of managing these input goods is through a management concept labeled "*just-in-time*" (JIT) where the goal is to increase efficiency by having inputs arrive when needed, rather than keeping vast storages that drive inventory costs (Buckley et al, 2018). This approach requires extensive supply-chain management, as any unforeseen variations in demand or supply is likely to cascade and cause ripple effects throughout the entire production network. The combination of reduced control and high geographical distance potentially gives rise to problems, since communication and the management of disruptions can be delayed, disregarded, or misunderstood (Buckley et al, 2018).

The increasing geographical fragmentation and extensive outsourcing of a firm's activities has given rise to the term GVCs, where "*some of the most successful firms buy in almost all*

their key components and do little more themselves than assemble and warehouse the product [...] *Effective management of the distribution channel is the really crucial factor*" (Casson, 1999, p84). This outsourced method of operations allows for greater flexibility and adaptability, since new suppliers can be contracted to respond to new developments in technology, for instance. The risk of having large investments into machinery becoming obsolete due to technological development are thus shifted on to the supplier (Buckley et al, 2018). However, this increased flexibility comes with a premium cost, as re-negotiating or terminating contracts could prove to be a costly endeavor. Recent trends in rising mergers and acquisitions (M&A) indicate that suppliers are consolidating towards oligopolistic equilibriums (Buckley et al. 2018) raising the new issue whether or not there are other realistic alternative suppliers available.

Porter's value chain displayed in Figure 1 suggests a scale between "geographically concentrated" and "geographically dispersed" configurations of the value chain activities, which each are opposite ends of a continuous scale. In a completely dispersed configuration, each of the value chain activities would be replicated in each market, while in a completely concentrated configuration each activity would only have one location (Porter, 1986). These are two extremes on opposite ends of a spectrum, with reality often being located somewhere in between. There lies an inherent trade-off in the two approaches, where the efficiency gains through the concentrated configuration have to be weighted against the inherent increased cost in coordination and communication (Porter, 1986) as well as through the liability of foreignness that arises due to operating in a foreign environment (Zaheer, 1995). Porter's (1986) argument is thus that firms need to decide on the optimal level of coordination and concentration for each value chain activity.

The preferred level of outsourcing and offshoring varies between different industries which makes it a compelling unit of analysis, as "*the industry is the arena in which competitive advantage is won or lost*" (Porter, 1986, p11). Porter (1986) further argues that industries can be placed on a continuum: from 'multidomestic' to 'global' industries, where the difference lies in how much competition in each country is affected by competition in other countries. In 1986, Porter made the argument that the retailing industry could be described as more of a 'multidomestic' industry, since the competition was less affected by competition in other countries, while the automotive industry served as the example of a more global industry, where different automotive manufacturers were competing with each other on a truly global

scene (Porter, 1986). By revisiting these classifications in 2022 after several decades of globalization, it has been argued that the retail industry has shifted to become more 'global' as well. A general trend in the industry has been that of outsourcing and offshoring for efficiency gains, where cheap manufacturing in the developing world has presented tremendous opportunities for clothing manufacturers, but the practice has been labeled by critics as a 'race to the bottom' with substantial issues both in terms of labor rights and environmental impact. The point is that the retailing industry has evolved with the times to a more global approach with high degrees of geographical fragmentation and interconnected supply chains (Kärnstrand & Andersson Åkerblom, 2017).

2.4 Global Supply Chains

It follows from the rise of GVCs and the geographical fragmentation of firm activities that demand for international transportation has risen. The total value of all global exports has risen from $53bn in 1950, to $16.5tn in 2015, which is an increase by over 300 times (Buckley et al, 2018). In 2021, The Port of Los Angeles broke the record for TEUs (Twenty-foot equivalent unit, a container) with a total volume of 10,7 million units handled during the year. In 1981, the total volume was 476,000 units (Port of Los Angeles, 2022). These developments have increased the popularity of phrases such as global supply chains (Wall Street Journal, 2022).

GSCs allow for greater diversification of the supplier base, and lower per-unit costs through efficiency gains. At the same time, lead-times are higher and there is an increased exposure to disruptions (Alessandria & Ruhl, 2021). Popular management practices such as JIT build on the idea of having components arriving at the designated factory at just the right moment, to limit the costs of warehousing. In practice, under ideal JIT conditions the mode of transportation such as the truck or boat, serves as a moving warehouse (Buckley et al, 2018).

A good illustration of the intricate web of GSCs is through a common product, such as an USB-type electrical charger purchased for a few dollars in the US. It is usually assembled and manufactured in Asia through a network of raw material suppliers and manufacturers, and then shipped across the Pacific Ocean before entering the Port of Los Angeles. In the port, it would be reloaded to trucks, who drive the container to a railway 'dry port'. The journey continues in the US by rail to different regional destinations, where a truck picks up the

container again and drives it to a logistics center who goes through the contents of each container and sorts it into corresponding boxes. Finally, a truck picks it up again and delivers it either to the end customer, or a store, with the total journey taking several months and spanning tens of thousands of kilometers (Wall Street Journal, 2022). Another illustration is Apple's 'iPhone' which has components from over 43 countries which are then sent across the world for assembly and sales (Petrova, 2018). These interconnected webs of transportation routes and logistics centers have been described as "*one of the most complicated endeavors that human beings have ever engaged in*" (Wall Street Journal, 2022).

2.5 Risk and Resilience of Global Supply Chains

Globalization of both consumers and producers has increased the exposure to disruptions in the supply chain, and the aspects of risk and vulnerability. The complexity of the global value chain is more often than not derived from external factors, where stakeholders such as customers and suppliers create pressure combined with economical, political and competitive forces (Manuj & Mentzer, 2008). Due to their complex nature, GSCs require a high level of coordination and obtaining a competitive advantage from lowering transaction costs by placing activities in different locations involves a great deal of risk exposure (Manuj & Mentzer, 2008).

The 2004 paper 'Building the Resilient Supply Chain' by Christopher & Peck has been referred to as one of the first and most important works in the field of SCRM (Fiksel et al, 2019). Christopher & Peck (2004) widened the discussion on risk management to also encapsulate activities that go outside the individual firm, downwards into lower tiers of the supply chain, as "*no organization is an island and even the most carefully controlled processes are only as good as the links and nodes that support them*" (p1). Christoph & Peck (2004) describes the phase of characterizing risk factors as a process where the potential harm is determined based on three categories. The categories are "*internal to the firm*", "*external to the firm but internal to the supply chain network*" and "*external to the network*" (p. 4-5).

In order to deepen the understanding of the link between supply chains and risk management, we turn to the works of Dr. Joseph Fiksel who is a major influence in the field with several thousands of academic citations reported. Fiksel et al (2019) defines resilience as "*the capacity for an enterprise to survive, adapt, and grow in the face of turbulent change*" (p57)

and discusses how evidence of the business environment becoming more turbulent has driven the research agenda towards incorporating risk management into the supply chain literature (Fiksel et al, 2019). Due to the increasing interconnectedness of global supply chains, where the different activities are heavily dependent on each other, it does not take much to disrupt an entire chain. Minor disruptions caused by both internal and external factors can challenge the effectiveness of a global organization (Fiksel et al., 2015a). This issue is complicated further by the fact that most of the potential disruptions are hidden, meaning that identifying and mitigating potential disruptions and risk is more difficult in the contemporary global economy (Fiksel et al., 2015a). The different risks that could damage the GVCs of MNCs can be illustrated by the 'CAGE' framework, which include differences in *cultural, administrative, geographical and economical* factors (Ghemawat, 2001). These differences between countries and regions where the firm is operating or sourcing from all have the potential to damage or disrupt (Manuj & Mentzer, 2008).

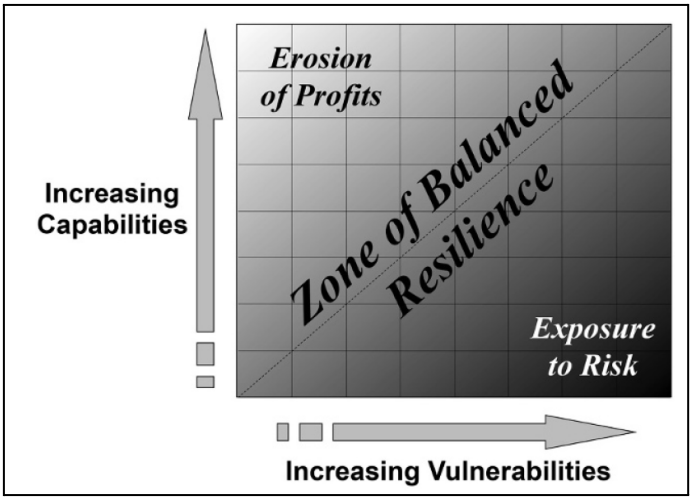
Managers of MNCs are confronted with the difficult task of administering supply chains that are vital for the profitability and competitive advantages for their company. Throughout the discourse on risk mitigation and management, several different types of strategies and approaches are presented, with emphasis ranging from internal- to external factors. With a focus more placed on the external factors, Courtney et al (1997) presents arguments on strategic approaches suited for uncertain future environments. When assessing the level of uncertainty of a future state, there are suggested strategic approaches, where more ambiguity invites firms to save resources while information is gained. Hence, organizations can manage uncertainty by evaluating future outcomes. The internal preparations are therefore determined by external factors and forecasting (Courtney et al 1997).

On the other end of the spectrum, Fiksel et al (2015a) argues for an emphasis based on how internal capabilities can mitigate the potential risk of disruption. By building internal capabilities, multinational companies can enrich their understanding of their vulnerabilities, and how they could be affected by disruptions. Capabilities refers to the "*Attributes that enable an enterprise to anticipate and overcome disruptions*" (Fiksel et al, 2015a, p81) which then can offset vulnerabilities. Some examples of these types of capabilities would be financial strength, and flexibility in terms of both sourcing and manufacturing. Advocates of capability-building proclaim that reserving excess capacity to combat unforeseen events is a superior approach compared to forecasting and scenario planning, as the efforts of planning

are wasted if the projection turns out to be faulty (Fiksel et al, 2015a; Fiksel, 2015b). In short, the capabilities could also be described as a type of "slack resources" that can quickly be utilized on demand, as a "*stock of excess resources available to an organization during a given planning cycle*" (Voss et al, 2008, p148).

The potential risks associated with GSCs are plentiful and difficult to identify, especially under systems heavily influenced by JIT logistics. The proposition of building internal resilience is recommended as it allows MNCs to prepare for whatever future that presents itself through their internal capabilities (Fiksel et al 2015a). Obviously, the costs of developing such capabilities are substantial. Therefore, MNCs engaged in capability-developing activities need to be aware of the level of erosion on potential profits. The tradeoff between eroding profitability and developing capabilities is known as the *"Zone of Balanced Resilience*", see Figure 2 (Fiksel et al 2015a, p. 85), and it is vital for companies to consider the balance between investment and profit erosion (Fiksel et al 2015a). The logic is presented further in Fiksel et al (2019) where it is laid out that forces of change drive supply chain vulnerabilities, at the same time as management controls create supply chain capabilities. It is then argued that excessive vulnerabilities relative to capabilities will result in increased risks, and excessive capabilities relative to vulnerabilities will result in the erosion of profits. The key idea behind Figure 2 is that MNCs should strive to balance their investments into capabilities, to find an appropriate relationship between exposure to risk and erosion of profits (Fiksel et al, 2019).

Figure 2: The Zone of Balanced Resilience



Source and illustration: Fiksel et al (2015a)

For example, consider an MNC that maintains two routes of transportation instead of one, to reduce the impact of one route being affected by disruptions, such as a natural disaster or congestion. Maintaining two parallel routes costs more in terms of resources, but greatly improves the resilience of the firm as individual disruptions can be mitigated to a greater extent. The Y-axis in Figure 2 "Increasing Capabilities", shows how investments into capabilities can erode profits, as building resilience costs both resources and attention. The X-Axis in Figure 2 on the other hand shows how increasing vulnerabilities (i.e. not building resilience) increases the exposure to risk. In the middle of Figure 2, we find the "*Zone of Balanced Resilience*" where firms find themselves after determining the appropriate level of investment into resilience (Fiksel et al, 2015a).

To complement these insights on balancing risk and reward, Jensen & Petersen (2013) presents an overview of how MNCs can prepare themselves for risk and methods of mitigation by preparing and transforming the geographically dispersed activities of the organization. The risk perception and risk tolerance of firms can be widened by conducting certain efforts that allows for a greater 'comfort zone' of the organization and employees therein. By expanding the comfort zone, the risk perception of the organization might be enhanced to a level where there is greater tolerance of risk. More specifically, Jensen & Petersen (2013) defines the comfort zone as "*a composite of the manager's risk perception, their risk tolerance, and the range of risk reducing measures they can mobilize*" (p75). The behavioral tendency of the organization is directly associated with both the tolerance and perception of risk, and it is therefore argued that by expanding the comfort zone, MNCs can accept a higher degree of risk in their supply chain activities (Jensen & Petersen, 2013).

In an attempt to present a thorough review of the concept of supply chain risk management, Ho et al (2015) combines the research stream on the matter. In previous literature, researchers have focused on different ends of the spectra. For example, Ellis et al (2010) presents findings focused on risks associated with the supply, whereas Jüttner et al (2003) describes risk as potential disruptions connected with the flow of products and information. Throughout the literature review, many different definitions are presented. Among them are strategic risks (Harland et al., 2003), financial risks (Cavinatio, 2004) and environmental risks (Bogataj & Bogataj, 2007). Attempts have also been made trying to create a division between different types of risk, where internal and external are most prevalent (Christopher & Peck, 2004; Wu

et al, 2006; Kumar et al, 2010). Another common division between risks are operational risks and disruption risks (Tang, 2006).

Gathering different definitions and types of risk, Ho et al (2015) develops a conceptual framework based on synthesized points in the literature. The framework suggests that the different types of risk that pose threats to global value chains can be characterized as macro-risks and micro-risks (Ho et al., 2015). The definition is similar to that presented by Chopra & Sodhi (2004) but is in that context referred to as catastrophic risks and operational risks. Other definitions of risk are presented by Manuj & Mentzer (2008). The different definitions and types of risk are similar to the ones presented in the literature review performed by Ho et al (2015), thus adding to the relevance of the distinctions macro-risks and micro-risks.

Manuj & Mentzer (2008) presents a framework where the process prior to mitigation efforts is the focal area. With a five-step process as foundation, the risk factor needs to be identified and classified through a systematic approach involving several sources and perspectives. Once the first step is accomplished, the process turns to stages of assessment and further evaluations, where a suitable mitigation strategy is selected and implemented. The approach is designed in order to allow managers to make risk mitigation decisions based on a solid framework that could be applicable to all different types of risk (Manuj & Mentzer, 2008).

Courtney et al (1997) discusses different scenarios of uncertainty for the future, without describing the sources of potential risks. The authors argue that the risk management strategies should be decided on factors such as potential disruptions and level of uncertainty instead of focusing the strategies based on the source of the risk. It is argued that the type of uncertainty can be labeled in four different categories, "*a clear enough future*", "*alternate futures*", "*a range of futures*" and "*true ambiguity*" (Courtney et al, 1997 pp. 70-71). The importance is thus drawn from the source of the uncertainty and placed on the implications that the uncertainty can accompany. The appropriate strategy is then selected based on the level of uncertainty, where different strategic postures and actions are argued for suitable responses (Courtney et al, 1997).

2.6 Contemporary Academic Discussion

Recent disruptive events, such as the Covid-19 pandemic, and the Suez Canal blockade during 2021, have intensified the interest in studying the vulnerability of international trade and global value chains (Contractor, 2021). Academics have presented arguments both for and against international trade in the post-pandemic reality (Contractor, 2021; Ciravegna & Michailova, 2021). This divergence of opinion amongst IB scholars provides us with reasoning and motivation to conduct our research.

The World Investment Report is an annual UNCTAD publication that has been published since 1991, with a focus on trends in foreign direct investment and global value chains. As such, it has become a common point of reference and discussion in the IB literature (See Contractor, 2021; Ciravegna & Michailova, 2021). The UNCTAD World Investment Report (2020) proposes that the Covid-19 pandemic "*will trigger a reconfiguration of global value chains according to four alternative trajectories: reshoring, regionalization, replication, and diversification*" (UNCTAD, 2020). While the latter two, replication (doing the same activity in more places) and diversification (utilizing more suppliers to hedge risks) would be measures that are taken to uphold current global value chains, the two other approaches concern a retraction away from the global towards a more regional, or local, GVC configuration. The main reasoning behind this shift would be to lower the exposure to risks (Elia et al, 2021).

Contractor (2021) argues in his article "*The world will need even more globalization in the post-pandemic 2021 decade*" that the underlying reasons for globalization and international trade are still present, and that the possibility of rising protectionism and nationalism can be handled by clever designs of supply chains, as firms been done throughout history (Contractor, 2021). However, Contractor remains open to the idea that GVCs may be reconfigured in order to create more resilience, as firms may have been over reliant on outsourced and offshored activities (2021).

Contractor's publication in JIBS has spurred the discussion forward. Ciravegna & Michailova (2021) argues in their counterpoint article "*Why the world economy needs, but will not get, more globalization in the post-COVID-19 decade*" that the Covid-19 pandemic "*will have significant long-lasting effects on globalization*" (p1). The authors base their reasoning on the

fact that inequality both within and between countries have increased during the pandemic, which could drive anti-globalization attitudes. In addition, the authors argue that the responses to combat both the economic- and health- effects of the pandemic primarily came from national governments, which could undermine trust in multilateral institutions. Finally, the pandemic has arguably fueled nationalism and populism, which could increase protectionism (Ciravegna & Michailova, 2021).

A thorough discussion on the subject can be found in Strange's (2020) arguments that the high prevalence of GVCs prior to the pandemic implies that the benefits generally outweigh the costs. However, Strange (2020) argues that this depends on a stable environment for the free flow of goods and services, and that the Covid-19 pandemic has exposed the weaknesses and altered the feasibility of this method of doing business. Several measures, such as building resilience, reshoring GVC activities, and internalizing activities that had been outsourced, are all discussed as measures to reduce risk exposure. Shortening supply chains would reduce vulnerability to disruptions, while insourcing previously outsourced operations would in theory increase control over supply (Strange, 2020).

At the same time, Strange (2020) nuances these recommendations with the fact that while increased regionalization may reduce exposure to disturbances of global transportation, it could in fact increase exposure to disruptions in home economies. Regionalization or reshoring could thus be a way of "putting all eggs in one basket" (Strange, 2020). In addition, re-shoring and regionalization is perhaps not always feasible if the desired goods or services are only available from specific markets or suppliers. Increased internalization also has to be weighed against the higher costs. The prevalent approach of outsourcing non-core activities to focus on areas of competitive advantage allows the firm to maximize the return on their limited resources, and an increasing scope of activities would undermine this strategic approach (Strange, 2020). Finally, Strange (2020) discusses alternate methods such as maintaining spare capacity, greater stockpiles, ensuring liquidity and proper risk management, which all imply an erosion of profits as more resources have to be committed. It is this key trade-off between increased resilience and eroded profits that is at the heart of the issue (Fiksel et al, 2015a).

Javorcik (2020) argues that the Covid-19 pandemic has exposed the weaknesses of GVCs and criticizes the "*excessive reliance on China for supplies*" (p112) as well as the JIT concept,

where stable environments are a precondition for operations. Javorcik (2020) believes that this will urge firms to investigate reshoring of activities, as well as diversification of their supplier base, as the current configuration emphasizes too much on efficiency and profit maximization. In addition, Javorcik argues that firms will be forced to incorporate greater degrees of resilience by their shareholders and different ratings agencies (Javorcik, 2020).

