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The Just-in-Time inventory philosophy in global value chains:
Its state, weaknesses and implications in times of modern crises

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Abstract - English

This thesis examines the functionality of the Just-in-Time (JIT) principle in global value chains (GVCs) of the garment sector. It assesses JIT's ability to adjust to modern crises, such as the COVID-19 pandemic, the war in Ukraine, and climate change, by analyzing expert interviews and academic and corporate documents. The results show that JIT enables efficiency and cost control, but also that its lack of resilience to external disruptions is a structural weakness. Companies are adapting their strategies and combining JIT with nearshoring, digital technologies, and minimal buffers. Nevertheless, challenges remain, such as supplier reliability, digitalization, labor exploitation, and environmental risks. In summary, the thesis asserts that garment brands must reassess their JIT strategies by integrating flexibility, risk management, and ethical sourcing into their future supply chain approach to stay competitive and sustainable.

Abstract - Deutsch

In dieser Arbeit wird die Funktionsweise des Just-in-Time-Prinzips (JIT) in globalen Wertschöpfungsketten (GVCs) des Bekleidungssektors untersucht. Sie bewertet die Fähigkeit von JIT, sich an moderne Krisen wie die COVID-19-Pandemie, den Krieg in der Ukraine und den Klimawandel anzupassen, indem sie Experteninterviews sowie akademische und Unternehmensdokumente analysiert. Die Ergebnisse zeigen, dass JIT Effizienz und Kostenkontrolle ermöglicht, aber auch, dass ihre mangelnde Widerstandsfähigkeit gegenüber externen Störungen eine strukturelle Schwäche ist. Die Unternehmen passen ihre Strategien an und kombinieren JIT mit Nearshoring, digitalen Technologien und minimalen Puffern. Dennoch bleiben Herausforderungen bestehen, wie z. B. die Zuverlässigkeit der Zulieferer, die Digitalisierung, die Ausbeutung von Arbeitskräften und Umweltrisiken. Zusammenfassend lässt sich sagen, dass Bekleidungsmarken ihre JIT-Strategien überdenken müssen, indem sie Flexibilität, Risikomanagement und ethische Beschaffung in ihren zukünftigen Lieferkettenansatz integrieren, um wettbewerbsfähig und zukunftsfähig zu bleiben.

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1. Introduction

The implementation of the Just-in-Time (JIT) method into global value chains (GVCs) has emerged as a critical operational strategy since the 1970s (cf. Keller & Kazazi 1993; Albino & Garavelli 1995; Jagan Mohan Reddy et al. 2021). Starting in the automotive sector, it has also spread to other industries such as the garment sector due to its benefits. JIT is a production and supply system designed to manufacture and deliver goods when they are needed, in the exact quantities required, and with minimal waste. It aims for constant improvement and efficiency by functioning as both as an operational method and an economic philosophy. This approach is primarily driven by lead firms within global value chains, emphasizing the importance of timely production and delivery while minimizing excess inventory. For instance, streamlining inventory management, aligning production with demand, reducing waste and costs, and improving efficiency are principles.

JIT relies on a stable economic environment. To improve efficiency, JIT reduces buffers and flexibility. If storage inventories hold low stock of necessary materials, subproducts, or complete products, any kind of delay in one part of the chain can cause major disruptions downstream. The lack of resilience is a vulnerability that can affect and compromise all links and parts of the chain, from sourcing over production to transportation and finally sales. Modern crises challenge the necessary economic stability and consequently bring this structural weakness of chain structures that use JIT to the forefront. Albino & Garavelli and Raza et al. state that such breakdowns may be triggered by large orders, demand shocks or supply shocks, material shortages, political or social unrests, wars, strikes of the workforce, natural disasters, etc. (cf. 1995: 71-72; cf. 2021: xi). The COVID-19 pandemic, shipping disruptions in the Red Sea, the war in Ukraine, and climate-related events like floods or heatwaves illustrate recent examples of these crises with disruptive consequences beyond local reach. All these events have disrupted JIT. Occurring consequences for the global economy are inevitable and their magnitude is often unpredictable (cf. Canuto 2020; Jiang et al. 2021; Keane et al. 2020; Pisch 2020). While the demand for some goods is shrinking substantially and thus is causing demand shocks, other goods are requested in higher amounts which leads to supply shocks during such events. These economic implications influence links of GVCs negatively, since, for example, orders may fluctuate between being cancelled entirely or placed in overwhelming quantities – either extreme might affect the labor force directly as well (cf. Anner 2020: 3; Brakman et al. 2020: 3). The workers could face a substantial increase or decrease in working hours or even work loss. Therefore, the lacking resilience of JIT can have dire consequence for the weakest member of a chain, the workers that are often located in the Global South.