Miroudot (2020a) argues that even during the middle of the Covid-19 pandemic, GVCs were still to a great extent delivering value and serving as intended, and states that it may be too early to disregard GVCs, or to imply that regionalized value chains would be any less risky per se. Miroudot (2020a) states that "*there is no correlation between the level of fragmentation of production and the severity of economic impact of Covid-19*" (p121).

In addition, Miroudot (2020a) highlights the difference between resilience and robustness in GVCs, where resilience refers to the ability to return to normal after a disruption, and robustness concerns the ability to maintain operations during a disruption. Diversification of the supplier base and replication of activities in several different locations would thus be classified as measures to increase robustness, while stockpiling and monitoring of the supply chain would be measures to increase resilience (Miroudot, 2020a). The overarching difference here is that firms pursuing resilience will not try to predict the future, but rather invest into capabilities to minimize the impact of any given crisis, where long term partnerships with suppliers serve as one of these methods (Miroudot, 2020a). There is empirical evidence of firms that have higher degrees of diversification of the supplier base taking longer to recover from supply disruptions, compared to those who use fewer suppliers with more vested long-term relationships (Miroudot, 2020a).

Regarding the theoretical reasonings for risk-aversion, Ciabuschi et al (2019) argues that throughout the internationalization process, higher levels of commitment in a foreign market leads to higher levels of risk exposure, which then in turn leads to higher levels of perceived uncertainty which finally increases the likelihood of reshoring, and thus lower levels of commitment. Their framework extends on the 'Uppsala Model' developed by Johanson & Vahlne (1977) which suggests that internationalization of firm activities is a learning process, with firms altering their commitment to foreign markets as they mature. In addition, Ciabuschi et al (2019) argues that increases in risk levels in host-countries relative to risk levels in home-countries would also favor reshoring.

Betti & Hong (2020) argues in their World Economic Forum Report that GVCs have traditionally been constructed from a cost-reduction perspective, which the Covid-19 pandemic has challenged. Betti & Hong (2020) recommends measures such as increased visibility throughout the supply chain, dual sourcing of critical components, near-shoring and the shortening of supply chains, and scenario planning techniques.

2.7 Contemporary Quantitative Evidence

A survey of 300 Swedish exporting SMEs (1-249 employees) done by the Swedish National Export Credits Guarantee Board in November 2021 found that 8 out of 10 companies had suppliers abroad (Exportkreditnämnden, 2021; Exportkreditnämnden, 2022). The share had increased by 6 percentage points compared to November 2020. 7 out of 10 companies stated that they had experienced difficulties with suppliers due to recent disruptive events, such as the Covid-19 pandemic and the Suez Canal accident, with 1 out of 4 companies reporting that they had switched to different foreign suppliers as a response. At the same time, 1 in 7 companies stated that they had or were planning to switch from foreign to domestic suppliers back home in Sweden. In total, the total number of foreign suppliers utilized had increased (Exportkreditnämnden, 2021) possibly indicating trends of diversification (Lundin, 2021).

Another survey of 400 Swedish purchasing managers in both the manufacturing and the service sector done by Swedbank and SILF in November 2021 found that 9 out of 10 companies in the manufacturing sector had changed their sourcing strategies and their supply chains due to longer delivery times and a shortage of components. Half of these manufacturing companies stated that they had started to maintain larger stocks, while a quarter stated that they had increased their number of suppliers (Swedbank, 2022). "*The pandemic and supply disruptions have shown vulnerabilities in companies' supply chains and production processes, which has increased the requirements for larger "safety stocks", mainly in manufacturing.* , says Jörgen Kennemar, Senior Economist, as a comment to the survey (Swedbank, 2022, p1).

Another survey of 1753 Swedish firms from all sizes and sectors conducted by the Confederation of Swedish Enterprise published in December 2020 found that 39% of respondents had no intention of altering their supply chains (Svenskt Näringsliv, 2020). On the other hand, this indicates that the majority of respondents had the intention of taking some

sort of action. 27% of firms said they would increase their warehouse capacity and stockpiles. Isolated to only manufacturing, this figure increased to 41%. 15% said that they would purchase more inputs from Swedish suppliers, but only 2% said that they would relocate their own production home to Sweden. "*It is striking that only 2% of the responding companies say that they plan to bring production home. Our conclusion is that most firms prefer stockpiling and diversification as the most effective means of building resilient supply chains*", says Anna Stellinger, Deputy Director General and Head of EU and International Affairs at the Confederation of Swedish Enterprise (Svenskt Näringsliv, 2020).

A more international perspective can be found in Bain & Company's survey of 200 managers of global manufacturing companies, conducted in November 2020. Flexibility and resilience were reported as the most important aspects for supply chains going forward, with cost-reductions falling out of favor (Rajan et al, 2020). In order to increase resilience, 45% of managers reported that they are investigating moving production closer to home within the next three years. Rajan et al (2020) concludes the report stating that firms need to balance their resilience improvement efforts with the erosion of profits, in line with scholars such as Fiksel et al (2015b;2019).

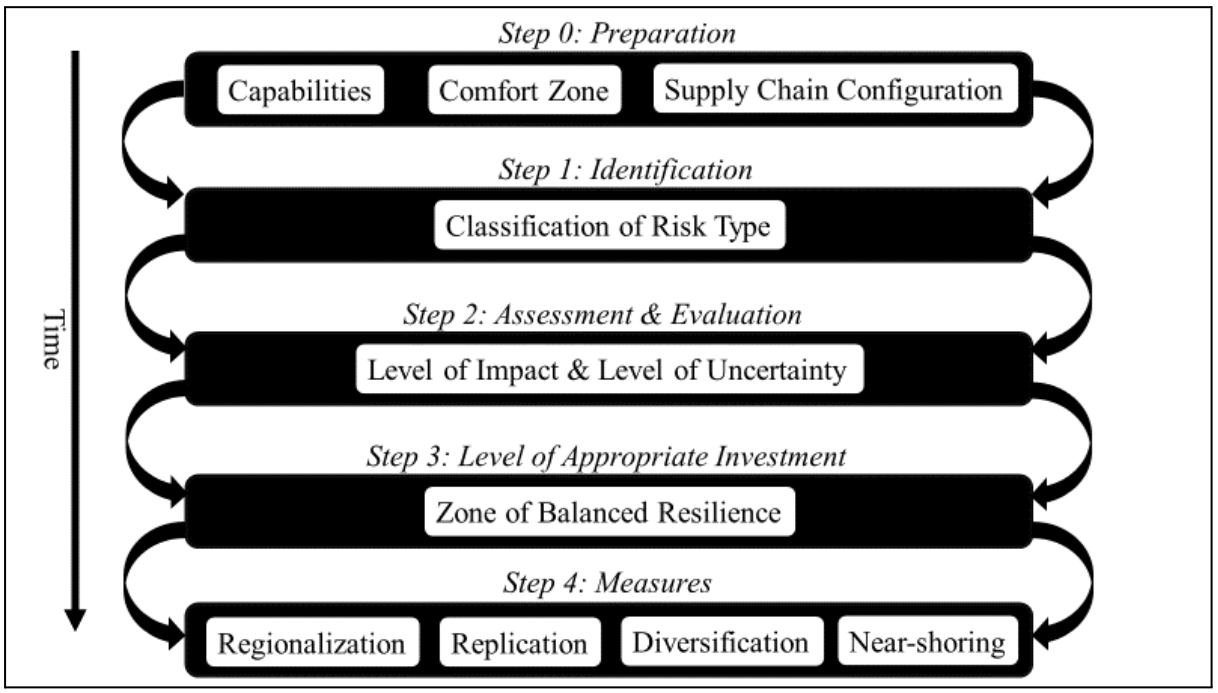
Baur & Flach (2022) of the Munich based IFO-Institut finds in a survey of 5,000 manufacturing firms in Germany that almost 25% plan to increase the level of kept stockpiles, as a response to disruptions caused by the Covid-19 pandemic. The authors note that this was especially prevalent amongst SMEs and interpreted it as a shift away from JIT manufacturing. 25% also noted that they wished to monitor their supply chains more closely. Notably, only 10% wanted to increase domestic sourcing from Germany, while 30% stated that they want to have more foreign suppliers as a means of diversifying their supply chain. Baur & Flachs (2022) paper is unique in the sense that it investigates the dimension of experience. On an overall level, the paper finds that firms affected by disruptions were more likely to adjust their supply chain than those who were unaffected, indicating evidence of learning and evolution within firms (Baur & Flach, 2022).

2.8 Conceptual Framework

In Figure 3, we present a conceptual framework based on a combination of the different streams of literature, as previously discussed. We aspire to combine the different theoretical

aspects to create a processual supply chain reconfiguration framework designed for disruptions to the global supply chains operated by contemporary MNCs. Our ambition is that this framework will nuance previous frameworks by including more factors related to the severity of the disruption and thus the level of impact and appropriate risk management strategies that follows. We anticipate that industry characteristics play a major role, as argued by Porter (1986) "*the industry is the arena in which competitive advantage is won or lost*" (p11). Given the relevance of industry, we opted for a multiple case study to investigate these differences.

Figure 3: Conceptual framework of the Supply Chain Reconfiguration Process



Source: Own illustration.

Collected insights from literature review, most notably Manuj & Mentzer (2008), Fiksel et al (2015a), Ho et al (2015) and UNCTAD (2020).

The framework above should be read as a temporal conceptualization of how the process of supply chain reconfiguration following severe disruptions unfolds, going from top to bottom. The Framework follows a logic of beginning in *Step 0: Preparation*, and then follows with *Step 1: Identification*, *Step: 2 Assessment & Evaluation*, and so forth. The temporal logic builds on the insights from the literature discussed earlier, such as Fiksel et al (2015a), Manuj & Mentzer (2008), and Ho et al (2015). The overarching idea is that MNCs go through several steps of consideration before selecting an appropriate reconfiguration of their GSCs.

In *Step 0: Preparation*, we are concerned with the preparatory efforts of firms before a severe disruption occurs or is identified. The preparatory efforts of firms going into a disruptive event has effects on the response being selected, as well as how they are perceived (UNCTAD, 2020; Jensen & Petersen, 2013; Porter, 1986). In addition, the capabilities of an individual MNCs has consequences on how the subsequent identification and evaluative steps are carried out (Fiksel et al, 2015a). Thus, we opted to fill this step in the framework with the three factors of 'Capabilities', 'Comfort Zone', and 'Supply chain configuration'.

In "*Step 1: Identification"*, we include the factor of 'Classification of risk type', which was identified as an important aspect in earlier research. There exists a multitude of research regarding the classification of different risks into categories, such as external or internal (Christopher & Peck, 2004), micro or macro (Ho et al, 2015), or into more fine-grained typologies such as strategic risk, financial risk, or environmental risk (Harland et al., 2003; Cavinatio, 2004; Bogataj & Bogataj, 2007).

In "*Step 2: Assessment & Evaluation*" we include the factors of 'Level of Impact' & 'Level of Ambiguity', which captures the aspect of taking decisions under uncertainty, as discussed by Courtney et al (1997). Firms need to judge the credibility of their own assessments based on available information, and the strategic approach selected follows that decision (Courtney et al, 1997).

In "*Step 3: Zone of Balanced Resilience*", we capture Fiksel et al's (2015a) framework of the 'Zone of Balanced Resilience' as discussed earlier, where more detrimental risks that are projected to impact profitability massively warrants greater investments. These considerations regarding the size of the appropriate investment are made prior to selecting the response, and thus included before such steps in our framework.

In "*Step 4: Measures*" we include several factors, namely 'Regionalization', 'Near-shoring', 'Replication', and 'Diversification'. These four specific measures are listed by UNCTAD (2020) as the four main pathways for GSC following the extensive disruptions to international trade imposed by the Covid-19 pandemic.

3. Methodology

In this chapter, we discuss the methodological choices taken throughout the thesis, and the different implications thereof. The chapter begins with a discussion of our research approach, followed by a description of our data collection procedure. Afterwards, our research process is outlined, and actions taken to improve the quality of the thesis are listed. The chapter concludes with our ethical considerations.

3.1 Research Approach

Given our research question "*How does the process of reconfiguring global supply chains of MNCs unfold, following severe disruptions?*", we found it logical to employ a case study approach, as it is commonly utilized to answer how-type questions (Bell et al, 2019; Ghauri, 2004). The case study design is favorable for studying "*complexity and particular nature*" of the case and is a common approach in business research (Bell et al., 2019, p. 63). As case studies are preferred when examining bounded entities, and the rationales within it (Bell et al., 2019), the research design was seen as the appropriate approach for our research, as we were interested in the actual decision-making process and rationales from the examined companies. Welch et al (2011) argues in their *2021 JIBS Decade-award* winning article that social phenomena cannot be properly explained without considering their contexts (Welch et al, 2011), and thus we favor a case study that digs deeper into the underlying reasons and processes. As the studied phenomenon is relatively recent, a case study is seen as a well-suited research design to lay the foundation for latter theory building (Eisenhardt, 1989).

Furthermore, to answer our research question, we have elected to employ a multiple case study as our research design. In recent years, an extension of the case study known as multiple-case study has grown in popularity within the business research field (Bell et al., 2019). To form a better understanding of the reasoning of supply chain management related aspects on a cross-industry basis, multiple-case studies can facilitate such learning on a greater scale compared to a single case study (Millis et al., 2010). As qualitative research methods are designed with the goal of particularizing, rather than generalizing (Bell et al, 2019), we decided that the method was appropriate to properly portray the process and underlying process from the two examined companies. These methodological choices naturally impact the generalizability and external validity of our research, which refers to the degree to which our findings are applicable to other contexts. Understanding that our findings

might not be applicable to other MNCs due to contextual differences, we aim to describe the cases as thoroughly as possible, enabling readers to apply learnings to other circumstances as desired.

Previous research within the SCRM literature has in recent years called for future research on the subject performed through case studies. Fiksel et al (2019) describes case studies in supply chain risk management as a way of exploring the depth and breadth of resilience as well as evaluating the concepts empirically. It is also suggested by Fiksel et al (2019) that future research should aim to integrate recent developments into the supply chain resilience literature. Another important aspect of future research in supply chain resilience is to investigate industry characteristics and variations, and customize relevant frameworks accordingly (Fiksel et al, 2019). Following these suggestions, this thesis attempts to answer these calls through employing a multiple case study.

3.2. Choice of Case

In our initial mapping of possible respondents, we found that we had the opportunity to access several high-level interviewees that are significantly knowledgeable of our topic at two large MNCs with extensive global supply chains, Volvo Cars and H&M Group. Not only are our respondents knowledgeable, but also key decision makers regarding the management of supply chains in areas such as risk, logistics and location. We thus made the conclusion that these specific individuals could provide great insights to our research question.

The selection of companies formed a combination of ‘convenience sampling’ and ‘purposeful sampling’ (Bell et al, 2019). The convenience aspect of the sampling of cases can be identified in our strategy of reaching out to contacts whom we were familiar with prior to the thesis in order to gain access to respondents. Based on these pre-existing relationships, we were confident in our ability to secure interviews with Volvo Cars and H&M Group. Given the constraints in time and resources associated with a master thesis, we felt it natural to utilize the options available to us. The purposefulness of our case selection can be found in the selection of two different industries, the automotive industry, and the retailing industry, as this gives us greater ability for comparisons and the opportunity to evaluate existing theories on two different contexts.

The purposefulness of our selected cases to our research question is strengthened by previous literature such as Baur & Flach (2022) who finds empirical evidence of firms that have been affected by disruptions to be more likely to adjust their supply chains. We therefore recognized that investigating global firms that had been significantly impacted by disruptions in recent times could provide for an interesting research scenario. Volvo Cars reported over 20 days of halted production at the Torslanda plant in 2021, due to shortages of semiconductors. This of course had great effects on the overall performance and profitability of Volvo Cars, as verified through secondary sources such as annual reports (Volvo Cars, 2022a). Likewise, H&M Group had been significantly impacted by the Covid-19 pandemic, where the measures imposed by local authorities such as lockdowns had caused over 4,000 out of 4,800 stores to be closed at its peak (Nyhetsbyrån Direkt, 2022c).

3.2.1 Pilot Study with AP Møller-Maersk

One limitation when dealing with high level interviewees is the aspect of availability, as participating in research may not be the main priority for managers under heavy workload, especially supply chain- related managers during times of severe disruptions to international trade. Our overall research strategy was shaped thereafter to maximize the return on these valuable interviews. We therefore opted for an approach of preparing extensively prior to interviewing our respondents at Volvo Cars and H&M Group, both by reviewing significant amounts of secondary data and conducting a pilot study with a respondent from AP Møller-Maersk, which is the one of the world's largest freight carrier who plays a major role in global supply chains and has a holistic view of international trade. In this way, the topics discussed during our interviews with our selected case companies became more nuanced and informed.

The pilot study with AP Møller-Maersk was conducted through an unstructured interview (Bell et al, 2019) with the Global Head of Trade to gain more insight into our research field and to aid in our problematization of the research. As the goal of the interview was to maximize our learnings from the interviewee, we felt it most appropriate to conduct the unstructured interview methodology, in order not to put constraints on the interviewee based on our prior understanding. The Global Head of Trade at AP Møller-Maersk is knowledgeable about international trade and supply chain management and provided feedback on what types of companies that could be interesting to investigate, and which

respondents that would be relevant, as well as providing recommendations on what types of questions that could be asked during our interviews with our case companies.

3.3 Data Collection

In this thesis, a combination of primary and secondary data was collected and analyzed. For our purposes, primary data is defined as data that has been generated by the researchers from firsthand sources while secondary data is data that has been collected by others (Bell et al, 2019). Even though this thesis is primarily of qualitative nature, both qualitative and quantitative types of data are utilized, as they together form a more nuanced picture and description of the case, where more details about the particularities of the cases are included (Bell et al, 2019). Examples of qualitative data used are interviews and news articles, while the quantitative data includes numbers from annual reports and other publications.

3.3.1 Primary Data

The primary data collected in this thesis has been generated from semi-structured interviews (Bell et al, 2019) with high level supply chain related managers with different functions at H&M Group and Volvo Cars, as well as a pilot study with a high-level international trade manager at AP Møller-Maersk, as described earlier. Semi-structured interviews are a common approach in case studies as they combine the rigidness of strictly structured interviews that follow a set of questions, with the flexibility of ordinary conversation. Thus, new and unexpected topics can be investigated further without necessarily breaking the interview format (Bell et al, 2019). The semi-structured interviews were supported by an interview guide which contained key questions on a high level on the desired topics, with the intent of delving deeper through follow-up questions. The interview guide is attached in Appendix 1.

The first interview conducted was the pilot study described earlier, in the form of an interview with the Global Head of Trade at AP Møller-Maersk. The interview was arranged by one of the researchers reaching out to a previous employer, who recommended us to contact the Global Head of Trade at AP Møller-Maersk.

The first interview with the Senior Logistics Manager at Volvo Cars was made available through a different employee at Volvo Cars whom one of the researchers was familiar with. During the interview with the Senior Logistics Manager, the work of the Supply Chain Risk

Manager had been discussed. Therefore, it made sense for us to follow up with an interview to verify our interpretations as well as gain new first hand insights from the person in question. The timespan between the interviews allowed us to analyze secondary data sources as a preparatory effort.

A similar process was followed in our primary data collection of H&M Group, where an initial contact was made through a mutual acquaintance between one of the researchers and the Global Head of Supply Chain at H&M Group. After the interview, we asked the Global Head of Supply Chain for referrals to colleagues that could be of interest to our thesis, and we were presented with several options. We contacted the Head of Strategy at the Global Logistics function, as it could be a nuancing and complementing perspective. All interviews were recorded and transcribed early on to ensure that the impressions gathered during the interview remained intact.

Based on this description, we find that our selection of interviewees to be based on both aspects of convenience and relevance of the study. The selected respondents were deliberately chosen as they were the best suited interviewees that were available to us, given the constraints on time and resources that a master's degree thesis project contains. Considering our collection of primary data, the sampling process was mostly collected through aspects of availability, known as "*convenience sampling*" (Bell et al., 2019, p. 197). Although the method to a great extent prevents the possibility of generalizing the results, we are not concerned with this fact as the purpose of performing qualitative case studies is to particularize, which implies to delve deeper into the details of the specific case (Bell et al., 2019). Further, the latter stages of data collection were performed through a method known as "*snowball sampling*" (Bell et al., 2019, p.470). From the first contact with an individual from the examined companies, we were together with the interviewee able to identify other interesting people within the organization to interview with the purpose of further painting the picture and nuancing the information. See Table 1 for a compilation of the interviews.

Table 1 - Interview Details

Interviewee	Organization	Role	Perspective	Date and length
M1	Maersk	Global Head of Trade	Transport Provider	8th Feb, 50 min
VC1	Volvo Cars	Senior Logistics Manager	Automotive Company	24th Feb, 60 min
VC2	Volvo Cars	Supply Chain Risk Manager	Automotive Company	31 Mar, 40 min
HM1	H&M	Global Head of Supply Chain	Retail Company	9th Mar, 50 min
HM1	H&M	Global Head of Supply Chain	Retail Company	13th Mar, 25 min
HM2	H&M	Global Logistics - Head of Strategy	Retail Company	11 Apr, 60 min

Source: Own compilation.

3.3.2 Secondary Data

Our secondary data consists of annual reports of both Volvo Cars and H&M Group, as well as extensive information and quotes gathered from news articles in Swedish and international news such as Dagens Industri, Göteborgs-posten, and the Wall Street Journal. An illustration of the process of gathering secondary data can be found in Figure 4.

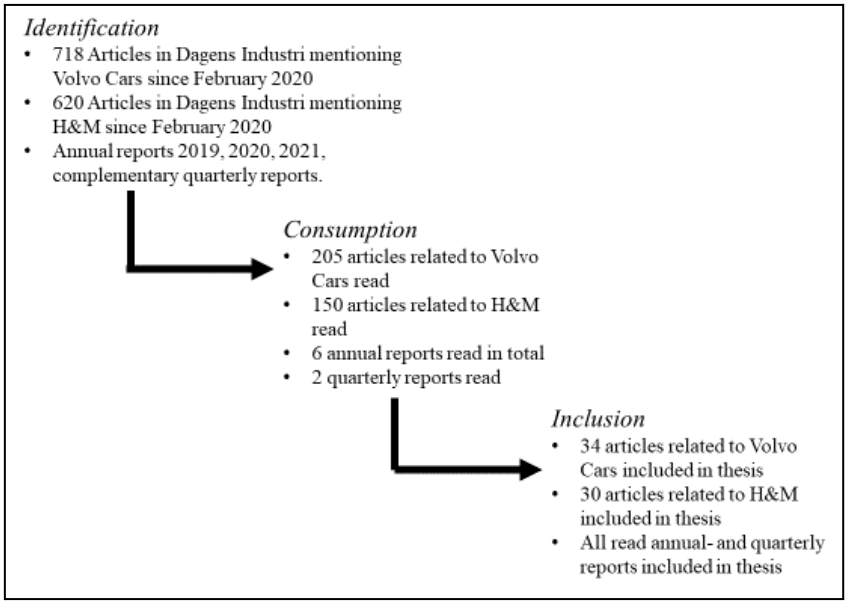
All mentions of "H&M" and "Volvo Cars" in newspaper Dagens Industri since the outbreak of Covid-19 pandemic (1st of February 2020 - 1st of May 2022 set as the cut-off period) was screened, and articles deemed to be relevant were read in their entirety, with findings that were of value to our research being included. In total, 718 articles in Dagens Industri mentioning Volvo Cars since February 2020 were identified. Out of these, 205 were deemed possibly relevant at first glance and read in their entirety. Out of these 205 articles, 34 were included in the thesis. The same process was followed regarding H&M, where 620 articles mentioning H&M in Dagens Industri were identified. Out of these, 150 were deemed possibly relevant at first glance and read in their entirety. Out of these 150 articles, 30 were included in the thesis.

The annual reports from the last three years were read for both companies, and relevant information extracted. According to Bell et al (2019), annual reports can be utilized in case studies as "*valuable background and information about the company*" (p505). In addition, quarterly reports and half-year reports were read where deemed necessary, for example the Q1 2022 reports, as it is the latest available data at the time of conducting this study.

Other news sources, such as Financial Times, Wall Street Journal and Göteborgs-Posten were used to complement or nuance the findings. A more direct form of data collection was

utilized regarding these news sources, as keywords where input into search engines and relevant findings included.

Figure 4: Illustration of Main Secondary Data Gathering Process



Source: Own illustration.

3.4 Research Process

This thesis follows the "abductive research approach" implying iterations between deductive and inductive research (Bell et al, 2019). Welch et al (2022) describes abduction as a process of "*counterintuitive observations that redirect the research process in search of plausible explanations*" (p9). While the deductive and inductive approach have been the predominantly used research methods in previous years, the abductive approach has grown as a favored method within business research in recent years (Bell et al., 2019).

Burawoy (1998) recommends "*questioning existing theories because they are unable to explain the phenomenon under study*" (p16) and conducting a critical discussion between theory, data and analysis, to "*reconstruct existing theories in the spirit of abduction*" (p16). This thesis attempts to answer this call by connecting primary data from interviews of individual managers with secondary data of greater macro trends and firm level observations. Welch et al (2022) argues that the role of the observer is to "*see the macro in the micro*" (p16).

Closely after the interviews had been conducted, both researchers transcribed the recorded audio into written format. By working together, we cross-checked our text to avoid filling any blanks or misunderstandings with inherent biases, as a form of internal reliability (Bell et al., 2019). While transcribing the interviews, we paid extra attention to usages of metaphors and facial expressions, to make sure that we understood the correct meaning of what was being stated, as recommended by Bell et al (2019).

A similar compilation was made where our findings from the secondary data sources were listed. We recognize that secondary data and in particular annual reports should be viewed with skepticism from a research perspective as market forces and stakeholder expectations can influence what goes into a report or not (Bell et al., 2019). We therefore actively tried to triangulate (Denzin, 1970) findings from annual reports with findings from news articles and our respondents in the interviews, as well as the other way around, where stated key strategic goals that were mentioned during the interviews could be verified in secondary sources as well.

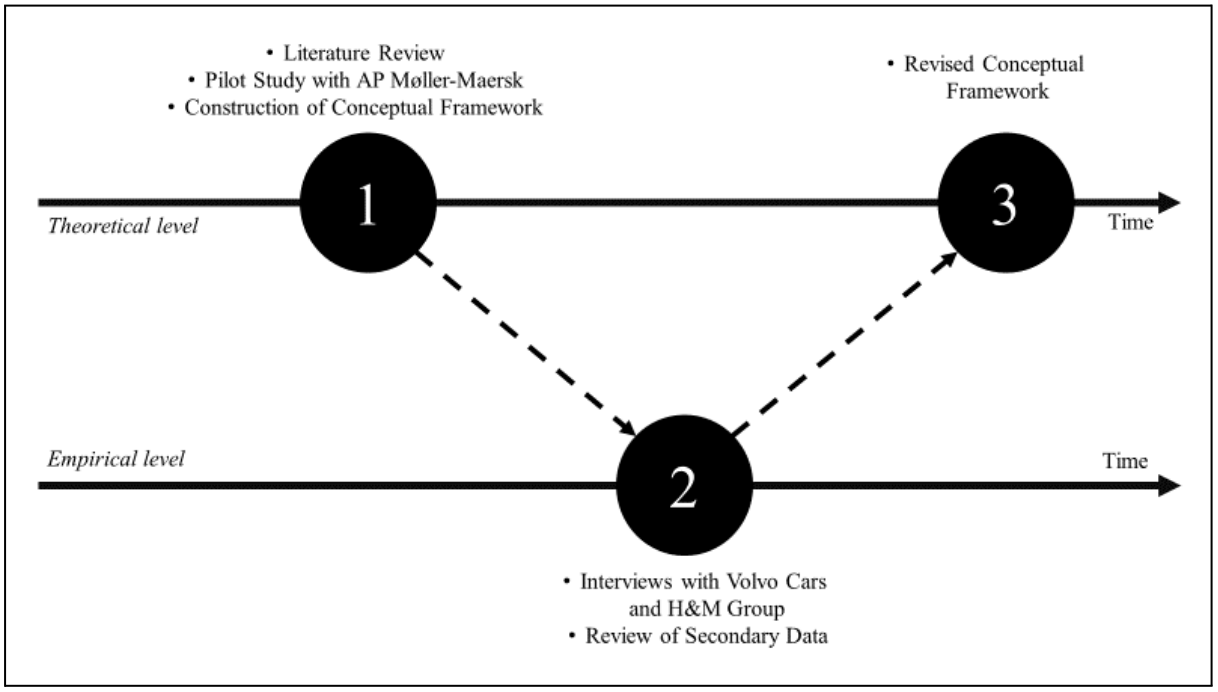
After writing up our raw data from both primary- and secondary sources, we initialized a process of grouping, or clustering, the findings around key topics. The process of clustering our findings was made through theoretical coding which revolves around the identification of themes that emerge during the interviews (Bell et al., 2019). For example, discussions on shortening supply chains from both Volvo Cars and H&M Group from both primary- and secondary sources of data were clustered together, while all mentions of risk identification processes were grouped in a different cluster. Thus, findings from both primary- and secondary sources were clustered together based on thematic content, with main lines of division originating in our conceptual framework, as outlined in Chapter 2. In practice, this meant that we divided our Findings (Chapter 4) into subheadings based on thematic content, according to our conceptual framework. This has the consequence that Chapter 4 presents observations from both of our case companies together, with the line of division instead being the thematic content. Findings that were deemed not to belong to any anticipated themes were not disregarded, but instead included in new, added sections which will be discussed later in a revised conceptual framework.

When the findings were clustered and organized according to our conceptual framework, we began the process of thematic analysis (Bell et al., 2019). Our analysis was heavily

influenced by our conceptual theoretical framework constructed prior to the interviews taking place. In essence, our findings were "filtered through" our framework and in that way related to previous literature, and earlier empirical findings. The goal was to confront our original understanding of the literature with reality.

The illustration below in Figure 5 is included to convey the underlying rationale of our research process, where prior knowledge and literature is empirically tested on our two cases, and the insights from the cases serve as motivation to view the literature in a new light. Naturally, the illustration is a simplified version of the actual research process, which in practice contained more continuous interactions between theory and empirics.

Figure 5: Our Abductive Research Process



Source: Own illustration.

The main branch of our identified contemporary academic literature lists several different pathways for the reconfiguration of global supply chains after increasing frequency and severity of disruptions, such as regionalization, near-shoring, replication, and diversification (UNCTAD, 2020). Throughout our observations, we found evidence of Volvo Cars employing strategies resembling regionalization and aspects of near-shoring, as predicted by Ciravegna & Michailova (2021) and Javorcik (2020) while H&M favored diversification instead of shortening supply chains, arguing that doing so would not inherently reduce risk in

any way, as argued by Miroudot (2020a). On another note, both observed companies discussed at length the potential of technological improvements leading to better control and predictability over supply chains, as argued by Javorcik (2020) & Contractor (2021). Throughout our observations, we were able to identify limitations regarding proposed pathways for global value chains, which were not identified in the literature review. This includes the strategy of 'regionalization' being limited by economies of scale, near-shoring being limited by access to labor and raw material, and stockpiling measures being limited by the feasibility of the product life cycle. Another unexpected finding that was highlighted was the importance of experience which prompted us to include this aspect as well. After conducting the analysis, we constructed a revised conceptual framework, which can be found in Chapter 5.6.

3.5 Quality of the Study

Aspects of reliability and validity and their importance in qualitative research is an ongoing discussion in academia (Bell et al, 2019). However, it has been argued that two of the most important factors in regard to evaluating business research are the aspects of reliability and validity. There are different types of validity, where the two most commonly used for qualitative studies are 'internal validity' and 'external validity' (Bell et al., 2019, p.46-47).

Merriam (1998) offers several strategies that can be utilized in order to increase the internal validity of a case study, many of which have been employed throughout our case study. To increase the internal validity of the study, the method of triangulation is one of the factors suggested by Merriam (1998) and Bell et al., (2019). Triangulation in essence refers to the practice of utilizing several points of data to find an object's true position (Denzin, 1970). To confirm our findings, they were compared and investigated through several types of data sources, an aspect further discussed in previous sections. We have also discussed the same topic with various people, with different perspectives and positions, an aspect we believe has increased the internal validity of the findings.

Additionally, the findings from interviewing participants in the case study was validated by means of confirming with respondents that their statements were correctly interpreted. This activity was not only performed with the purpose of increasing internal validity, but also

because it is seen as good research practice (Bell et al., 2019). The respondents showed appreciation for our concern of accurate interpretation, and misinterpretations were adjusted.

As long-term observation has potential to increase the internal validity of the research (Merriam, 1998), we would argue that given the time constraints of a master thesis, our efforts have been performed to the best possible extent, i.e., during one semester. In an ideal research scenario, further time and resources would have been committed.

Furthermore, we have throughout the process of conducting our research we have been in close contact with our supervisor. Maintaining continuous discussions regarding both theoretical and methodological aspects have enabled us to stay on top of different perspectives and interpretations, as well as ensuring that we do not 'fall down rabbit holes'. Discussions have also been kept with various student colleagues, and the peer examination of our research has been beneficial in terms of building internal reliability, in line with the suggestions of Merriam (1998) and Bell et al (2019).

Regarding the degree of objectivity (Bell et al, 2019), the previous assumptions and world view of us as researchers were grounded in the elective course 'Global Sourcing', offered by the School of Business, Economics & Law at the University of Gothenburg. However, the primary influence from the course was the spark of interest in us as researchers, impelling us to conduct the specific research. None of the researchers are directly connected with any of the respondents, nor do we hold shares in the examined companies.

In terms of external validity, we are aware that case studies generally are performed to highlight the particularities of the examined case, rather than with the aim of generalizing the results (Bell et al., 2019). Although we elected to conduct a multiple case study rather than a single case study to nuance the applicability of theoretical frameworks, we do not claim that the results of our study are generally applicable or necessarily true for other MNCs. Our goal is to provide a 'thick description', meaning rich accounts of details and data, to illustrate the specifics of our selected cases (Bell et al, 2019). Readers are encouraged to judge for themselves the applicability of our findings on other scenarios. Through our attempt to understand the two examined cases in as great depth as possible, we aim to contextualize contemporary academia with real case examples.

In terms of reliability, we are constrained with the replicability of our research. Qualitative research is rarely subject to replication, due to the changing environment of social setting (Bell et al., 2019). The internal reliability of the thesis was as previously discussed ensured via cross-checking of interpretations and transcriptions, as well as a continuous collaborative relationship.

Given that the respondents were located in different regions and countries, it made the most sense for us and the respondents to conduct the interviews digitally through tools such as Microsoft Teams and Zoom, both from a logistical and financial perspective. Both researchers are highly skilled in both Microsoft Teams and Zoom after studying and working from home during long periods since the breakout of the Covid-19 pandemic, and thus smooth interviews were able to be carried out despite not being attending physically. The location aspect has been described as a key strength of the digital interviews (Bell et al, 2019), and while we agree, we would like to add that the aspect of time is also managed easier through digital interviews. Digital interviews allowed the respondents to avoid taking time out of their working hours to instead conduct the interview after working hours, which would have been harder if there were constraints on physical location given that both researchers and respondents have other obligations, such as family commitments. We allowed the respondents to choose which digital meeting software they preferred to increase their sense of comfort and familiarity, to make sure that we avoided any unnecessary disturbances that might affect the interviewees. In that way, a better flow of conversation and better understanding can be achieved (Bell et al, 2019). There are of course limitations associated with conducting digital interviews, such as lackluster internet connection, uncontrollable disturbances (e.g., a family member walking into the room of a respondents), or malfunctioning hardware such as microphones or cameras (Bell et al, 2019). These limitations were mitigated by familiarizing ourselves with our digital setup and performing several test-runs regarding audio, video, and recording capabilities. The interviewees were also encouraged to conduct the interview from a place of less risk of disturbance and with strong internet connectivity.

3.6 Ethical Considerations

Information regarding supply chains can be of business-critical importance and thus participants in research might feel the urge to leave out information that is deemed too

sensitive. Therefore, we offered the possibility of anonymity and decided that names of the interviewees would not be included. In addition, respondents were always asked for permissions prior to recording the interviews. Findings and quotes used in this thesis have been sent to the interviewees for verification, in accordance with recommendations by Bell et al (2019). In line with proposed research ethics found in Swedish Research Council (Vetenskapsrådet, 2017) we always informed our interviewees about our research topic and scope of the study prior to the interview taking place, so that the interviewees knew what they were getting into. The main topics for the interviews were disclosed beforehand via email.

Finally, we believe there to be significant ethical considerations behind supply chain academia. Regionalization or near-shoring of global supply chains could in practice imply millions of lost jobs for local communities, often in developing markets. The opposite has long been true for outsourcing of manufacturing and operations from the "advanced economies" to markets with comparatively lower wages. While that particular dilemma is of political nature and beyond the scope of this thesis, we wish to remind readers of the human impact behind the theoretical discussion of supply chains and the location of production.

4. Findings

In this chapter, our empirical observations are presented. This chapter begins with an introduction to both of our selected case companies, Volvo Cars and H&M Group. Following the introduction, our observations are listed. The observations are clustered together based on theoretical content, and observations from both Volvo Cars and H&M Group are presented together. The subheadings follow the structure of our conceptual framework (see section 2.8).

4.1 Background to Volvo Cars and H&M Group

Volvo Cars is a Swedish MNC in the automotive industry. With the headquarters located in Gothenburg, Sweden, Volvo Cars employs 41,000 people over the globe. In 2021, the company recorded a revenue of 282 MSEK, with an EBIT margin of 7.2 percent, an increase from 2020's figure of 262 MSEK and 3.2 EBIT margin percent (Volvo Cars, 2022a). The company was founded in 1927 in Gothenburg. Throughout the years, Volvo Cars has operated both as a separate entity, but also under different ownership structures. Ford bought Volvo Cars for approximately 50bn SEK in 1999 and sold it in 2010 to China based Geely for 13bn SEK (Volvo Cars, 2022a; Lejland, 2022). Volvo Cars produces their cars in production plants located in Gothenburg and Ghent in Europe, Charlestown in the U.S. as well as Chengdu, Daqing and Taizhou in China. The production plants are geographically located close to Volvo Cars' main markets, in order to reduce operational risks (Volvo Cars, 2022a). In addition to the production plants, Volvo Cars also have R&D facilities in Shanghai, California, and Gothenburg. There are also two assembly factories in Bangalore, India and Kuala Lumpur, Malaysia.

In recent years, Volvo Cars have expanded their portfolio with brands such as Polestar and Lynk & Co, both companies offering a new concept to the automotive industry. Polestar was acquired by Volvo Cars in 2015, and targets the premium segment of electric cars, now co-owned with PSD Investment. Lynk & Co is co-owned with Geely and is a subscription-based alternative to sharing automobiles (Volvo Cars, 2022a). In October of 2021, Volvo Cars was listed on the Stockholm Stock Exchange, a venture that resulted in approximately 200,000 new shareholders, and a market valuation of 158bn SEK, with estimates showing that Geely has made a 12x return on their investment (Olander, 2021d).