The mentioned crises expose the vulnerabilities of the JIT strategy and can lead to disruptions for GVCs. The consequences can have economic, social, and environmental implications. This study presents the status of JIT and its performance during modern crises over the last decade. The focus lies upon the vulnerabilities of JIT within GVCs and their possible consequences for the whole chain.

The illustrated case of Just-in-Time in global value chains and the consequences for chains in times of modern crises lead up to the following research questions:

How does the currently implemented form of the Just-in-Time method of global value chains in the garment sector perform in times of modern crises?

Has JIT to change, evolve or even be replaced by alternatives?

What role do alternative strategies (e.g., nearshoring, diversification, digitalization) play in strengthening JIT resilience?

How do JIT systems affect labor rights, supplier dynamics, and environmental sustainability across GVCs?

A qualitative research design combines secondary data with expert interviews to answer these questions. The interviews provide industry-specific insight into how JIT operates in different settings and organizational levels. The supplementary data provide a further useful comparative angle that identifies differences between companies and independent research and policy agendas. This provides a concrete understanding of JIT and how it can evolve or transform in the garment industry, where mere efficiency is no longer sufficient.

1.1. Motivation

JIT is rarely questioned in global economics. Even when its lack of resilience gets exposed repeatedly due to disruptions it is only criticised during the time of malfunction but rarely gets examined or challenged (cf. Choi et al. 2023; Pisch 2020). It seems to be untouchable since it improves efficiency and consequently profitability during times of stability. Disruptive crises represent rather short-term inconveniences that could be solved with temporary solutions or workarounds. Nevertheless, the lack of resilience of JIT is rarely discussed as a structural weakness that will be brought to the forefront more often in the future, especially due to the increasing frequency and intensity of extreme weather events caused by climate change.

The garment sector presents itself as a fitting addition for a specific sector focus, especially with the emergence of (ultra) fast fashion. Here the social component is also a factor due to ethical concerns. Cost-driven efficiency and the exploitation of labor in low-cost sourcing regions have always been an issue (cf. Anner 2020). Therefore, this research is motivated as well by the desire to assess whether JIT systems can be modernized and meet today's economic, social, and environmental challenges.

1.2. Relevance for International Development

This research is relevant to the field of international development as it analyses how the vulnerabilities of JIT impact GVCs and their workers and suppliers in the Global South. Many garment production sites are based in the Global South, e.g. in Bangladesh, Vietnam, Cambodia, etc. These countries are crucial for supplying Western markets, but they face challenges such as poor infrastructure, weak labor protections, and risks from climate change (cf. Adidas 2024, 81, 180-184; Anner 2020; Labour behind the Label 2023).

This thesis adds to the discourse of ethical globalization, inclusive trade, and pro-poor industrial policies by analyzing the effects of JIT on GVCs and consequently on workers, supplier relations, and purchasing decisions (cf. Coveri & Zanfei 2023, 84-85; Judd & Jackson 2021; Jiang et al. 2021, 174-176; Malacrino et al. 2022;). Furthermore, the power relations between global brands and local suppliers are addressed. This research also shines a light on how modern crises intensify inequalities and advocates for more openness in regard to business practices prioritizing resilience, sustainability, and worker protection. Overall, the study tries to bridge chain structure design and labor rights, climate justice, and global production network governance.

1.3. Case study selection

Global Value Chains represent a field of research within the studies of International Development. JIT became a fundamental approach of GVCs that is intertwined with all their steps and linkages. In the case of transformation of or adaptations to JIT, the whole scientific field of GVCs would be affected. All linkages within the chains could face changes and lead to consequences. Subsequently, subfields of GVC research would be affected as well, e.g. workers' rights, policy making, power structures, etc.