Since Ford sold their ownership of Volvo Cars to Geely, total cars sold has increased from approximately 373,525 in 2010 to 698,000 in 2021 (Westman, 2022). Volvo Cars have several ambitions, such as selling 1.2 million cars and 50% being electric by mid-decade (Mölne, 2021). In October 2021, Volvo Cars announced that they would take over ownership of the factory in Luqiao, China from Geely Holding. As part of the transition, the factory would be renamed as the Taizhou factory (TT Nyhetsbyrån, 2021). Volvo Cars is currently planning a third factory in Europe, in addition to Torslanda and Ghent. However, no formal decision has been made (Höiseth, 2021).

Recent disruptive events, such as the Covid-19 pandemic, as well as semiconductor shortages have impacted the operations of Volvo Cars greatly. During 2021, Volvo Cars reported over 20 days of halted production at just the Torslanda plant, with significant effects on production and in turn, sales volume (Olander, 2021f; Lindgren, 2021; Hultgren, 2021b).

H&M is a Swedish multinational clothing company founded in 1947 as “Hennes” (H&M Group, 2021a). In the early years, the clothing operations primarily focused on women's clothing, broadening the product offering after acquiring hunting apparel retailer Mauritz Widforss, rebranding to “Hennes & Mauritz" or “H&M”. The international expansion began in 1976, as a store in London was opened, with operations outside Europe ensuing in 2000 as a store in New York opened. As of November 30th 2021, H&M Group operates 2,844 stores in “Europe & Africa”, 1,161 stores in “Asia & Oceania” and 765 stores in “North & South America”, forming a grand total of 4,801 operational stores across 75 markets, down from the peak of 5,076 stores in 2019 (H&M Group, 2022a, p12; H&M Group, 2021a). During 2021, H&M Group reported total sales of 199bn SEK ($21bn) and an operating margin of 7.7% (H&M Group, 2022a, p111).

A key characteristic of H&M is that they do not produce their own clothes, instead they source them from their extensive supply chain, which is described as a crucial part of their competitive advantage (H&M Group, 2022a). In their sourcing strategies, H&M states that they aim to buy the right product, from the right market, at the right time, at the right cost and the right terms (H&M Group, 2022a). H&M Group works with approximately 600 different product suppliers, which in turn operate over 1,200 factories, primarily in Asia (H&M Group, 2022a, p63). H&M Groups tier 1 and tier 2 production supply chains employ around 1,5

million people (H&M Group, 2022a, p31). This can be compared to the number of inhouse employees, which in 2021 was just above 107,000 (H&M Group, 2022a, p90).

The covid-19 pandemic impacted H&M Group extensively, as governments imposed ‘lockdowns’ which limited access to physical stores. At the peak of the pandemic, H&M Group had around 4,000 out of the 4,800 stores closed (Nyhetsbyrån Direkt, 2022c).

4.2 Structure of Empirical Findings

In our conceptual framework presented earlier, we included several different phases of supply chain risk management, based on the contemporary academic discussion. In this section, we will structure our observations according to this logic. The empirical observations listed in this chapter will be gathered from both primary- and secondary sources of data, i.e., interviews, company publications and news articles. Observations from both Volvo Cars and H&M Group are presented together, and instead divided based on their theoretical content. The interviewees will be referred to as VC1;VC2;HM1;HM2. For the secondary data, a standard referencing style is applied. The roles of these interviewees are presented below. For more detailed information about the interviewees, see Table 1 in the Methodology chapter.

- VC1 = Senior Logistics Manager at Volvo Cars.
- VC2 = Supply Chain Risk Manager at Volvo Cars.
- HM1 = Global Head of Supply Chain at H&M.
- HM2 = Global Logistics - Head of Strategy at H&M.

4.3 Risk Preparation

4.3.1 Capabilities

One of Volvo Cars' capabilities in terms of risk preparation is a continuous monitoring of their supply chain by having ‘control towers’ at their factories. These control towers are constantly monitoring the in- and outflow of all goods, operating with estimated time of arrivals designed after the building process (VC1). These monitoring procedures apply to everything from screws and bolts to larger components (VC1; VC2) and allow Supply Chain Controllers to identify shortages in certain products, as calculations are done with output volume being subtracted from the combined volume of incoming products plus current stock,

resulting in either a negative or positive number, where a negative result indicates projected shortage.

Equation 1: Calculation of Sourcing Status of Goods at Volvo Cars

$$(Incoming\ Volume + Current\ Stock)\ - Output\ Volume = Sourcing\ Status$$

Interpretation: *If the equation yields a negative number, then the given product is put on an "alarm list", which implies that the amount of a certain good is not enough to reach the designated output volume.* Source: VC1.

In each factory, up to ten employees are monitoring the supply chains (VC1). Beyond the monitoring processes, Volvo Cars constantly develops solutions for aiding suppliers meeting desired output volumes (VC2). In the annual report of 2021, Volvo Cars describe how audits and assessments of suppliers are important in order to ensure that the right quality of products and processes are maintained, but also to identify points of development for the supplier (Volvo Cars, 2022a).

Volvo Cars expressed a desire to shift towards more predictive risk management, as opposed to the current reactive approach (VC1). The ambition was found to be somewhat new, and originates in the issues stemming from disruptions caused by the Covid-19 pandemic. The aim of such a technical capabilities system was explained to function as indicators of disruptions in the important markets of Volvo Cars. Through information flows, Volvo Cars hope to be made aware in cases of price fluctuations, logistical interferences or other types of risk. The purpose of implementing a system such as this was explained to increase the level of preparation, and offer some flexibility in the risk management process, and shifting from a reactive to proactive, and perhaps even predictive approach (VC1). "*We need to stop being reactive, and start being proactive, hopefully even predictive. The technology is there. The challenge is connecting everything to our current system, or replacing our current setup"* (VC1).

By developing capabilities in terms of forecasting and the use of various analytical tools, Volvo Cars strengthens their capabilities regarding working with indicators that can identify potential areas of risk and disruptions at an earlier stage (VC1). By exemplifying the difficulties with identifications, and how the insights from humans can lack in accuracy due

to inherent biases, the Covid-19 pandemic was discussed, and how difficult it would be to anticipate the government restrictions that would follow. Volvo Cars noted that models and projections could be useful in such instances (VC1).

In this regard, developments have been made at Volvo Cars since the Covid-19 pandemic, especially regarding communications with suppliers of logistics services. The flows of goods are now monitored and evaluated on a daily basis, as opposed to monthly prior to the pandemic, and that the employees are in constant contact with suppliers (VC1). Volvo Cars engages in continuous meetings with their suppliers, even outside of a particular disruptive context. This is done in order to solve issues before they grow out of hand and in order to promote continuous improvements (VC1;VC2). *"During these meetings, we would rank suppliers on a "top-flop" list and show (without including the names of other suppliers) where the specific supplier would rank in terms of performance*" (VC1).

Volvo Cars maintains a separate unit of experts on standby, referred to as "*Special Forces*" (VC1) or "*Ambulance Drivers*" (VC2), composed of about five to ten employees in total, varying over time (VC1). This unit is maintained as a preparatory measure to strengthen the resilience of the supply chain, and to increase the likelihood of solving critical problems quickly (VC2). The actions of this unit will be described in more detail in later parts of this chapter.

H&M described the importance of having an existing structure and protocols in place prior to the disruption occurring. This was emphasized both regarding the speed of decision making in pressured situations and to avoid biased outcomes (HM1). *"The important thing is to decide beforehand what decisions that you will take if an event occurs, before it actually occurs"* (HM1).

H&M argues that a key capability to manage disruptions to their supply chains is to have a flexible, efficient and fast supply chain structure. Furthermore, H&M has recently developed new capabilities regarding demand- and transportation planning, where new inputs of information are used to change delivery dates and product volumes accordingly (H&M Group, 2022a).

As the Covid-19 pandemic began to break out in China in January 2020, former CEO Karl-Johan Persson noted that "*we have a good plan and flexibility*" as H&M began closing down stores in the Wuhan region (Nylander, 2020). By the 10th of February 2020, H&M had closed over 334 out of 520 stores in China (Axelsson, 2020). Three days later on February 13th, 37 of these closed stores had reopened (Nyhetsbyrån Direkt, 2020a). By February 19th, 260 out of 520 stores were closed, and H&M stated that they saw no effects of the Covid-19 pandemic on their capacity to deliver goods (Nyhetsbyrån Direkt, 2020b). On February 24th 2020, 164 stores were closed (Livebrandt, 2020) and by the 4th of March, the number was down to 66 closed stores out of 520 (Nyhetsbyrån Direkt, 2020c). On the 16th of March 2020, only 18 stores were closed in China, but with a rising number of closed stores in central- and southern Europe instead. "*This is an extreme situation and things are changing day by day, hour by hour*" stated a spokesperson for H&M (Agazzi & Petersson, 2020).

By the middle of March 2020, over 1,100 stores had to be closed in Germany and the US. The number of stores closed in China were down to just 16. The peak was reached in April 2020, where around 4000 stores were closed (Nyhetsbyrån Direkt, 2022c). The key strategic goal was to avoid a "mountain of stockpiles" in warehouses, something which was achieved by capabilities of reducing incoming supply and redirecting stock towards markets that were less affected (HM1; Mothander, 2020). "*We have an ongoing dialogue with our suppliers, we can delay, reduce and cancel orders* [...] *It is in our interest to always balance our flow of goods, it is very important. We will manage this, but it is going to be tough*" stated Nils Vinge, Head of Investor Relations at H&M Group (Mothander, 2020). By August 2020, H&M had not sold their products at a discount at a greater rate than previous years and stated that the plan of maintaining warehouse volumes low was working (Hultgren, 2020).

The "second wave" of the Covid-19 pandemic hit H&M's stores in November 2020, where the number of closed stores quickly rose from a few hundred to approximately 1500 (Petersson, 2020d). These stores were still closed by Februari 2021 (Nyhetsbyrån Direkt, 2021b), with first indications of better times being observed in March 2021, where the figure of closed stores was reduced to 1000 (Petersson, 2021a).

Finally, H&Ms financial strength was referred to as a key capability in tackling the Covid-19 pandemic, as the company was in a better position financially compared to its competitors (Bråse, 2020). During spring 2020, H&M announced that they would issue no dividends to its

shareholders, and instead keep the projected 16.1bn SEK to mitigate the effects of the pandemic. This was the first time ever that H&M canceled the shareholder dividends since the introduction to the Stockholm Stock Exchange in 1974 (Vilenius, 2020).

4.3.2 Supply Chain Configuration and Risk Preparation

Adoptions to the sourcing strategy and the overall configuration of the supply chain was discussed by Volvo Cars, where it was discussed how always going for the cheapest alternative could end up with unforeseen costs, in terms of disruptions (VC1). Challenging the status quo of global sourcing, Volvo Cars are exploring possible alternatives to their current supply chain configuration. "*Purchasing everything in Asia, then transporting it to Europe and building it here, is not right. We do not have that luxury anymore in the world. I believe that over time, maybe in the next 10 years, the awareness regarding this will increase*" (VC1).

The amount of resources committed by Volvo Cars towards the current structure of the supply chain and the vulnerabilities invited by such a structure, is compared to competitors (VC1). "*We are not as large as Toyota, BMW, or Volkswagen Group, and that's why we want to double our size. Because if we are larger, then we can support a more regional configuration of our supply chain*" (VC1).

When the Covid-19 pandemic began to develop in early 2020, China was Volvo Cars largest market in terms of sold cars. Both production and sales stood still as lockdown measures were imposed by the Chinese government. Initially, CEO Håkan Samuelsson believed that the effects would be contained to Q1 2020 (Olander, 2020a). However, as the lockdowns in China continued, the shortages of specific components caused concern that production in Europe would be forced to come to a halt (Lejland, 2020). Sales in China during Q1 2020 were 81% less than Q1 2019 (Fagerström, 2020). By the 9th of March 2020, Volvo Cars' Chinese factories had been closed for 7 weeks, while the factories in Sweden and Belgium were still running. However, ripple effects had begun to show as shortage of specific components meant that specific models of cars with additional equipment were delayed (Olander, 2020b). In March 2020, Volvo Cars announced that they would halt production at Swedish factories between 26th of March and 20th of April, and the Belgian factory between 17th of March and the 20th of April (Hultgren & Olander, 2020).

H&M stressed just how important their globally diverse configuration of supply chain is to their overall success (HM1). The diversification across geographical regions was portrayed as a means to lessen the exposure to individual events, as risks were hedged in the sense that other markets could compensate (HM1). "*What has made us more successful than our competitors is the fact that we employ a diverse supply chain. We have the largest network of suppliers, we have the largest organization, we source from the largest number of countries. We always try to be diversified, because you never know what happens.* [...] *There are definitely firms that are larger than us, but few are as global*" (HM1). In contrast, Inditex, one of H&M's main competitors, has a more regional approach to their business with over 50% of production originating close to Europe (mainly Spain, Portugal, Turkey and Morocco) and 48.5% of total sales in 2021 occurring in Europe as well (Inditex, 2022).

H&M Groups contracts allow for around a third of all leasing agreements of physical stores to be closed each year indicating the degree of flexibility in the configuration. "*Close teamwork with our partners enables a flexible supply chain*" states H&M Group in their annual report for 2021 (H&M Group, 2022a, p16).

4.3.3 Comfort Zone and Risk Tolerance

At Volvo Cars, a composed attitude towards risk has been developed following the last years of increased disruptions. As disruptions such as the ones caused by the Eyjafjallajökull volcanic eruption and the Arab Spring, Volvo Cars has developed an internal resilience to risk, and to some extent grown accustomed to the disruptive global environment (VC1). *"Previously it was the Arab Spring. Before that it was Eyjafjallajökull. There are always disruptions, it's a reality we have to live with"* (VC1).

Volvo Cars manufacturing processes run on vulnerable JIT manufacturing schedules, where disruptions could potentially halt production at the factories, resulting in massive costs (VC1). At Volvo Cars, "wasting" too much resources on risk prevention is more accepted internally compared to neglecting a risk and subsequently causing production to come to a halt (VC1; VC2).

H&M emphasized the returns that taking risks can give in terms of additional profits. In addition, H&M described how risk mitigation strategies generally come with increased costs (HM1). To exemplify the attitude towards risk, HM1 offered a figurative metaphor. *"There*

are two guys walking in a jungle when a tiger shows up. The first guy stops, and laces on running shoes. The other guy then says "are you stupid? you can't outrun a tiger". The other guy then replies "I'm not. I'm just going to outrun you" (HM1).

The metaphor was then explained as the attitude towards risk in H&M. Rather than avoiding risk, or being risk-averse, H&M claims that a large part of their competitive advantage lies in their ability to subject themselves to risk and managing disruptive circumstances more effectively than their competitors (HM1). With regards to the comfort zone and risk tolerance explained by HM1, it was also revealed that the configuration of the supply chain is created in order to reap the advantages of managing risk effectively. "*Our historical strength has not been to mitigate risk, but rather to subject us to it. You do not have a complex and interconnected supply chain because it is fun, you do it because you get something out of it*" (HM1).

H&M is aware of the competitive advantages they gain from the decision of exposing themselves to scenarios of risk and have arranged their supply chain accordingly (HM1). H&M also elaborated upon how recent disruptions have changed the overall mindset within the organization, and how the speed of acting on changes has increased (HM1; HM2).

4.4 Risk Identification

4.4.1 Classification of Risk Type

Volvo Cars identifies risk types such as transport issues or capacity issues at the supplier (VC1). In order to correctly classify the risk, Volvo Cars deploys a team of experts to the scene of a crisis to gather information with an open perspective, rather than evaluating previously determined parameters. This team of experts was described as having extensive experience of working with crisis management and fills the purpose of classifying and identifying potential risks within the supply chain (VC1; VC2). The industry in which Volvo Cars are operating in is characterized by a high degree of risk, and it is of larger importance to assess the impacts and effects of each potential risk, rather than labeling them into certain categories (VC1).

In the annual report for 2021, H&M Group states that there was an increase in the ratio of risks related to the external events compared to internal business-related risks. The Covid-19

pandemic, congested ports, an increase in freight costs are listed as examples. (H&M Group, 2022a, p57). H&M Group states that there are significant risks associated with social tensions in sourcing markets, which may impact the availability of supply and deliveries. H&M thus needs to monitor such developments closely and have contingency plans in place to manage these disruptions in a way that is beneficial for both H&M Group and its suppliers (H&M Group, 2022a). H&M described how identifying and categorizing risks was of less importance, and the majority of H&M's efforts were instead focused on identifying the potential impacts of said risk, rather than categorizing the risk itself (HM1).

4.4.2 Accuracy of Risk Identification

Volvo Cars and H&M are evaluating tools such as monitoring software and forecasting algorithms, as means to increase the probability of correctly identifying potential disruptions by both of our observed companies (VC1; HM1).

By collaborating with the R&D department, the logistics team at Volvo Cars wants to access data notifying where all the current shipments are currently located, in order to gain more information regarding disruptions and why they occur (VC1). As Volvo Cars supply chain stretches over the globe, there are needs for information on disruptions not only directly linked to their supply chain, but also on external events. The lack of information was described by Volvo Cars as a *"point of weakness"* in their operations and disclaimed that a new software system is under development, where these aspects are attended to (VC1). Access to indicators around the world and retrieving information on potential threats to the supply chain is desired by Volvo Cars, as it could allow them to increase their accuracy of risk identification (VC1; VC2). However, skepticism towards these predictive algorithms was also presented, since correctly inputting complex qualitative data such as political developments into a quantified algorithm, and then correctly interpreting the outcome, could prove much more difficult than commonly anticipated (VC2).

Three key elements of H&M's risk management process are *accuracy, predictability* and *actionability* (HM1). H&M expressed how they are firm believers in analytics and data-driven decisions, and wants to strengthen these elements through technological investments, which is described further in coming sections. By building and accessing what H&M called 'control towers', (the same terminology used by Volvo Cars, as described

earlier) it is believed that certain events of disruption can be anticipated at an earlier stage, and thus also mitigated (HM1; VC1).

During the annual general meeting in May 2020, newly appointed CEO of H&M Helena Helmersson described how projections and estimates were difficult to create in such a volatile environment. Instead, H&M had opted for a development of multiple scenarios that they could follow as more information became available. "*Conducting projections has never been as difficult as it is now. We have a lot of different scenarios that we are working with, and the situation differs across different markets*" (Petersson, 2020a). The same week, the German Government had just announced that they would allow stores to reopen, following several weeks of closure. However, the pace of opening up would vary across Germany, as it were the regional administrations that made the final decision. Germany is H&M's biggest market (Petersson, 2020a).

H&M is actively evaluating external solutions to the analytical development of data-driven decisions. For instance, it was described that H&M had been approached by a major software development company, who had developed a modified version of their navigation system that was now equipped with forecasting capabilities (HM1).

4.5 Risk Assessment & Evaluation

4.5.1 Risk Assessment in Practice

The risk or disruption is continuously assessed at Volvo Cars and is evaluated as it passes through an internal process of escalation (VC1). When the risk is assessed, it is always weighed against financial targets as well as to the effects on 'bottom line' financial results. (VC1; VC2; HM1).

One determining factor for the 'rush' of the assessment is the impact on financial targets (VC1). The greater impact, the faster assessment process and implementation of risk mitigation efforts (VC1). *"Things that instantly impact our bottom line will go straight to the highest management"* (VC1).

Although Volvo Cars stressed the importance of making informed decisions, the process of assessment can be very rapid, and without a priorly determined timeframe (VC1). As an

illustration, VC1 highlighted the assessment stage of the crisis stemming from the Russian invasion of Ukraine, illustrated in the following quote. *"We already know that in the next step there will probably be a stop on sourcing from Russia. We are currently sourcing from Russia, and the European Commission will probably impose sanctions. This crisis team is already working on how we can compensate for that volume* " (VC1). [Interview conducted on the 24th of February, a few hours after the Russian invasion into Ukraine].