Significant studies and papers were conducted on the history of the garment sector and garment GVCs (cf. Anner 2020; Fernandez-Stark et al. 2011; Rosen 2002). This sector is already well researched in the field of GVCs. Therefore, a basis of knowledge and data can be provided to display the necessity of this research. The garment industry faces challenges in controlling production costs and reducing

non-value-added activities. The implementation of modern tools and techniques, such as JIT, is seen as crucial for minimizing waste, reducing errors, and ultimately achieving cost minimization and competitive advantages. As an example, the application of JIT techniques in the sewing sections of garment factories can be named. Defects in the sewing process, which hinder overall productivity, can be identified and therefore present potential for improvement.

Garment GVCs constitute a dynamic field that adapts quickly to adversities and inherits fast production cycles. The importance of Just-in-Time techniques is immanent for the garment sector, particularly in countries like Bangladesh. Karim and Parveen et al. detected significant improvements in productivity and efficiency after the implementation of JIT techniques, suggesting that this method can effectively enhance operational performance in the garment sector. JIT is crucial for the garment sector because it enables on-time delivery with quality and in quantity, which are essential for meeting customer demands in an industry, where lead times are decreasing and customer requirements are continuously changing. By reducing defects and optimizing production processes, JIT helps garment manufacturers improve productivity, efficiency, and overall competitiveness in the global market (cf. Karim 2019; Parveen et al. 2019).

Furthermore, research on JIT in garment GVCs is conducted to improve operational efficiency, reduce costs, enhance product quality, optimize supply chain management, and promote sustainability within the garment industry. This research aims to understand how JIT principles can be effectively applied within garment GVCs to minimize waste, maximize efficiency, and improve overall performance. It explores the cost implications, quality improvements, supply chain relationships, and sustainability aspects of implementing JIT practices in the garment industry. Ultimately, research on JIT in garment GVCs seeks to drive innovation and competitiveness while ensuring environmental and social responsibility (cf. Parveen 2019).

People are confronted with it in some way in everyday life, since fashion is omnipresent in shops, news, social media and in the streets. Social responsibility is prevalent since a significant amount of people are involved in this industry as cooperate stakeholders, policy makers, members of organisations or unions, researchers or workers on every level of the chain, from material sourcing over fabrication to sewing and finally promoting and selling. All these mentioned components and groups of people could face changes, if the current form of JIT is deemed to be insufficient to meet the modern challenges.

This thesis is based on the theoretical framework that defines the central concepts of GVCs in the garment sector and JIT. The background adds a typology of crises to categorize the different kinds of disruptions and their effects, followed by alternatives to JIT. The theory and typology build the

foundation of this research. Followingly, a chapter gives insight into the methodological approach, including its empirical design, methods and field access. Afterwards the key results and findings are presented, followed by the conclusion. Finally, a short outlook can provide inspiration for further research.