On the 25th of February, Volvo Cars confirmed to Swedish media Göteborgs-Posten that they would redirect a shipment of 400 cars that was on route to Russia back to Gothenburg instead and sell the cars in other markets (Kennedy et al, 2022). Furthermore, on the 28th of February, Volvo Cars stated that they will not deliver any cars to the Russian market until further notice (Reuters, 2022).

The war in Ukraine has caused the prices for raw materials, energy and freight to increase. Volvo Cars will continue to increase prices towards customers to manage these increased costs (Mölne, 2022). Former CEO Håkan Samuelsson commented on the war in Ukraine, stating that Volvo Cars had no direct suppliers in Ukraine, but a few sub-suppliers within software development, which now had to be covered by other suppliers (Wande, 2022a). During 2021, Russia represented 1.3% of Volvo Cars sales. Volvo Cars stated that it was not the sanctions that made the decision, but rather the overall risk of being associated with trading with Russia (Olander, 2022f).

The foundation of the risk management process operated by H&M lies in three different parameters that serve as identification and assessment simultaneously (HM1). By measuring any identified disruption against (1) the likelihood of occurrence, (2) the level of impact and (3) timeframe that the disruption could occur, H&M monitors the external environment and constantly assess different potential disruptions (HM1; HM2). The decision-making process at H&M is rapid, and once the risk has been assessed and decided to be mitigated, the decision on mitigation implementation is swift (HM1; HM2).

Equation 2: H&M's Assessment of Potential Disruption

$$Disruption\ Assessment = (Likelihood\ of\ event\ x\ Impact\ of\ event) - Time\ until\ impact$$

Source: Own illustration, based on insights from HM1 & HM2.

These parameters are constantly monitored, with a more thorough evaluation of the foundations conducted on a yearly basis (HM1). Prior to the Covid-19 pandemic, only two parameters were assessed, likelihood and impact. As the internal processes for supply chain risk management has been strengthened by recent exposure to turmoil, the third parameter has been added in order to increase the accuracy of timing when implementing mitigation measures, as even though a disruption is deemed to be highly likely, it is difficult to know the exact time of occurrence (HM1; HM2).

When a disruption has been assessed by the three parameters described, it is grouped into a focus area, which classifies disruptions. One example of a focus area is 'geopolitical, customs & trade' and encompasses all disruptions that could be categorized as affecting those aspects. Trade wars between different countries and regions are examples of potential disruptions categorized in the 'geopolitical, customs & trade' focus area (HM1). The effect on customs and trade is now constantly monitored and assessed against the three parameters (HM1).

H&M works to increase automation in decision making related to supply chain management. Specifically, the three objectives of predictability, accuracy and actionability are being developed. Predictability refers to the ability to forecast future developments, accuracy refers to the correctness of these forecasts, and finally the actionability is concerned with the ability to "*do something about it*" (HM1).

These three parameters of H&M's supply chain risk management are currently being reinforced internally, as a means of strengthening capabilities. Predictability is being developed by the implementation of monitoring and predictive software based on data driven algorithms, as discussed earlier. Improved accuracy of predictions is also being reinforced by the usage of technological improvements, such as "*putting transmitters on our packages and scanning them at every point. For example, if irregularities are detected at a port in Bangladesh, then we can predict which ripple effects it will have on the US east coast*" (HM1). Actionability is being improved through developing the capabilities to redirect transports of material earlier in the chain of transportation, as well as improving the ability to move stock between two different points to ensure that supply meets demand on a global level. The ability to shift stock through different parts of their organization has improved greatly since the breakout of the Covid-19 pandemic (HM1; HM2). H&M Group states in the annual report for 2021 that during the Covid-19 pandemic, the temporary closure of stores

due to restrictions by the local governments has been handled by redirecting products to other sales markets and to other sales channels, such as online retail (H&M Group, 2022a).

4.5.2 The Role of Experience

The aspect of experience among decision makers is an important factor when assessing a crisis or disruption by both Volvo Cars and H&M. The pace of decision-making is important, and experience can thus speed up the process of evaluation and assessment (VC1; VC2; HM1; HM2). Regarding experience, a combination of experience gained from the industry is best combined with new academic knowledge from younger colleagues (VC2). On a more organizational level, Volvo Cars have evolved as an organization since the start of the Covid-19 pandemic. The pandemic has generated experience that Volvo Cars is now applying on other disruptions, such as the semiconductor crisis. "*We learned alot from Covid-19, lessons that we are now applying on the semiconductor crisis. We are building databases and systematics, so that when the next crisis comes, the time between the crisis occurring and the first action shortens"* (VC2).

A potential disruption can be assessed prior to the event taking place, without knowing the exact shape or form of the disruption (VC2). By preparing for different scenarios and deciding what to do beforehand, the judgments of decision-makers are not clouded by non-critical noise, and trust is put on the prior preparations (HM1).

Despite the emphasized value of experience, Volvo Cars desires a shift towards more data-driven decision making (VC1). Monitoring systems are highlighted as certain disruptions, most notably uncommon ones, are difficult to assess. By highlighting the start of the Covid-19 Pandemic, VC1 argued that predictive software systems could have aided the assessment phase of the start of the pandemic and described the projected utility of such systems. *"I am almost certain that as things* [The Covid-19 Pandemic] *were starting in Wuhan, no one would have said 'we need to watch out', it would probably have been like 'it will soon be over' or 'it will stay in China'. Here is where I believe that models and projections can be useful*" (VC1).

H&M:s CEO Helena Helmersson stated in an interview in August 2020 that as Covid-19 began to spread in China they were monitoring the situation, but "*no one of us thought it would become a world crisis. We held discussions with Hong Kong and China regarding our*

500 stores there, but it was not until the virus reached Italy that we understood that it would become much greater" (Lindholm, 2020).

By becoming more predictive in the monitoring of disruptions, the necessary alterations to the supply chain can be implemented prior to the disruption occurring, minimizing the impact on financial targets (HM1; VC1). If the assessment phase is more data-driven, parameters such as level of impact would be more accurately assessed, thus providing for improved accuracy in the scope and scale of the response (HM1). With operations and supply chains crossing over the globe, there are constantly disruptions affecting supply chains (HM1). In order to alleviate the pressure of employees to constantly monitor these, an automated process driven by data has the potential to offer risk assessments on a daily basis, without overburdening employees with administrative workload (VC1).

Stefan Persson, former Chairman of H&M Group, described how H&M would emerge stronger as an organization after the Covid-19 pandemic, due to the fact that the industry already had been characterized by degrees of saturation. "*I believe that we* [H&M]*, with our price, quality, and fashion image will be a compelling option. The industry has been oversaturated, and the closures that would have happened regardless are now happening at a faster pace due to the Covid-19 pandemic*". In addition, Persson discussed the organizational rearrangements that were taking place. "*I think when all this is over, we will emerge with a much more effective and slimmer organization*" (Petersson, 2020b).

H&M:s CEO Helena Helmersson stated that the main experience and lesson learned from the covid-19 pandemic was the importance of the speed of decision making, and that it was an aspect that H&M will continue to develop (Lindholm, 2020).

4.6 Zone of Balanced Resilience

The higher the impact on Volvo Cars' 'bottom line' financial performance of a risk, the higher the level of investments into mitigation (VC1; VC2). As an example, the Volcanic eruption in Iceland in 2010 compelled Volvo Cars to increase their committed response, as it was deemed likely to have dire financial consequences. *"For example, the Eyjafjallajökull* [Volcano in Iceland which erupted in 2010] *eruption had the potential to halt all production in both Torslanda and Ghent. That really shaped the size of our response*" (VC1).

In regard to the crisis team utilized by Volvo Cars, referred to as "*Special Forces*" earlier, the team only operates on concerns regarding the inbound supply chain, and not outbound (VC1). The major cost implications from shutting down internal production facilities are greater than costs arising due to delays in outbound logistics, thus causing incentive to manage the disruption as quickly as possible (VC1; VC2).

Volvo Cars has the ability to upgrade their shipments to what they call 'premium freight', which means for example transporting by airplane instead of ships, to save time. Airborne transport is more expensive, but frequently used in times of disruptions in order not to stop production, a scenario associated with high costs (VC1).

There are two golden rules at Volvo Cars when it comes to investing in supply chain risk management. The first rule is that the production never can stop. If faced with two alternatives, where one implies that you must perform heavy investments into risk management, it is always worth it if the other option is to stop production (VC1). "*I have often said to my groups* [of employees] *that explaining that you paid too much is acceptable, but explaining that you are the reason that the line of production has stopped, that is never acceptable* [...]" (VC1). The other rule is to act quickly. The magnitude of the risk decides the pace of the management process, and if confronted with a large risk, employees are urged to respond quickly with less concern of the size of the investment (VC1; VC2). "*If there is an emergency, do not hesitate. Act*" (VC1).

During 2021, shortages of semiconductors as well as other disruptions would cause the production of Volvo Cars to come to a halt several times. In March 2021, Volvo Cars announced a temporary stop of production at their factories in China and the US due to the shortage of semiconductors, stating that it was a matter of prioritization of keeping the bigger factories in Europe open instead (Olander, 2021g). A list of production stops due to semiconductor shortages in 2021 at the Torslanda and Ghent plants is presented in Table 2.

Table 2: Volvo Cars Production Stops at the Torslanda- and Ghent Plants During 2021 due to Shortage of Semiconductors

Torslanda	Ghent
May 10th - May 16th	June 21st - June 27th
Aug 11th - Aug 15th	Aug 24th - Aug 27th
Aug 30th - Sep 7th	Aug 30th - Sep 7th
	Nov 24th - Nov 25th

Sources: The Brussels Times (2021), Olander (2021f), Lindgren (2021), VRT (2021), Hultgren (2021b), Joris (2021).

As a consequence of the shortage of semiconductors, Volvo Cars produced around 50,000 less cars in Q3 2021 than during Q3 2020 (Volvo Cars, 2021b; Hultgren, 2021a). The Q1 2022 report had similar findings, stating that shortages in specific semiconductors kept production volumes down, and a projection for similar challenges during Q2 2022, with CEO Jim Rowan commenting that he believed the shortage would lessen during the second half of 2022. Regarding global sales during Q1 2022, Volvo Cars sold 20% less cars than Q1 (Volvo Cars, 2022b). At the same time, Volvo Cars announced that their projected sales volume for the full year 2022 would be revised downwards (Mölne, 2022). Volvo Cars issued no dividends to its shareholders for the financial year of 2021 (Mölne, 2022).

Newly appointed CEO of Volvo Cars Jim Rowan stated in one of his first interviews with Swedish media that he was an advocate of investing more resources into the supply chain to get more robustness. "*I have studied logistics and I think I know more about supply chains than most CEOs. The pandemic has taught us that we need more robust supply chains and we shall invest to achieve that"* (Olander, 2022c). On Jim Rowan's second day as CEO, the 22nd of March 2022, Volvo Cars announced that eight shifts at Torslanda would be canceled due to semiconductor shortage, and that the factory in Taizhou, which was acquired from Geely in late 2021, would temporarily close due new outbreaks of Covid-19 in combination with a shortage of components (Olander, 2022e).

The financial considerations are not only relevant for isolated events of disruptions, but also on larger matters such as supply chain configuration (VC1). VC1 referred to the current configuration of the supply chain and discussed the desire for a more regional approach (VC1). Conducting changes of large magnitude, such as altering the supply chain

configuration requires massive investments, and the risk of over-investments causes Volvo Cars to conduct this transition at a slower pace (VC1). The risk of possible over-investment mitigation is generally smaller compared to the risk of suffering an unmitigated impact of a disruption (VC1).

The objective of optimizing the production is further described in Volvo Cars' annual report of 2021. As the company is in a phase of growth and is aiming at selling 1.2 million cars annually by the middle of the decade (compared to 698,693 in 2021 and 661,713 in 2020), the aspect of optimizing the internal processes grows in importance (Volvo Cars, 2022a). The desire to grow thus creates even more incentives for supply chain managers to implement measures designed to support higher levels of production (VC2).

In regard to the automated risk-assessment tools desired by both companies as described earlier, it is believed to be a highly valuable and necessary tool in the risk management process, but there are concerns about the price tag for developing such an analytical tool (VC1). As the effects of such a tool is not yet obvious in terms of financial losses or gains, the investment and implementation costs of the capability-enhancing tool is currently deemed too high (VC1). Even still, utilizing such a tool could increase the accuracy of future investments (VC1).

H&M evaluates risk reduction measures from a cost perspective, highlighting the inherent trade-off that lies within risk and reward. In the evaluation of near-shoring and shortening of global value chains, the cost of decreasing exposure to a certain market to mitigate risk could end up being more costly, due to higher costs of operations (HM1). "*You are always mitigating risk against a cost*" (HM1). A similar position can be found in H&Ms annual report of 2021: "*It is always a business impact evaluation which determines whether an action is to be taken to reduce the likelihood of a risk and if so, to what extent. Business decisions also determine the extent to which the consequences of a risk should be mitigated*" (H&M Group, 2022a, p56).

According to H&M, it is important to consider which disruptions that you as a firm can actually affect, and when to save resources when the situation is beyond the scope of control and influence. The issue is referred to as the tradeoff between the "*circle of influence and the circle of concern"* (HM1). Being a global company of the size of H&M, there are disruptions

at several different levels, ranging in possibilities to affect. Considering the vast range of types of disruption, H&M are constantly monitoring which disruptions that are able to affect, and which ones that are not. This activity is performed in order to avoid sunk costs and losses of efficiency (HM1).

H&Ms primary strategy in terms of risk mitigation is diversification, both in terms of supplier base and its geographical coverage of markets (HM1; HM2; H&M Group, 2022). However, the diversification also comes with additional costs, due to economies of scale of maintaining several routes of transport at once. HM1 exemplified the trade-off of having six versus two operational routes out of Asia, and the final judgment that has to be made in terms of erosion of profits. Another challenge related to diversification is to maintain the degree of diversity over a period of time, as growth and changing market conditions quickly skews the diversification towards a concentration to profitable areas (HM1).

In January 2022, H&M Group reported that they were planning price increases on their products, due to a worsening in the external factors that affect market conditions, such as the price for transports and raw materials. Investments into technology were also listed as a reason for higher expenses (Petersson, 2022a). CEO Helena Helmersson commented on the issue "*When we adjust our prices, we have to do it wisely so that we maintain trust amongst our customers*" (Wande, 2022b).

Another aspect is the trade-off between decisions taken with incomplete information and costs of correction (HM1; HM2). Specifically, H&M weighs taking the decision to relocate stock earlier up in the supply chain versus the risk of taking a wrong decision (HM1; HM2). The earlier the decision is made, the less it will cost in terms of shipping and re-packaging, but the risk of making a false projection about future conditions is higher the earlier the decision is taken as well. As products travel down from suppliers to stores, more information is gained about future market predictions and sales estimates, which will aid in the decision-making process. This debate between cost savings and accuracy is an ongoing debate internally and is portrayed as a key area to strengthen with the aid of advanced analytics and predictive algorithms (HM1). "*Redirecting products from one store to another is much more expensive than redirecting boxes that are en-route. At the same time, the upside is certain since you are more confident that the decision to relocate is the correct one*" (HM1).

4.7 Measures

4.7.1 Volvo Cars Escalation Mechanism

Volvo Cars employs an "escalation mechanism" that contains several steps to manage issues in the supply chain (VC1), as illustrated in Figure 6 below. This escalation mechanism exists for all supply chain activities to and from the factories, such as sourcing, inbound logistics, and outbound logistics of finished cars (VC1). In the first step of the escalation mechanism, a taskforce of experts would be deployed and sent to the site of the supplier. "*These experts would aid the supplier in solving the issue*" (VC1). In this first stage, the supplier is given a 12-week period of working together with the experts sent out from procurement and operations of Volvo Cars to increase deliveries.

Figure 6: Illustration of the "Escalation-Mechanism" at Volvo Cars.

The Escalation-Mechanism

Step 1 "Send the Experts"	*"This is the first major step that we take, to send out the experts within logistics and engineering. It could be that the reasons for the shortage are capacity issues due to inefficiency. These experts would aid the supplier in solving the issue"*	12 Weeks
Step 2 "Involve Management"	*"Procurement would state to the supplier things such as 'if everything goes wrong, we will see each other before the courts' and 'we will seek reimbursement of all additional costs' etc."*	18 Weeks
Step 3 "Business-on-Hold"	Supplier notified that no further business beyond current contract would be allocated to them. *"a very strong message. Obviously, no one wants to end up here"*	12 Weeks
Step 4 "Phase-out"	*"Here we will say 'Ok, it is over'. We will not stop the contract, but we will start actively looking for a new supplier of the service or product instead"*	

Source: Own illustration. Based on insights gathered from VC1 & VC2.

If this first step of escalation does not solve the issue, then the process would be escalated further into step 2 which is similar to step 1 but also contains management at both the supplier and at Volvo Cars. In step 2, 18 weeks are given to find a solution to the problems. This differs from step 1 in the way that it is an escalation of formality as well. "*Procurement would state to the supplier things such as 'if everything goes wrong, we will see each other before the courts' and 'we will seek reimbursement of all additional costs' etc."* (VC1).

If issues are not resolved in step 2, then the matter would be escalated to step 3, "Business-on-hold" (VC1). In this phase the supplier would be notified that no further business would be allocated to them. The supplier may continue on existing contracts but will not be offered any new requests. "*This is a very strong message. Obviously no one wants to end up here*" (VC1). In this third step, the supplier is given a further 12-week period to make adjustments to operations to fulfill promised performance. "*The supplier by now has had almost a year to improve things* [12+18+12 weeks, approx. 10 months]" (VC1). Finally, if issues are not resolved within the 12-week period during "Business-on-hold", then the escalation would continue into its final step 4 "Phase-out". *"Here we will say 'Ok, it is over'. We will not stop the contract, but we will start actively looking for a new supplier of the service or product instead"* (VC1).

In April 2021, Volvo Cars confirmed that they had terminated the contract with supplier Spectra Premium in Trollhättan, Sweden, which manufactures stainless fuel tanks. Spectra Premium gave notice to all 90 employees about termination of employment, with the CEO stating that the size of the Volvo Cars contract made it impossible to continue. Volvo Cars stated that the reason for termination was the technology shift and the fact that "*global suppliers are needed in all three regions, therefore we will change this supplier*" (Hultgren, 2021c).

In Step 1 "Send the Experts", Volvo Cars sends what is referred to as the "*Special Forces*" team that aids suppliers in achieving their target volume (VC1). A key guideline of this unit is that they do not leave the supplier's site until there is a long-term sustainable solution in place, and are dispatched to the site once a crisis occurs (VC2). "*They are often there when a crisis occurs, such as now"* (VC1). [Interview conducted on the 24th of February 2022, the day of Russian invasion into Ukraine].

Volvo Cars generally do not employ the "*Special Forces*" unit to a supplier when there is only a single Volvo Cars plant being affected, because then other suppliers can usually cover for the loss. But if a key supplier which is serving multiple production sites is encountering issues, then the "*Special Forces*" would be deployed rapidly and sent as an independent group to make a fair assessment of the situation (VC2).

Once a disruption has occurred, as with the Covid-19 pandemic, the "*Special Forces*" unit is primarily concerned with "*stop the bleeding activities*" (VC2). One such measure would be to state that "premium freight" as described earlier would now be used for all shipments in the next three-week period, in order to catch up to the projected volume. Other measures that could be employed when the issue was more ambiguous is to have Quality Assurance Engineers screen the production process at the supplier step by step to identify where the true issue lies (VC2). The goal of these emergency efforts are always to get the supplier back on a level that is sustainable in the long term. This can require new investments into machinery, or an overhaul of the work processes done in the facilities of the supplier. Necessary investments are negotiated between Volvo Cars and the individual supplier to find a mutually acceptable solution (VC2).

The "*Special Forces*" team is not only employed due to faults or crises occurring at the supplier (VC2). When drastic changes take place internally within the operations of Volvo Cars, the "*Special Forces*" are able to work together with certain suppliers to aid the situation. For example, a rapid increase in demand for cars could cause issues for the supplier to keep up. As the supplier cannot foresee such developments, Volvo Cars works closely with the supplier and develops their operations (VC2). "*We are there to support the supplier, but they are also there to support us*" (VC2).

4.7.2 The Supply Chain Reconfiguration

4.7.2.1 Geographical Configuration

Volvo Cars has a desire to transition towards a more regional based supply chain, commonly referred to in literature as 'regionalization'. "*We want to depart from them* [the globalized supply chains]. *There are no other alternatives, that is my personal belief* [...] " (VC1). Volvo Cars states in their Annual Report of 2020 that their goal is to "*Build where we sell, and source where we build*" (Volvo Cars, 2021a, p38). This goal is not mentioned in the Annual Report of 2021 (Volvo Cars, 2022a).

However, Volvo Cars does not yet have the footprint to support a regionalized supply chain, due to constraints in volume and economies of scale (VC1). Through the strategic goal of doubling volume to 1.2 million sold cars by the middle of the decade (Volvo Cars, 2021a), more factories can be supported, and thus a regionalized supply chain can be constructed.

This transition would span over a period of several years, as major investments need to be made to revamp the already existing structure (VC1). This transition would not only affect Volvo Cars, but also the suppliers. "*Whatever we produce in the Torslanda or Ghent plants should also, supplier-wise, be produced into the area where we are in. Just to avoid these kinds of disruptions and disturbances. And to be less vulnerable to global happenings*" (VC2).

Volvo Cars state in their Annual Report of 2020 that a more regional approach will help in reaching their goals of sustainability and reduction of Co2 emissions, with production centers geographically located close to their main markets (Volvo Cars, 2021a). A joint venture between Volvo Cars and battery manufacturers Northvolt announced in 2022 that a battery manufacturing plant would be located in Gothenburg, in close proximity to Volvo Cars' production facilities. The 30bn SEK investment is expected to create close to 3,000 jobs, and is supposed to support Volvo Cars in their mission to only produce electric vehicles by 2030 (Northvolt, 2022).

Diversification is H&M's most important factor in the configuration of their global supply chain (HM1; HM2). The high degree of diversification allows for compensating one market's disruptions by utilizing another. In practice, it serves as a hedge against risk (HM1). Diversification is the only "*certain cushion for impact*" in times of disruption, regardless of type of disruption (HM1). In practice, this diversification refers to the vast network of suppliers, both in terms of numbers and geographical distance that H&M engages with through partnerships (HM1; HM2). Sourcing from many different countries and having a large organization is the most important measure to protect the organization against risk (HM1). "*The most important factor is to have options. Diversification trumps everything else"* (HM1).

H&M Group states in their annual report for 2021 that they were responsive and fast during the covid-19 pandemic. By quickly adjusting volumes both up and down, and relocating between sales channels and markets, supply was able to meet demand to a greater extent. "*Flexibility has been a vital enabler during the pandemic and is expected to be even more important going forward*" (H&M Group, 2022a, p29). HM2 explained how the logistics department developed different nodes within the logistical network in order to offer more

flexibility within the supply chain, a method that diversifies the options within transportation schemes (HM2).

H&M show less evidence of near-shoring or shortening the length of supply chains in general, with HM1 arguing that such measures are more feasible for smaller organizations. "*You hear a lot of talk about near-shoring in panels and news articles. They use the examples of small studios who have managed to get it to work. On a larger scale, it is not feasible.* [...] *So this argument of building factories closer to home is something that I just do not believe*" (HM1).

At the same time regionalization was discussed in more positive terms than near-shoring by H&M, with HM1 stating that it is already implemented to a certain extent, with suppliers from Turkey primarily serving the European market for example (HM1).

Regarding a regional structure of the supply chain, the key issue is the overarching goal of the regionalization initiative. According to HM1, aspects such as lead-times and reduction in emissions could both be objectives of shifting to a more regional configuration "*You have to consider why you are doing it* [shortening supply chains]. *Are you doing it to have less emissions? To have shorter lead-times? There are always multiple aspects to consid*er" (HM1).

4.7.2.2 Outsourcing

Volvo Cars employ a strategy of outsourcing everything that is not deemed a 'core competence' such as handling of documents (VC1). On the 11th of March 2022, Volvo Cars announced that they would reshore and insource their software development, with the Chief Product Officer stating that more control over the software is needed as it becomes more complex. The goal is to go from current volume of 10% internal software development and 90% outsourced, to a 50/50 split by 2025. The new facilities are planned to be operational before 2023 and will host 700 engineers in central Stockholm (Ek, 2022). In 2019, Volvo Cars announced that it would shift the combustion engine manufacturing plant in Skövde into a new, separate company called "Aurobay" which would be merged with the Chinese combustion engine factory in Zhangjiakou (Olander, 2021a).

Volvo Cars announced in February 2022 that they would invest 10bn SEK in the Torslanda factory into areas such as the new production technology 'megacasting' that revolves around casting larger pieces of aluminum, rather than welding together several smaller components. The new 'megacasting' technology follows the same trend of insourcing activities to in-house production, as the suppliers do not have the financial strength to conduct the required investments by themselves. The investments are scheduled for completion around 2025 and coincide with the shift to electric, with this new production technology reducing complexity by two thirds (Olander, 2022a).

H&M operates with outsourcing as a key part of their business strategy, since they have no factories on their own and instead considers the complex network of suppliers as a key aspect of their competitive advantage, with significant concern about preventing competitors from "*copying it*" (HM1) According to recent estimates, as much as 80% of H&M's products originates from Asian suppliers (Petersson, 2020c). Inditex, one of H&M's main competitors, has a mix of in-house production and outsourced production, with over 50% of products coming from production facilities in, or close to, the European market (Petersson, 2020c).

4.7.3 Supply Chain Monitoring & 'Control Towers'

4.7.3.1 Control Towers

The need for control and monitoring has increased following the Covid-19 pandemic, the efforts of automating and surveillance throughout the supply chain has grown in importance (VC1). With the purpose of ensuring a stable logistics system and creating opportunities for the global operations to work efficiently, Volvo Cars' monitoring efforts have had great success (VC1). The number of cars delivered within the agreed contract period rose from 75% to 95% since the beginning of 2021. Prior to these changes, Volvo Cars reportedly measured these delivery performance ratios on a monthly basis, and now instead reviews them daily (VC1).

The purpose of building monitoring systems, known as 'control towers' by both HM1 and VC1 exceeds the notion of increasing control. An increased focus on monitoring of the external environment can create possibilities for predicting disruptions occurring in the future, affecting the global supply chains (HM1; VC1).

VC2 nuanced the potential of predictive software as a measure to maintain global supply chains, arguing that the possible conclusions that can be drawn from such algorithms and monitoring systems would be limited, as complex events such as geopolitical trends or local shifts in sentiment towards international businesses would be very hard to capture in data. "*What are these AI machines doing? They are picking up signs that are happening in the world. But they can not predict the next tsunami. They can not predict political changes. I don't think AI can look into the head of political managers. We need to be very careful when taking in the data of AI. I think it will be hard to interpret in the right way"* (VC2). There is significant potential in the predictive algorithms in areas such as purchasing and demand planning, but not related to short term disturbances within the next 1-5 years. To handle such disturbances, micromanaging supplier trends can be more fruitful (VC2).

In order to increase control and insights over the vulnerabilities of the supply chain, H&M has employed several measures of monitoring, with a expressed desire to increase their focus on developing this area. With the increasing complexity and interconnectedness of global trade, the notion of understanding where certain shipments are geographically located, and identifying every route of transportation creates a foundation of better understanding of potential areas of risks (HM1). However, the current shape of monitoring tools is not sophisticated enough, and that H&M desires a system where monitoring mechanisms are integrated with quantified data, in order to build predictive software, offering better data to make more informed decisions from (HM1). "*Ideally, you want information to be processed and then predict the future flows of trade. These predictions could then serve as a foundation for redirecting shipments* [...] *predictability is everything*" (HM1).

HM1 proposed automation of risk management responses to be a desired way forward, with less emphasis on the decision-making of the individual employee. Due to increased levels of volatility, the prospect of automating decision making was expressed as a solution to restricting the risk of human error. "*In a more volatile world, you need more automation. You will need to make decisions often because things are constantly happening.* [...] *We want to automate the decision making process, because there will be too many biased decisions otherwise.* [...]. *Input qualitative data and quantify it, and limit human interaction*" (HM1). More specifically, H&M described how the implementation of 'control towers' could aid logistical schemes in times of disruption. *"If I am sitting stuck in traffic, it is not because something has happened on the road I'm driving. It is because of a completely separate*

event, a couple of streets up. That is what's affecting me. In these cases, you want a system that tells you which ways to drive in order to avoid the traffic" (HM1).

H&M Group states in their annual report for 2021 that the investments into AI, advanced analytics and logistics have made their supply chain faster, more efficient and flexible. These investments allow H&M Group to "*always have the right product in the right place at the right time and at the right cost*" (H&M Group, 2022a, p3).

4.7.3.2 Collaboration

At Volvo Cars, managers from different departments are composed into the crisis management team known as the "*Special Forces*" (VC1; VC2). Developing closer relationships with suppliers was highlighted as a key measure by Volvo Cars. By working closely and conducting audits, more disruptions can be avoided (VC2). These audits were specifically highlighted to be of great importance prior to awarding the first contract to a supplier.

By investigating suppliers' key performance indicators (KPIs) such as process quality, symptoms of disorder can be identified through analyzing logistics data, where a backlog usually indicates difficulties (VC2). "*If a supplier needs premium transports or if they have no material ready for pickup, there is a sign for bad performance*" (VC2).

H&Ms internal mechanisms were developed shortly after the outbreak of the Covid-19 Pandemic. By reorganizing internal structures, H&M created several cross-functional teams, combining different departments and areas of expertise in order to work together in pursuit of optimal solutions to disruptions. These types of groups had close communication with different external stakeholders and business partners and had daily meetings in order to rapidly respond to market changes and dynamics (HM2).

H&M have engaged in more partnership-based collaborations with their suppliers. Recognized as an important virtue for managing disruptions, fruitful relationships with suppliers and different partners within their supply chain was explained to be one of the major focal points going forward for H&M, in order to avoid further disruptions (HM2). H&M works with active decisions regarding investments into suppliers, as a commitment from the side of H&M can serve as a hedge against the risk of a key supplier being purchased

by a competitor (HM1). "*You can choose to carry out an investment* [in cooperation with a supplier] *to avoid the supplier being purchased*" (HM1).

4.7.4 Additional Measures

Another way of handling shortages of specific components such as semiconductors is by adapting the build-sequence, where different procedures can be swapped in time to suit the ETA of deliveries (VC1). Due to the shortage of semiconductors, Volvo Cars announced during 2021 that they would adapt their cars to increase the pace of deliveries. Customers who had purchased the "Blind Spot Information System" (BLIS) as an add-on would be given the option to remove the addition to receive the car earlier. The BLIS system has hefty requirements in terms of semiconductors. The sensor works by alerting the driver in the side mirror when another car is approaching from the side, within the so-called "Blind Spot" (Olander, 2021e).

One of Volvo Cars main resilience efforts in terms of tackling disruptions is stockpiling, where if disruptions are projected to occur, then the volume in deliveries would be increased beyond the current output volume, so that an excess supply is generated to cover up for future shortages (VC1). The scale of this safety stock differs between product categories, where more scarce and critical components such as semiconductors could be increased to a stockpile capable of covering two full production days at a given factory without additional incoming deliveries, while more common products such as screws and bolts are generally not maintained above an eight hour shortage window, since they are more easily replaced by other suppliers (VC1).

During times of projected component shortages, Volvo Cars increases the speed of deliveries by shifting transportation from sea to air. "*This could in practice mean shifting transport from Sea to Air. We did that during the Suez Canal Blockade in 2021, when the vessels took the long route around Africa which added a week or two to the transport"* (VC1). Increased pace of transportation could also be achieved through double-staffing of truck drivers, where one driver would be driving and the other sleeping, rotating to achieve continuous driving while complying with labor regulations (VC1). Other measures included finding alternate sources of supply of certain products to use instead, or requesting overtime production at suppliers. However, overtime at suppliers was limited by the fact that many suppliers already run on a 24/7 schedule (VC1).

H&M does not utilize stockpiling as a main measure of developing resilience, since the clothes generally run on a shorter product life cycle, where fashion trends are quickly outdated. Stockpiling a relatively perishable good is thus more complex, than a good with more stable demand over time (HM2). Given the short product life cycle and lack of possibilities to stockpile, H&M have instead increased their focus on warehouse optimization. In addition to developing nodes within their supply chain for easier transportation and logistics schemes, a further focus on warehouse allocation with the purpose of *"shifting supply to where demand is"* has been initiated since the outbreak of the Covid-19 pandemic (HM1; HM2).

In order to employ measures efficiently after the outbreak of the Covid-19 pandemic, H&M paused several non-business critical activities in order to free up resources. The decision on which activities to pause was made together with all H&M brands in cross-functional teams, with the purpose of maintaining effectiveness, without neglecting long-term objectives (HM2). The additional resources freed up from pausing activities were aimed at solving urgent issues caused by the Covid-19 pandemic (HM2). *"Under this period, we noticed that we lacked certain abilities. In the early days of the Covid-19 pandemic, we decided to accelerate these developments.* [...] *Partly to increase flexibility, but also to prepare for future disruptions* (HM2).

4.7.5 The Role of External Stakeholders

Volvo Cars described how the decision to shift deliveries from sea to airborne transport has to be weighed against other goals, and the goals of external stakeholders. "*To shift transport from sea to air is of course not an easy decision to take since we have environmental obligations as well*" (VC1).

Societal obligations or market expectations can have effects on the design of the supply chain structure, as well as on the actions taken during times of crisis (HM1). HM1 described how it was important to implement a Covid-19 response that was "*sustainable to our partners*". On the 29th of March 2020, H&M assured suppliers that they would pay for canceled orders if the products had already been manufactured (Mirdha, 2020). Other retail companies such as TopShop and The Gap did not pay for canceled orders (Lindholm, 2020).

From January 1st 2022, H&M will not onboard new suppliers if they have on-site coal boilers in their factories (H&M Group, 2022a). In a report published in January 2022 by Fair Action and Fair Finance Guild, it was described how all large Swedish banks are having a continuous dialogue with H&M about wages for workers at their suppliers. "*We have signaled clearly that Nordea wants H&M to increase the pace in their work to guarantee better wages and better transparency regarding wage data*" comments Katarina Hammar, Chief of Responsible Investments at Nordea (Ahmadi, 2022).

In addition, H&M discussed the role of other external stakeholders, such as auditing committees, which regularly question the management about their current level of risk exposure, which supply chain is a major part of. These auditing committees are required since H&M is listed on the Stockholm Stock Exchange (HM1). "*H&Ms risks are reviewed centrally on a quarterly basis with each brand and every central function. The quarterly meetings are conducted in order to ensure each listed risk has an action plan to minimize impact and is on an acceptable risk level*" (H&M Group, 2022a, p40).

During late 2020, H&M issued a statement taking a stand against reported forced labor in Xinjiang Province, China. H&M stated that they would not source products from the region (H&M Group, 2020b). This led to backlash in China, with e-commerce platforms dropping H&M and state-affiliated media criticizing the brand (BBC, 2021). In March 2021, H&M released a new statement which described how China "*is a very important market*" (H&M Group, 2021b). Q2 2021 sales in China dropped 23% compared to Q2 2020 (BBC, 2021). Prior to the situation, H&M had reported that China was their fourth largest market in terms of sales. However, after the Xinjiang controversy, China is no longer listed in the top-ten markets that H&M publishes quarterly (Petersson, 2021). Swedish Prime Minister Stefan Löfven commented in March 2021 that it was "*exemplary*" of H&M to stand up for worker's rights, while also noting that "*China is a big and important country*" (Nyhetsbyrån Direkt, 2021a). In July 2021, reports emerged from Spanish news outlet EFE that H&Ms sponsorship negotiations with football team FC Barcelona had ended due to the turbulence emerging from the sourcing decision in Xinjiang, China (Nyhetsbyrån Direkt, 2021c). In March 2022, H&M Group still had no access to Chinese e-commerce platform Tmall. CEO Helena Helmersson noted that: "*We have still not returned to the desired level of sales, but we continue to view China as an important market for us*" (Wande, 2022b).

The balancing act that H&M have to perform between the different expectations of various stakeholders. "*It is very complex to have customers and partners all over the world, it is a tough balancing act*" (HM1). The following passage can be found in the Annual Report of 2021: "*H&M operates in many markets that have different challenges, and where laws, environmental requirements and social conditions may differ, why acting consistently and with a strong ethical compass is necessary*" (H&M Group, 2022a, p39).

5. Analysis

In this section, we will relate our findings to our conceptual framework and review of the literature, as presented in Chapter 2. The subheadings follow the structure of our conceptual framework. At the end of this chapter, a revised conceptual framework is presented, based on our insights from our empirical observations.

5.1 Analysis of 'Risk Preparation'

In terms of preparatory efforts to manage disruptions in supply chains, the collected data indicates that the activity is integrated in MNCs risk management processes. Naturally, the measures differed between Volvo Cars and H&M, an effect we believe can be explained by aspects such as industry dynamics and business models. H&M Group and Volvo Cars employ different types of supply chains, as Volvo Cars has in-house production of cars, while H&M Group has outsourced all of their production processes. We argue that the reasons for these different approaches stem from differences in industry and products, factors that influence the optimal configuration of a supply chain (Porter, 1986; Dunning, 1977).

A notable confirmation of our suggested conceptual framework was the aspect of capabilities. Employing internal mechanisms in order to mitigate the effects of impending disruptions was found to be a common technique from both examined MNCs. To increase control of the complex and disruptive global environment, both companies described the desire to develop 'control towers' i.e., systems that work as predictive mechanisms to forecast global events. The desire to implement such systems was explained by both companies as a measure to both increase the accuracy of identification, as well as serving as a foundation for optimal preparation and response. We believe that this underlying shift can be explained by the impact that recent disruptive events, such as the Covid-19 pandemic, has had on the operations and profitability of both observed companies.

Since the outbreak of the Covid-19 pandemic, Volvo Cars have changed their attitude towards risk management and are now striving to become more predictive, rather than reactive. By developing 'control towers', Volvo Cars explained that technological advancements can increase their control of the external environment, thus increasing their own ability to manage it. "*We need to stop being reactive, and start being proactive, hopefully even predictive. The technology is there"* (VC1). Similarly, H&M also expressed a desire to increase their

capabilities, to increase their sense of control over their supply chain. This desire has taken the shape in the form of investments into ‘control towers’ with monitoring abilities. We argue that the demand for increased control originates in the fact that both of our observed companies were taken by surprise by the Covid-19 pandemic and the governmental measures that were imposed because of it, with massive financial implications (Volvo Cars, 2022a; H&M Group, 2022a). Although the shapes of the desired ‘control towers’ differs between the companies, we note that the ambition from both MNCs is to increase control over the supply chain. As noted by Christopher & Peck (2004), the supply chain is only as strong as the weakest link and the risk management processes of firms should thus be widened to include factors that go beyond the individual firm.