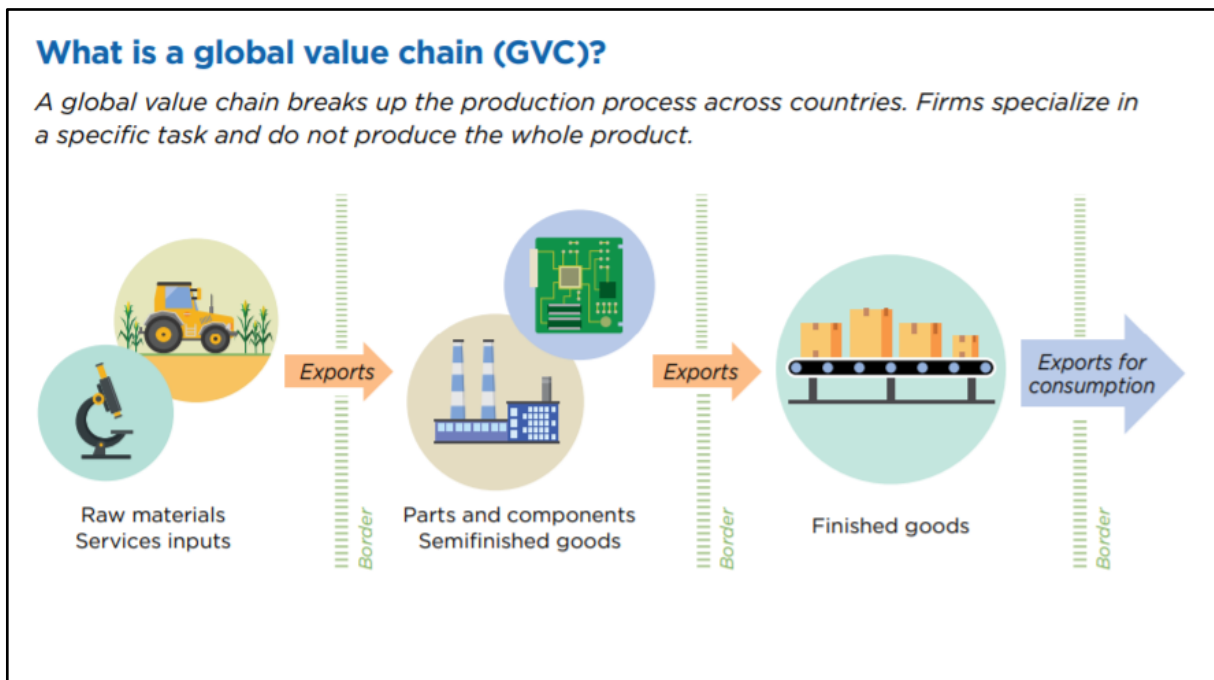
2. Theoretical Framework

Further progress of this work will be based on the following definitions and characterisations. They demonstrate and create the necessary foundation to understand GVCs in the garment industry and the JIT method.

2.1. Global Value Chains and the Garment Industry

Globalisation of trade and financial flows has led to the increase of international trade and foreign direct investment. Today, GVCs are related to about 50% of world export (cf. Lanz & Piermartini 2018: 2). The trade volume of final and intermediate goods is partly due to the emergence of GVCs which implies the fragmentation of production in many steps and their geographical dispersion (cf. Milberg 2004: 51-52). These decisions aim to increase profits and efficiency. Therefore, corporations use the method of outsourcing to exclude specific production steps or even the whole production process from their own activities. Furthermore, companies often transfer these duties and responsibilities to foreign subcontractors at arm's-length by relocating operations to other territories or countries. This method is called offshoring. In other words, every chain link fulfils a specific step of production. Afterwards the intermediate products get transported to the production site of the next link in the chain for further conversion to continue the progression. This sequence adds value by every step and consequently results in a finished product with minimal cost. These intensive cross-border movements are financially sustainable as long as transport costs are not too high, as otherwise this approach would not be profitable and make the whole production scheme inefficient. A simplified portrayal of a GVC definition is given in Figure 1.

Figure 1: *Simplified definition and portrayal of a GVC*



The World Bank 2020

By splitting up production processes and partly outsourcing and offshoring them, the economies of developing countries often participate in manufacturing GVCs. Developing countries offer lower taxes, lower labor cost and looser standards regarding labor rights, social security and environmental protection. Therefore, these countries are economically interesting for companies that want to disperse and relocate manufacturing and assembling activities geographically. These advantages lead to the decision to relocate production steps to these countries to boost efficiency and profitability (cf. Milberg 2004: 49). GVCs also use innovative technologies, efficient transport logistics and trade policy reforms to improve their efficiency and profitability regularly. Furthermore, many GVCs can be characterised as vertical structures. In this form, their hierarchies often consist of a buyer or lead firm at the top that subcontracts (sub-)supplier firms at arm's-length to produce intermediate goods or provide specific services. As Milberg (2004: 55) claims these relations are characterized to some degree by trust which is important „in guaranteeing both reliability of supply and flexibility in responding to exogenous shocks, such as shifts in demand or design”.

The most powerful actors represent buyers and/or lead firms in these structures, due to their ability to choose and switch between suppliers. GVCs have also the capability to connect different levels of the global economy and hence have far-reaching effects on states, societies, and their population: „In effect, GVCs link the macro-level of international trade, investment, and finance with the meso-level of national and regional economies, and the micro-level of local suppliers, communities, and workers” (Gereffi 2020: 289). The United Nations Conference on Trade and Development's (UNCTAD)

definition summarizes the given picture, which portrays the basic structure of GVCs and hence can be attributed to many structures of economic linkages:

„The fragmentation of production processes and the international dispersion of tasks and activities within them have led to the emergence of borderless production systems. These can be sequential chains or complex networks, their scope can be global or regional, they are commonly referred to as global value chains (GVCs)” (UNCTAD 2013: xxi).