As previously discussed, the purpose of increasing predictive capabilities, and thus being able to increase the level of preparedness for coming disruptions, are similar between the examined MNCs. As noted by Fiksel et al (2015a), contemporary organizations operating in disruptive environments are urged to develop internal capabilities in order to increase the resilience of the organization. In this instance, we find a clear connection between the ideas proposed by Fiksel et al (2015a), and both examined MNCs. The development of ‘control towers’ from Volvo Cars and H&M could be explained as a desire to increase control of the complete supply chain, in order to gain knowledge and information that can serve as foundations for preparing and configuring the supply chain in a less risk-sensitive manner. The increase of control can be explained by not only the overall enhancement of resilience to the supply chain but also the ambition to predict the future more accurately. Courtney et al (1997) describes how the increase of information and knowledge has the ability to decrease the level of uncertainty for the future, thus enabling decision makers to perform more educated forecasts of possible scenarios. Therefore, the implementation of ‘control towers’ has the potential to increase the level of tangible information for both Volvo Cars and H&M, making them more informed about future scenarios. Not only does the monitoring capabilities increase the odds of more accurately predicting the future, it has in the case of Volvo Cars’ proven fruitful in terms of maintaining their operations lean. As discussed in chapter 4, Volvo Cars control of their supply chain has improved since the outbreak of Covid-19, and it is an approach they are inclined to develop further.

The aspect of control was suggested to be paramount for both examined MNCs. In a pursuit of increasing control of operations, Volvo Cars decided to insource priorly outsourced activities. Quinn & Hilmer (1994) suggest that outsourcing activities should be decided on identifying the organization's core competencies, and outsourcing other activities. Following this reasoning, companies are able to enjoy benefits such as economies of scale and a more efficient utilization of resources. However, it is also brought to attention that strategic risks, such as loss of control and loss of skills could hurt the company if the outsourced activity or contracted supplier is not monitored properly. Strange (2020) argues that there is a business case for insourcing activities following the disruptive global environment caused by the Covid-19 pandemic. By regaining control over priorly outsourced activities, the vulnerability of the supply chain could decrease (Strange, 2020). Therefore, we find support in the literature for both companies' push for increasing control, and especially Volvo Cars' desire to insource and reshore activities where control has been lacking. Volvo Cars' decision to insource software development and recruit over 700 engineers to a new Stockholm office (Ek, 2022) can be viewed in this light. It is evident that when severe disruptions disturb the supply chain, our examined companies display a desire to regain control through different approaches.

It has been argued that increasing the 'comfort zone' of the internal organization can have beneficial effects on business performance in uncertain and risky environments (Jensen & Petersen, 2013). On this subject, we observed different, but rather related attitudes between Volvo Cars and H&M that are interesting to compare with the literature. H&M displayed a composed attitude towards risk, claiming that rather than avoiding risk, they subject themselves to it as it has been an integrated part of their business models for years. Porter (1986) argues that competitive advantage is won or lost in the industry, which we found indications of throughout our observations of H&M. Even though recent years of disruptions have impacted H&M significantly, we detected a hint of opportunism from H&M, as several of the largest competitors failed to survive the Covid-19 pandemic crisis, consequently offering market shares to H&M. Following the arguments from Porter (1986), the capability of being able to source and conduct business in environments where others opt not to has been argued to be a origin of competitive advantage (Jensen & Petersen, 2013), and there are plentiful indications that the 'comfort zone' of H&M is vast, enabling them to manage disruptions superior to their competitors. "*Our historical strength has not been to mitigate risk, but rather to subject us to it. You do not have a complex and interconnected supply chain*

because it is fun, you do it because you get something out of it" (HM1). Even though our respondents at Volvo Cars displayed a moderately tranquil attitude towards risk, claiming that disruptions are common and something Volvo Cars have gotten used to, we did not find the same level of willingness of risk exposure at Volvo Cars compared to H&M. The administrative heritage of companies, formed by aspects such as organizational history, paths and norms have been found to influence the risk tolerance of organizations (Jensen & Petersen, 2013).

On the aspect of different configurations of the supply chain inviting different degrees of vulnerability, we found some indications of evidence. H&M described the importance of employing a diverse supply chain as it allowed them to manage disruptions relatively better than close competitors. "*What has made us more successful than our competitors is the fact that we employ a diverse supply chain. We have the largest network of suppliers, we have the largest organization, we source from the largest number of countries. We always try to be diversified, because you never know what happens* (HM1). Volvo Cars existing J-I-T processes invites a great deal of risk, as indicated by the effects on operations by the recent disruptive events, such as the Covid-19 pandemic and the blockade of the Suez Canal. Evidence of Volvo Cars vulnerability can be observed in Table 2 in chapter 4, where the production stops at the European manufacturing plants are listed.

Although the possibilities of reconfiguring supply chains in the midst of disruptions are few, indications between supply chain configuration and preparatory efforts were found. Javorcik (2020) argues that diversifying the supply chain has the potential to increase the resilience of the supply chain, while Miroudot (2020b) emphasizes that companies should consider whether or not redesigning the supply will solve the issue. As H&M already operated a diverse supply chain prior to the Covid-19 pandemic, the company could enjoy the benefits in the form of retaining options throughout their supply chain.

Consequently, we identify that there is a link between preparatory efforts and competent supply chain management as suggested in our conceptual framework. However, we restrain from suggesting specific efforts as we found them to be highly industry dependent, and in some cases restricted by forces such as industry dynamics or business models. Instead, we urge managers to consider which types of preparatory activities are most fitting for their

organization, and therefore we revise the conceptual framework accordingly as shown in Figure 7, in chapter 5.6.

5.2 Analysis of the 'Risk Identification'

Both Volvo Cars and H&M Group showed less than anticipated evidence of classifying different types of risk into categories, as is common practice in literature (Christopher & Peck, 2004; Harland et al., 2003; Cavinatio, 2004; Bogataj & Bogataj, 2007). H&M Group displayed degrees of categorization by classifying risks into either external events, or business risks (H&M Group, 2022a). Despite this, the main focus was instead placed on the level of impact of each potential risk, where less attention was given towards labeling and categorizing. This was explained by the importance of speed in decision making, where efforts to categorize risk were deemed less important than evaluating the impact and finding appropriate responses.

Volvo Cars described the usage of monitoring software and predictive algorithms as a desirable way of identifying potential risks, confirming the arguments presented by Betti & Hong (2020) and Miroudot (2020a). Volvo Cars efforts to install tracking devices on shipments throughout the supply chain can be viewed as a means to increase the information available, to make more informed decisions regarding the appropriate response to a specific disruption. H&M Group also discussed the strengths of such tracking devices, as more information combined with more powerful and predictive algorithms could allow for more cost-effective decision making earlier in the shipment processes. We interpret these ambitions from both of our observed companies as efforts to gain access to more information throughout the supply chain, an aspect that has the potential to increase the accuracy of identifying future disruptions, and in turn corporate strategies overall (Courtney et al, 1997).

Interestingly, H&M Group expressed a desire to limit the influence of human interaction in the risk identification process. Based on our observations, we argue that this desire has arisen due to the risk of human bias interfering in the process on previous occasions. As noted by Jensen & Petersen (2013) an individual's perception of a risk is defined as "*the decision makers' assessment of how risky a situation is based on probability estimates*" (p75). Evidence of both of our observed companies strengthen the relevance of human bias, such as this quote by the CEO of H&M Helena Helmersson, "*no one of us thought it* [The Covid-19

pandemic] *would become a world crisis",* or the following quote by the Senior Logistics Manager at Volvo Cars: *"I am almost certain that as things* [The Covid-19 Pandemic] *were starting in Wuhan, no one would have said 'we need to watch out', it would probably have been like 'it will soon be over' or 'it will stay in China'. Here is where I believe that models and projections can be useful*" (VC1). On the same note, H&M expressed a desire to implement algorithms and predictive software, to anticipate and mitigate crises at an earlier stage. Overall, the objective of such developments was argued to be to improve accuracy of the risk identification process. As an illustration to the purpose of predictive software, the issue was described through a metaphor of congested traffic, and how 'control towers' can alleviate in disrupted environments. *"If I am sitting stuck in traffic, it is not because something has happened on the road I'm driving. It is because of a completely separate event, a couple of streets up. That is what's affecting me. In these cases, you want a system that tells you which ways to drive in order to avoid the traffic"* (HM1).

It has been argued that in order to deal with growing complexity and challenges, global supply chains need to be developed into smarter systems, and contemporary advancements in technology and computer science have the potential to pave the way for grand improvements in the utilization of global supply chains (Wu et al., 2015). H&M identified during the first wave of the Covid-19 pandemic that they lacked certain capabilities to properly manage the disruptions. The rapid spread of the pandemic served as an alarm-clock for H&M, who realized that in order to manage the impending disruptions they had to act quickly in developing appropriate capabilities. The acts were explained as a response to the disruptions caused by the Covid-19 pandemic, as well as creating abilities for future risk management. *"Under this period, we noticed that we lacked certain abilities. In the early days of the Covid-19 pandemic, we decided to accelerate these developments.* [...] *Partly to increase flexibility, but also to prepare for future disruptions* (HM2). Due to the extensive disruptions during March 2020, the accelerated capabilities were many, such as the development of logistical nodes within the supply chain. In addition, a desire to automate and develop automated competences within the supply chain was among them.

We argue that both of our observed companies are jaded from the experiences of the pandemic and the disruptions associated with it. Both MNCs were blindsided by the rapidly emerging Covid-19 pandemic and could not foresee its developments and ripple effects and are now readjusting their GSCs after the pandemic has occurred, to great financial costs. By

strengthening risk identification procedures, we argue that our examined MNCs aim to increase their capability to discover potential risks, and potentially even adjust their GSCs *prior* to the next disruption occurring, limiting losses to profitability. In essence, the predictive risk identifiers made available through technology can serve as a tool to "skip" learning-by-doing, towards a sense of learning-before-doing where disruptions do not have to be experienced prior to implementing solutions thereof. We thus encourage future research to evaluate the potential learnings that MNCs can gain from such insights. Naturally, this approach places great confidence in the potential of future technological developments, an aspect that was also nuanced by one of our interviewees of Volvo Cars, who stated that these kinds of algorithms would struggle to foresee complex political movements and social disruptions.

5.3 Analysis of the 'Risk Assessment & Evaluation'

The Covid-19 pandemic and the subsequent government-imposed lockdown measures had caused H&M to reflect on aspects such as "Circle of Control" & "Circle of Influence", implying an analysis of what events that H&M can actually affect as an organization, and what events that H&M should adapt to. We interpret this as evidence of Courtney et al (1997) division of strategy into "*Shape the future, Adapt to the future, or Reserving the right to play*" (p73), where firms judge the situation and the possibilities of affecting the environment. We interpret H&Ms efforts of increasing their capability of redirecting stock between different markets as a sign of "*Adapting to the future*" in Courtney et al (1997) framework, where government-imposed lockdowns could be mitigated by shifting products from the affected market to another, where stores were still allowed to be open. The urgency of this development was arguably strengthened by the fact that during the pandemics peak, over 4,000 out of 4,800 stores were closed (Nyhetsbyrån Direkt, 2022c). It became evident during our observations of H&M Group that the Covid-19 pandemic had been deemed outside the "Circle of Control", which in practice meant that H&M Group adapted their actions accordingly.

Throughout our observations, we find evidence of both Volvo Cars and H&M having evolved as organizations in the face of recent disruptive events, such as the Covid-19 pandemic and the shortage of semiconductors. All interviewees at both companies described valuable lessons learned, such as the importance of speed in decision making, as well as taking

decisions under ambiguous conditions. It was stated how these lessons learned were now being applied to other types of disruptions, and more efficient procedures of disruption management had been implemented. These findings point to experience being one factor that affects the process of MNC reconfigurations of their supply chains, which we interpret as our observed MNCs have witnessed for themselves the vast consequences that disruptions can have on both operations and performance. This finding is in line with previous survey data by Baur & Flach (2022) who finds that firms that had been affected by a disruption were more likely to change their supply chain. We argue that the role of experience can be further emphasized in the SCRM literature, for example by integrating lines of thought from well-known IB literature such as the 'Uppsala Model' of internationalization, which suggests that the internationalization of firms is a learning process, where incremental gains in commitment leads to experience gained, which then leads to further commitments (Johanson & Vahlne, 1977). Put plainly, 'what you have affects what you do, and what you do affects what you have'. In the context of GSCs, incremental experience of volatile supply chains could lead to incremental adjustments of the supply chains in question, which then leads to new, and different experiences. Naturally, the original context of the 'Uppsala Model', which is the internationalization of firm activities, has a vastly different timeframe compared to MNCs management of supply chain disruptions. However, we believe that the overarching notion in the model is relevant for our scope. We thus argue that the process of supply chain reconfiguration is an ongoing process, in a constant state of flux. Our conceptual framework has been revised to reflect this fact, and is presented in its entirety in section 5.6.

Experience was also highlighted on an individual level, where more senior employees could carry out the process of evaluating and assessing a disruptive event faster than junior colleagues, due to having experienced other similar types of events before. The interviewees included in this thesis all have several years of experience within the field, and called upon their learnings on several occasions, such as the Senior Logistics Manager at Volvo Cars. "*Previously it was the Arab Spring. Before that it was Eyjafjallajökull. There are always disruptions, it's a reality we have to live with"* (VC1). We argue that this quote illustrates the process of experience gained through continuous exposure. We interpret this as evidence of what is commonly referred to in the literature as "*tacit knowledge*", defined as "*knowledge that is difficult to transfer to another person by means of writing it down or verbalizing it*" (Asheim, Isaksen, Trippl, 2019, p38). Grant (1996) argues that the transfer of tacit knowledge is "*slow, costly and uncertain*" (p111) and therefore we predict a rise in demand on the labor

market for Supply Chain Managers who have extensive experience of significant crises. Recruiting a veteran supply chain manager may be a more cost-effective way of tapping into situation-specific knowledge, instead of developing it within the organization through experience.

5.4 Analysis of the 'Zone of Balanced Resilience'

Our data suggests that both firms are justifying their increased investments into the supply chain based on a logic of 'bottom line results' where the recent disruptions faced, such as the Covid-19 pandemic and the ongoing shortage of semiconductors have impacted profitability to a large extent. In academic terms, we relate this to Fiksel's (2015b, p101) "*Zone of Balanced Resilience*", where rising vulnerabilities can be offset by increasing investments into capabilities, such as the predictive algorithms discussed earlier. We interpret our findings as evidence that the equilibrium of balanced resilience has in fact shifted and adjusted to a more volatile environment, illustrating that more investments are sound from a business-logic. As an illustration, we list evidence in Table 2 of Volvo Cars factories in both Sweden and Belgium stopping production on multiple occasions, despite their own golden rule of "*production shall never stop*", as described by the Senior Logistics Manager at Volvo Cars. The reasoning for this golden rule was described to be the vast financial implications of halting production. We interpret this as evidence of the severe challenges that the company is currently facing, and it provides further context on how the process of MNCs are adjusting their supply chains.

We find evidence of Volvo Cars taking the effects on financial performance into account when evaluating the appropriate supply chain response to a disruption, both in a historical perspective, as well as during contemporary challenges. As described in our empirical findings, the Eyjafjallajökull Eruption in 2010 had the potential to halt Volvo Cars entire European production, which according to one of the interviewees shaped the size and speed of their response. Regarding more recent disruptions, newly appointed CEO Jim Rowan describes how the Covid-19 pandemic has taught Volvo Cars that they need more robust supply chains, and that they shall invest in order to achieve that. We find the reasoning behind such investments to lie in the effects that supply chain constraints have had on Volvo Cars financial performance. As a consequence of the shortage of semiconductors, Volvo Cars produced around 50,000 less cars in Q3 2021 than during Q3 2020 (Volvo Cars, 2021b).

On the same topic, we observe H&M Group taking a similar stance, as described by one of our interviewees "*You are always mitigating risk against a cost"* (HM1). H&M Group described how resilience could be achieved in their GSCs by maintaining several parallel routes of transportation, but that this increased resilience had to be weighed against the erosion of profits that arise due to costs of maintenance, as well as opportunity costs having resources on standby. Throughout our empirical observations, we find strong evidence of the validity of Fiksel et al (2015a) 'Zone of Balanced Resilience', where investments into capabilities have to be weighed against the erosion of profits. Our interviewees discussed this interlink at length, and we encourage future research to utilize the model to a greater extent going forward.

Additionally, we observed evidence of Volvo Cars taking aspects of the 'Zone of Balanced Resilience', as defined by Fiksel et al (2015a) into account when determining which areas of the supply chain that are more reasonable to strengthen from a return-on-investment (ROI) perspective. Volvo Cars described how their team of experts that is responsible for solving supply chain related emergencies, the "*Special Forces*" team, does not concern itself with the activities of the outbound supply chain. Rather, this team only focuses on the inbound supply chain. Volvo Cars described how this decision had been made due to the fact that shortages of supplies and holdups in the inbound logistics have massive financial consequences, as staff and production had to be halted. Issues related to outbound logistics on the other hand "only" had consequences in terms of delivery to the end customer, which has much less impact on 'bottom line results'. We argue that this finding nuances the contemporary discussion on supply chain management and the capacity & resilience building efforts and that firms should consider which parts of their supply chain which are truly crucial, on a more fine-grained level. We argue that firms should target low-hanging fruit first, and invest into areas of the supply chain that makes the most sense from a business- and product specific perspective. This difference in ROI of supply chain resilience for the outbound- and inbound supply chain has, in our view, not been thoroughly discussed in the literature. We accredit this insight to our abductive research process, which aims to combine insights from both academia and industry to facilitate understanding on a deeper level.

5.5 Analysis of the ‘Measures’

Throughout our observations, we found evidence of both our case companies adjusting their supply chains and implementing mitigatory measures. Volvo Cars discussed a movement away from the fully globalized supply chains that are currently commonplace in much of international business, as described in Chapter 2. In Volvo Cars’ Annual Report of 2020, we identify the strategic goal of “*Building where we sell, and source where we build*” (Volvo Cars, 2021a). A desire to shift to a more regional-based system of supply chain was expressed, as the volatility and risk exposure of the global supply chains was deemed to be too high to be compatible with the vulnerable JIT production systems of Volvo Cars. We interpret this as evidence of the arguments presented by Ciravegna & Michailova (2021) and Javorcik (2020), where stable environments are portrayed as a precondition for the extensive global supply chains. In terms of UNCTAD’s (2020) ‘Four Pathways’ of international trade, we find that Volvo Cars follow the path of “Regionalization”, with indications of “Near-shoring” as well, based on the decision to build a new battery factory in Gothenburg, as well as the decision to insource previously outsourced software development to Stockholm.

H&M on the other hand favored maintaining current global structures, as it was described how the complex network of suppliers was deemed as a key component of their competitive advantage. A key distinction here between H&M and Volvo Cars is that they do not produce their own products, instead they source them from their extensive supply chain (H&M Group, 2022a). In relation to UNCTAD’s (2020) ‘Four Pathways’, we find evidence of H&M pursuing the path of “Diversification”, as it was argued during our interviews that being truly global serves as a hedge against risk, as options for alternative action are maintained. In practice, this means that H&M can turn to other suppliers if one is affected by a disruption. These observations are in line with researchers such as Mirodout (2020a), Contractor (2021) and Strange (2020), while also strengthening the relevance of Courtney et al’s (1997) idea of “reserving the right to play”.