The definition of Brennan and Rakhmatullin shall be stated too to portray the constant movements between different links of GVCs and their respective locations:

„Global Value Chains are value chains that can be divided among multiple firms and dispersed across wide swaths of geographic space [...]. GVCs represent the enactment of globalization, which at its heart is about flows: flows of materials, goods, information, knowledge, finance, and people” (2015: 7-8).

Brennan and Rakhmatullin emphasise the spatial sphere of chain links and the fluctuation of movements between them. These factors are focal, since JIT can only be effective if flows between links function mostly steadily and without disruption.

Manufacturing GVCs have an inherent global supply chain (GSC) which constitutes its economic core. It is necessary to present a description of a GSC and therefore for a GVC as well, to lay out its purpose: „[...] the term „global supply chains” refers to the cross-border organization of the activities required to produce goods or services and bring them to consumers through inputs and various phases of development, production and delivery” (ILO 2016: 1). These interconnected systems implement the JIT method to improve their productivity and value. Therefore, the literature regarding GSCs is also relevant to understand the characteristics of JIT and can be applied to elaborate on the characteristics of GVCs and JIT.

2.2. Just-in-Time

To grasp the paradigm of JIT as part of modern life, the complete embeddedness of JIT in global processes should be considered. On the one hand, it is known as economic method to streamline production processes in the most efficient way. On the other hand, we have to keep in mind that JIT has entered our presence via (neoliberal) capitalism and has become part of our current lifestyle. This can be clearly seen in the prevalence of online shopping. JIT allows companies to manufacture products on demand or as per customer order, reducing inventory expenses and maximizing productivity. Customers purchase items online and the retailer forwards the order to suppliers or manufacturers, who then produce the item and deliver it straight to the customer. This efficient process reflects the

values of neoliberalism, emphasizing personal choice and convenience and influencing our consumption patterns towards immediate satisfaction and prompt delivery.

The literature on the economic form of the Just-in-Time principle is broad and diverse. Over time, economic approaches like JIT are implemented in different sectors and different ways. Therefore, also the understanding of JIT can vary, and a universal definition is difficult to propose. In this thesis, the definition of Van Wyk and Naidoo will serve as a summary of the main characteristics of JIT: „JIT is conventionally and intellectually defined as a system for manufacturing and supplying only the goods that are needed, only when they are needed, and in the exact quantities needed, instantaneously, with perfect quality and no waste” (2016: 244). This definition sums up the reasons for and the dynamics of JIT. But the phrase „only when they are needed, and in the exact quantities needed” must be seen from a buyer/lead firm driven perspective in a GVC, which contracts their partners in need of a service. This definition will be contrasted by the Just-in-Case philosophy and other adaptations or alternatives to JIT will be elaborated later on.

Keller and Kazazi and many other economists present a description that references JIT as a kind of economic philosophy: „In a sense, JIT must be understood as a philosophy which [...] is a guide to continual improvement at all company levels” (1993: 4). The label of philosophy is due to the far-reaching influence of JIT which is supposed to find the causes of weaknesses and their solutions on all levels (cf. Keller & Kazazi 1993: 4-5). This desire underlies most companies as well as global value and supply chains because the centre of these chains are lead firms, which implement the JIT principle/philosophy to streamline their production processes. Hence the lead firm can use its power to structure and restructure the composition of the GVC to set up the most efficient combinations and connections of linkages accordingly to the JIT principle by choosing specific suppliers that fulfil the requested expectations (Gereffi et al. 2005: 88).