Throughout our observations, we found multiple indications of limitations to popular recommendations to build a resilient supply chain, such as “Regionalization”, “Near-shoring”, “Diversification”, “Replication”, or “Stockpiling” (UNCTAD, 2020; Strange, 2020). For example, Volvo Cars described how economies of scale was a constraint

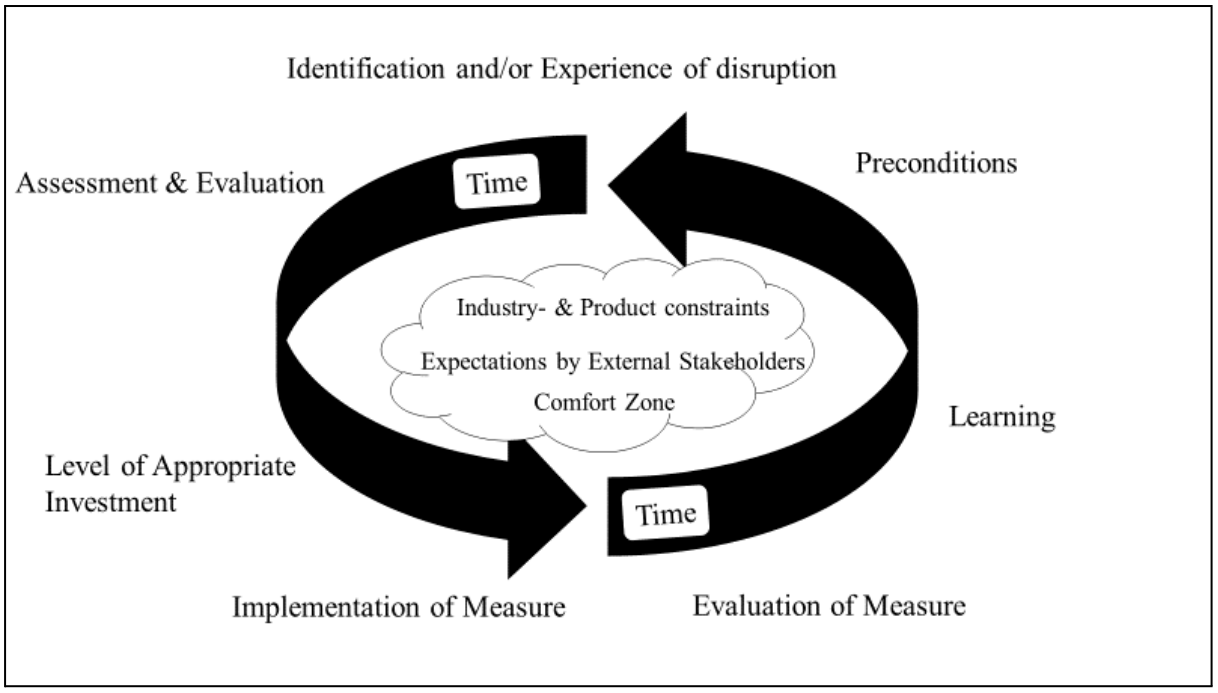
to their ambitions to regionalize their supply chains, as a regional approach involves an increased amount of production sites. Subsequently, we can achieve greater understanding of Volvo Cars strategic goal of doubling sales volume to 1.2 million vehicles by mid-decade. This connection between achieving a more regional supply chain and increasing sales volume was confirmed during our interviews with Volvo Cars. In addition, we observed how Volvo Cars insourced the complex activity of 'megacasting' of aluminum, since the suppliers available did not have the financial strength to carry out necessary investments. This observation challenges the feasibility of "Diversification", as the constraints placed by technological specificity may force companies to carry out activities by themselves, as opposed to utilizing a larger set of suppliers, as recommended by advocates of diversification (Miroudot, 2020a). H&M on the other hand described how "Near-shoring" production back home to Sweden would be "impossible" due labor market characteristics and raw material access. Finally, H&M discussed how their products run on a short product life cycle (Vernon, 1966), which placed constraints on their possibilities to maintain storage, questioning the feasibility of "Stockpiling" as a means to reduce risk in their supply chain, as argued by Miroudot (2020a). These aspects illustrate that firms need to evaluate these broad recommendations based on their industry and product context.

Both Volvo Cars and H&M showed indications of adjusting their supply chains based on the expectations of external stakeholders, as well as taking into account such expectations when employing supply chain related measures. Volvo Cars described how a more regional based supply chain will aid in reducing carbon dioxide emissions (Volvo Cars, 2021a) and how they refrain from shifting transportations from sea to air unless absolutely necessary, as they have "*environmental obligations as well*" (VC1). In addition, H&M pledged to pay suppliers for orders that had been canceled, even as demand for their products was plummeting, stating that it was important to act sustainable towards their partners (Mirdha, 2020). We relate this aspect to arguments by Javorcik (2020) who argues that firms will increasingly adjust their supply chains based on external stakeholders, such as shareholders and ratings agencies. We argue that these groups of external stakeholders span beyond the financial sector, to also incorporate broader groups of stakeholders, such as the general public. H&Ms decision to stop sourcing from the Xinjiang Province, China, and the backlash that followed, indicate the interconnectedness of societal expectations and global supply chains.

5.6 Revised Conceptual Framework

In this section, we will introduce our revised conceptual framework. The conceptual framework is designed as an illustration of Volvo Cars and H&M's supply chain reconfiguration process. The framework also serves the purpose of summarizing our key findings. The original conceptual framework can be found in section 2.8. The reasons for alterations are discussed below and based on the analysis of our empirical findings. An explanation of the layout is provided.

Figure 7 - Revised Conceptual Framework of the Supply Chain Reconfiguration process



Source: Own illustration. Inspired by Johanson & Vahlne (1977) & Manuj & Mentzer (2008), Fiksel et al (2015a).

The most notable difference in this revised framework compared to the original framework is the emphasis given to the continuous efforts of MNCs to progress, now illustrated by the loop-shaped design of the framework. As discussed in our analysis section, we find that the process of supply chain reconfiguration is continuous within MNCs, that is in a constant state of flux. This builds on the aspect of the 'Uppsala Model' by Johanson & Vahlne (1977) and their process of incremental internationalization. Our ambition with this new framework is to stress the importance of iteration within the supply chain design. The relevance of this factor was strengthened in our observations of both H&M and Volvo Cars, as implemented measures were designed to handle both current and future disruptions.

A significant difference in the revised framework is also the coupling of identification of a risk or disruption, and the experience of one. In our empirical observations, both of our surveyed MNCs expressed how they did not foresee the pandemic, nor the ripple effects that followed. Rather, they opted to reconfigure their supply chains after experiencing the effects. Interestingly, both of our surveyed MNCs expressed a desire to break this pattern, and shift towards a more proactive and predictive approach, throughout the usage of technological developments in the form of predictive algorithms (Betti & Hong, 2020). We interpret this as a means to gain access to learning and experiences of disruptions, without necessarily suffering the consequences thereof. Based on these indications, we opt to portray this shift by combining the identification of a risk and the experience of one into the same factor. We call on future research to validate the extent to which this is feasible. The initial conceptual framework found in chapter 2.8 included a moment of risk-classification during the identification phase of the framework. However, as we found that the interviewed supply chain managers did not see the relevance of classification, we decided to remove the factor. The importance of speed in decision-making was discussed by our interviewees to be one of the reasons for not conducting classifications, which strengthens the decision to omit the factor in the revision of the conceptual framework.

Beyond the obvious difference of the loop-shaped design, ‘Evaluation of measures’ and ‘Learning’ are new factors that are introduced in the revised conceptual framework. The reasoning for inclusion is the empirical observations of our two case companies, where experience and learnings played an important role in the process of supply chain management. The revised framework also introduces the new factors in the center of the figure. These factors are ‘Expectations by External Stakeholders’ (Javorcik, 2020), ‘Industry & Product specific constraints’ (Porter, 1986), as well as shifting ‘Comfort Zone’ (Jensen & Petersen, 2013) from a preparatory factor to the center of the figure. The goal of placing these three factors in the middle is to indicate that they permeate the entire process. The external stakeholders aspect was included as it became evident in our empirical observations that external stakeholders, ranging from financial institutions to the general public, all play a role in affecting the GSCs of MNCs in the contemporary landscape. Our interviewees described how both policymakers and consumers are placing greater emphasis on practices such as ‘sustainable sourcing’ and demand an increasing amount of transparency from businesses. Recent initiatives by H&M to refuse suppliers that have on-site coil boilers should be viewed in this light. Similarly, Volvo Cars described how one of the reasons for striving for a more

regionalized supply chain is to limit the carbon dioxide emissions that arise from transportation. We argue that the interlink between societal demands and supply chain configurations is still in its infancy, with an increasing amount of attention being granted to the subject.

Regarding the industry- and product specific constraints, our logic for inclusion into the framework is based on the numerous observations collected where both of our surveyed companies disregarded popular recommendations for resilience building, based on the constraints placed upon them by their respective industries and products. For example, H&M described how they could not adopt practices such as ‘Stockpiling’, as their products run on a shorter product life cycle, where clothes quickly go in and out of fashion amongst the consumers. Similarly, Volvo Cars discussed the challenges of adopting a ‘Regionalized’ (UNCTAD, 2020) supply chain due to the economies of scale, as higher total sales volume is required to justify multiple sites of production. Our ambition of including this factor into the framework is that managers and researchers alike will to a greater extent consider the firm's context before implementing recommendations that risk being unsuitable.

Throughout our data collection, we found aspects of the ‘comfort zone’ (Jensen & Petersen, 2013) affecting the entire supply chain management process. We have thus decided to extract the factor from the preparatory step as it were in our original framework, and to insert it as a permeating factor in the revised framework. The perception and tolerance of risk was found to affect other factors as well, such as the level of investments and which measures to implement. For instance, the decision to pursue a regionalization of global operations have substantial implications for the business model and industry. We argue that conducting these sorts of important decisions are affected by the risk tolerance of managers, hence the revision of the factor. Furthermore, as the shape of our framework has been altered to a loop, implying that the process is continuous, we can assume that the ‘comfort zone’ of both the organization and individual employees is altered throughout the process. Enduring a severe disruption of the proportion of the Covid-19 pandemic, the perception of risk is likely to modify the size of the ‘comfort zone’ (Jensen & Petersen, 2013). This would imply that future supply chain risk progress is affected by the expanded ‘comfort zone’.

The last notable difference between the two presented conceptual frameworks is the change in name of the preparatory step. Given the severity of recent disruptions, as well as the

collected empirical evidence, we are able to conclude that these sorts of events are near impossible to prepare for (Courtney et al, 1997). Therefore, the name ‘preconditions’ offer a more representative interpretation, as it involves the conditions a MNC enters a crisis with. Furthermore, we have through our analysis discovered that the reasons to configure the supply chain, or develop certain capabilities within the organization stretch beyond factors of risk to the supply chain. Hence, the adjustment of the name.

6. Conclusion

This chapter summarizes our analysis of the empirical observations of Volvo Cars and H&M Group, gathered in order to answer our research question "How does the process of reconfiguring global supply chains of MNCs unfold following severe disruptions?". Below, we relate our findings to earlier research, and the implications for both managers and researchers. Limitations of the thesis, and suggestions for future research are discussed.

Throughout this thesis, we attempt to answer the question "*How does the process of reconfiguring global supply chains of MNCs unfold following severe disruptions?*". By conducting a multiple case study examining the processes of Swedish MNCs Volvo Cars and H&M Group, we find that the process of supply chain reconfiguration at the observed companies unfolds in a continuous pattern. Based on our observations, we argue that incremental adjustments of the supply chain follow incremental experiences of disruptions. The process is characterized by the issue of balancing resilience and the erosion of profits, and is permeated by several factors, such as industry dynamics, external stakeholders, and the comfort zone of the organization.

The increasing interconnectedness of global trade has increased the sensitivity and vulnerability of global supply chains, an issue that has culminated following the recent years of severe disruptions in global supply chains, spurring academic interest. While several studies have examined the shape of reconfiguration of global supply chains and the reasons for the change, we found a lack of research on how the process of supply chain reconfiguration unfolds. We argue that the research topic can be developed by combining insights from various fields, such as *Supply Chain Risk Management*, and *International Business*. Based on our observations, we find that the SCRM literature can be complemented by IB literature, with insights from the 'Uppsala Model' (Johanson & Vahlne, 1977) which argues that the internationalization of firms is a continuous process. We argue that this line of thought can be integrated into the SCRM literature, as we observe indications that the process of reconfiguring supply chains also unfolds in a continuous process.

Earlier research in the field of global supply chain risk management had called for an increased utilization of case studies to understand the underlying phenomena and drivers of the process of reconfiguration (Fiksel et al, 2015a; Fiksel et al, 2019). A first conceptual

framework of how the process of reconfiguration of global supply chains was constructed based on the review of the literature, as well as through a pilot study with AP-Møller Maersk, one of the world's largest freight carriers.

Following the construction of a conceptual framework, we confronted the theoretical foundations on experienced supply chain managers of Swedish MNCs H&M Group and Volvo Cars, based on their conducted efforts to mitigate the effects of the recent years of severe disruptions to supply chains. The collected data was filtered through the lens of our established conceptual framework, and organized through the processes of theoretical coding and thematic analysis (Bell et al, 2019). We observe that the most notable factor of the supply chain risk management processes between our examined MNCs is the aspect of continuity. Our interviewed managers possess a great deal of experience among them, and all described how the global landscape is characterized by various degrees of disruptions at all times. Consequently, the efforts to manage them are continuous, and a great deal of learning and development is incorporated in the process. This finding made us reevaluate the shape of our original framework (chapter 2.8), which was later revised into the shape of a loop (chapter 5.6). As discussed earlier, the reasons for the loop-shaped design build on the ideas of Johanson & Vahlne (1977), as we find that the risk management processes of Volvo Cars and H&M are characterized by incremental steps, and the importance of iteration is emphasized. By illustrating the process of reconfiguration of supply chains as a continuous process, we aim to convey to the reader the importance of experience and learning.

Another major finding was the applicability of the theories proposed by Fiksel et al (2015a) regarding the difficulty of finding appropriate balance of directed investments toward risk management. Known as the *"Zone of Balanced Resilience"*, (p85) the concept refers to the issue of investing the right amount of resources, without eroding potential profits too much. The interviewed managers in this thesis all confirmed the issue, and reflected upon how difficult trade-offs characterize the entire process. An interesting finding on this subject is the fact that bottom-line financial results were found to be the foundation of all decisions, and that building resilience within the supply chain is constantly weighed on potential impact on profitability.

Following our discovered findings and analysis, we are comfortable with our research question being answered, thus accomplishing the purpose of the thesis. In concluding

remarks, we find that the process of reconfiguring supply chains following severe disruption unfolds in a continuous fashion, and is characterized by a trade-off between investments and resilience. We argue that the process is permeated by factors such as industry- and product specific constraints, the comfort zone of managers, as well as the expectations from external stakeholders that influence the progress.

6.1 Limitations

As discussed in chapter 1.4 “Delimitations”, this thesis concerns the processual patterns of supply chain configuration of two Swedish MNCs, Volvo Cars and H&M Group. The thesis is also delimited to a time period of 1st of February 2020 to 1st of May 2022. These delimitations naturally result in limitations regarding the external validity (Bell et al, 2019) for our thesis, which will be discussed in this section.

The degree to which our findings are generalizable is low. This stems from the fact that our research design follows the case-study approach, where we are more interested in delving deeper into the specific context of our selected cases, rather than generalizing our findings on other scenarios. Despite this, we would not be surprised if our findings were indeed valid in other settings too, given that we interviewed knowledgeable respondents at two major MNCs who find themselves in the midst of supply chain reconfigurations. However, we call upon future research to investigate whether the pattern of continuous iteration of supply chains holds true on a broader level.

6.2 Implications for Future Research

As discussed in the limitations section, future research could empirically validate the degree to which our findings are applicable to other contexts. Researchers are invited to both carry out qualitative research with other cases, and quantitative research with broader and longer data sets to investigate if the continuous process of supply chain reconfigurations holds true in other contexts.

One of our more notable findings in this thesis is the indications of MNCs attempting to skip the step of experiencing a disruption before implementing a solution thereof, by implementing technological advancements in the form of predictive algorithms and monitoring software. In essence, these advancements could enable MNCs to access

knowledge about a disruptive scenario before it unfolds, allowing the MNC to bypass the learning-by-doing process, towards a learning-before-doing notion. We call upon future research to evaluate the degree to which such tools will allow firms to truly generate valuable knowledge. The approach places great confidence in the potential of technology, and we find that both of our observed MNCs are in the midst of evaluating and implementing such tools. As such, research on whether sophisticated forecasts can replace hands-on experience is invited.

In addition, future research could further investigate the extent to which industry- and product specific constraints impact the feasibility of certain resilience-building measures. In this research area, we argue that SCRM literature and IB literature can be fruitfully combined, to form a more holistic view of what drives the processes of change at contemporary MNCs. In this thesis, we found that aspects such as a product's life cycle limits the feasibility of 'Stockpiling' , a popular recommendation to increase resilience in supply chains. Similarly, we found that efforts to 'Regionalize' the supply chain were limited by economies of scale, as sales volume had to be increased to support more sites of production. 'Diversification' was limited by the availability of suppliers, and 'Near-shoring' limited by the local factor endowments of markets. We suspect that managers of MNCs find themselves in a myriad of recommendations and advice as to how to best proceed in this contemporary volatile environment, and research that questions and provides nuance to these popular recommendations could be of value both to researchers and MNCs alike.

6.3 Implications for Managers

As illustrated in this thesis, the process of reconfiguring global supply chains is a complex issue, with a multitude of factors that are affecting the outcome. We urge managers to consider their industry- and product constraints before deciding upon which resilience measure to implement in the face of rising volatility to supply chains. Popular suggestions, such as 'Stockpiling' and 'Near-shoring' are limited by aspects such as the life cycle of a product and the access to labor and raw materials.

Throughout the reconfiguration process, we encourage managers to evaluate investments into the supply chain based on 'bottom line' results, where the capabilities gained through investments are related to the erosion of profits of said investments. This notion can be

applied on a more fine-grained level of the supply chain, where managers are encouraged to divide their supply chain into different segments, and target those with the highest ROI of increased capabilities.

We recommend managers to embrace the concept of continuous learning and the value of experience. Based on our observations, we find that the process of reconfiguring supply chains unfolds as a continuous process, with multiple iterations between implementation and learning. Firms wishing to tap into this knowledge without necessarily having the means of developing it by themselves are encouraged to investigate the possibility of recruiting veteran Supply Chain Managers, whom we believe will increase in relevance in corporate management going forward.

Finally, our observations indicate that there may be value in developing predictive capabilities regarding how supply chains will be affected through algorithms and data processing models. These predictions could serve as a way for firms to play out disruptive scenarios before they occur, allowing firms to gain access to knowledge beforehand and adjust accordingly, breaking the cycle of reactive configuration, towards a more proactive approach.

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Appendix 1 - Interview Guide

Preparatory Efforts

- Do you prepare for disruptions to supply chains?
- Do you prepare for a specific type of disruption, or for disruptions in general?
- Has disruptions increased since the breakout of the Covid-19 pandemic?
- Do you compare your global supply chain to your competitors?

Identification & Assessment Efforts

- How do you work with identifying external disruptions?
- How do you work with identifying internal disruptions?
- Has this process of identifying disruptions changed in recent years following the increase in disruptions?
- Do you grade the level of severity of disruptions?

Zone of Balanced Resilience

- Is there a risk of investing too much resources on preparatory efforts, compared to committing resources once the disruptions occur?
- Do you spend much resources on avoiding disruptions?
- What do you think of the financial investments related to increasing resilience in the supply chain?
- Has the level of investments into the supply chain changed since the outbreak of the Covid-19 pandemic?

Risk Mitigation Efforts

- What actions do you take when a disruption occurs?
- Since the breakout of the Covid-19 pandemic, have you taken any measures to alter or adjust your supply chain?
- Do you have any examples of measures implemented that were more and less effective?
- Has the Covid-19 pandemic changed your internal work process, regarding global supply chain management?
- Are there any specific capabilities that you aim to strengthen?

General Insights / Future of Supply Chains

- What do you think of the future of Global Value Chains?
- What do you think about technological improvements to aid supply chains?
- Have you had discussions regarding the level of outsourcing versus in-house production in the context of increasing disruptions?
- How do you consider external stakeholders in your supply chain configuration?