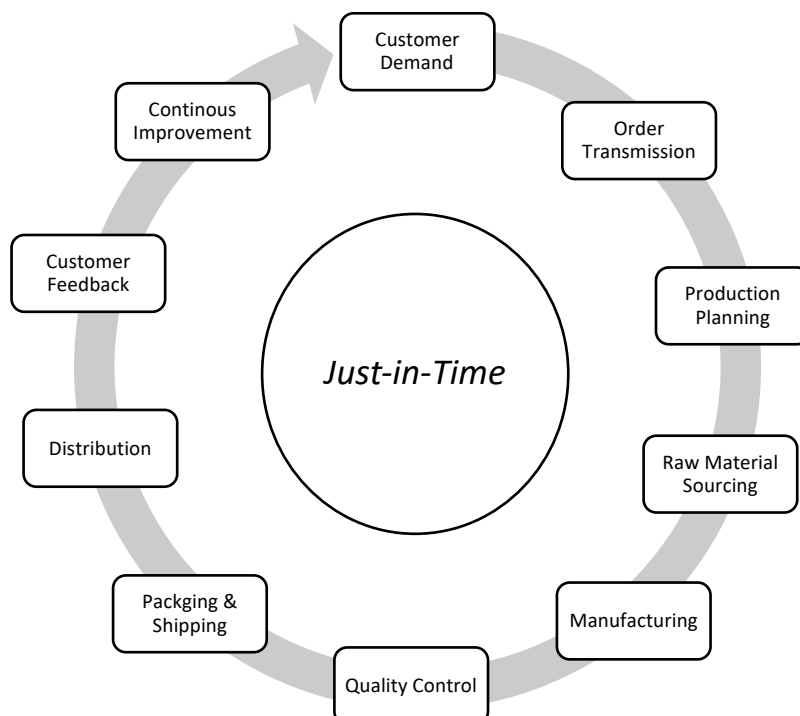
The reduction of waste to a minimum represents a common factor in the production processes and is a basic feature of the JIT philosophy. Based on the text of Ohno from 1982, Keller and Kazazi list numerous scenarios or areas to reduce waste, e.g. overproduction, transportation, processing, storage, etc. (cf. Keller & Kazazi 1993: 5). The reduction to a minimum of waste in these segments improves the productivity, the quality, and the profitability of the production systems of a global value and supply chain. Thereby, its members increase their revenue.

Referring to Schonberger’s work from 1986, Albino and Garavelli characterise the conditions for a successful implementation of the Just-in-Time system: „To achieve the best performance, JIT systems need a stable environment, characterised by low demand variability, low process complexity and high reliability of supply, machine and scheduling” (Albino & Garavelli 1995: 71). If this foundation of

stability and reliability is given, then the JIT model is deemed to be successful. Many GVCs have established these conditions and implemented the JIT model. Companies that manufacture complex products like computers and cars find value in implementing JIT practices to effectively manage costs, e.g. Toyota, which has been an innovator of JIT. But these GVCs are increasingly hard to sustain since major events have regularly challenged them during the last years. Adaptations or alternatives for the JIT are discussed and can provide more resilience in exchange for differing forfeits.

A simplified, universal version of JIT in garment GVCs is depicted in Figure 2. The customer demand always starts the process. This represents the driving force behind JIT - producing goods based on actual customer orders rather than forecasting. Order transmission involves receiving customer orders and transmitting them to the production stage. Production plans are based on the received orders and are followed by sourcing the necessary raw materials. Subsequently, manufacturing represents the actual production of garments based on the received orders. Afterwards, the quality of the manufactured garments is ensured before packaging the garments and preparing them for shipment. The products are transported to distributional sites and moved on to retailers. The sales numbers and direct feedback of customers signal the success of the product and therefore the whole cycle.

Figure 2: *Simplified and universal Just-In-Time*



Own representation

The perfect implementation of JIT would lead to a variety of benefits: Inventory, delay, lead time and waste would be reduced to zero in order to optimize the production cycle. Such a reduction, however, is only achievable in theory. Nonetheless, the goal is minimizing these factors.

Part of the implementation of JIT is Kanban. Kanban is a production scheduling and inventory control method used to streamline manufacturing processes and reduce waste, for instance in the industry. It originated from the Japanese manufacturing system, specifically the Toyota Production System, and has been widely adopted in various industries. Kanban involves visual signals, often in the form of cards or markers, to indicate the status of different stages in the production process. It operates on a pull-based system, where production is driven by customer demand. Kanban limits the number of items that can be in production at any given time, preventing overproduction and reducing excess inventory. It also encourages continuous improvement by regularly reviewing processes and identifying bottlenecks. In the garment industry, Kanban can be applied to manage fabric and material flow, workstation scheduling, and finished goods inventory. Implementing Kanban can lead to benefits such as reduced lead times, lower inventory, lower costs, improved production flexibility, and better alignment with customer demand. It helps garment manufacturers operate more efficiently and respond more effectively to changing market trends (cf. Albino & Garavelli 1995: 75; Jagan Mohan Reddy et al. 2021: 18f).

Expected weaknesses of the model are owed to uncertainties: „Moreover, the intrinsic weakness of the JIT systems, caused by a considerable reduction of resources (workforce, stock, etc.) makes JIT approaches vulnerable to internal and external forces variability, such as machine and human failures, demand fluctuation, supply delays and defects, schedule errors” (Albino & Garavelli 1995: 71-72). It is necessary to configurate the relations of centralised versus decentralised production, production capacity versus inventory buffers, stable versus flexible workforce within GVCs to deal with uncertainties (cf. Albino & Garavelli 1995: 72). The core factor regarding the sensitivity to variability of GVCs can be countered by proper planning, adequate flexibility and/or diversification. There are different measures to prepare for variabilities, but they just grant as much protection as necessary to secure GVC's functionality and hence value from deteriorating.

2.3. Garment Global Value Chains and Just-In-Time

The garment industry has a rich history and was a corner stone for many countries during their phase of industrial development (cf. Fernandez-Stark et al. 2011: 6f). While many central exporting countries of the sector are located in the East-, South- or South-East Asia, e.g. China, Bangladesh, Vietnam, India, Malaysia and Indonesia, the biggest importers of textile are from the global north, e.g. the US, UK, EU and Japan. Successful garment retailer groups have reached a powerful position in the sector and follow strategies to minimize cost by relocating the labor-intensive production to developing countries. There, they profit from a labor force that can carry out the mostly low-skilled

tasks and is rarely unionized. Furthermore, the companies take advantage of the local situation, which offers fewer labor regulations, lower wages and sustainability standards in comparison to example in the EU (cf. Fernandez-Stark et al. 2011; Taplin 2014: 251; Raza et al. 2021: x, 20).

The garment global value chains have undergone several changes in recent decades due to the emergence and growth of fast fashion (cf. Fletcher 2014: 190; Maile & Staritz 2023: 97; Nguyen 2018; Taplin 2014: 246). Fast fashion has transformed traditional garment GVCs, and retailers have used this approach to quickly respond to changing consumer trends. This adoption has had a major impact on the structure, processes, and implications for various stakeholders. By coordinating design, production, and distribution across geographically dispersed suppliers, fast fashion retailers can speed up the cycle of the garment industry.

The multifaceted impacts of fast fashion on labor, environment, and local economies within the garment GVCs concern people who are trying to limit big businesses, e.g. NGOs, social movements, political movements, etc. While fast fashion's rapid turnover of styles satisfies consumer demand for trendy garment, it raises questions about exploitative labor practices and environmental degradation in the countries where the clothes are made (cf. Fletcher 2014: 190). The intensification of production cycles poses challenges to ensure that workers' rights, fair wages, and sustainable handling of resources are taken care of.

In today's fast fashion era, the garment industry must balance agility, sustainability, and ethical responsibility in order to meet consumer desires. Researchers are studying the relationship between industry strategies, supply chain governance, and their impact on society and the economy. As fast fashion continues to dominate, it is crucial for stakeholders in the garment industry to find a way to reconcile rapid consumption with fair and sustainable practices.

Ian Taplin (2014) examines the garment industry's evolution in the context of global commodity chains and fast fashion. The author investigates how the industry has adapted its production and distribution processes to keep up with rapidly changing consumer preferences.

Taplin emphasizes the importance of global commodity chains that include production, distribution, and consumption. The fast fashion industry forced brands to readjust these chains to quickly adapt to fashion trends and make the products available in stores in a short period of time (cf. 2014: 250). This requires effective supply chain management, from sourcing raw materials to delivering finished products. Fast fashion brands rely on creating a sense of urgency and limited availability to stimulate consumer demand and sales. This approach drives consumer engagement and fosters a culture of frequent and impulse-driven buying behaviour, which fits with the fast fashion concept (cf. 2014: 256). The article discusses the consequences of fast fashion for labor practices, sustainability, and

environmental impact. The quick production cycles of fast fashion raise again concern about working conditions, exploitation of labor, and high levels of consumption. Taplin challenges a critical examination of the social and environmental consequences associated with the industry's rapid evolution (cf. 2014: 260).

The article „Workforce Development in the Apparel Global Value Chain” (2011) from Fernandez-Stark, Frederick and Gereffi analyzes how workforce development operates in garment GVCs. By exploring the difficulties and tactics involved in enhancing skills, providing training, and managing labor practices in the supply chains of the garment industry, they also highlight that the garment GVCs are constantly changing on various stages, e.g. design, manufacturing, and distribution. Due to the emergence of fast fashion, these levels underwent adaptations as well. The number of designs produced in a year have increased and the periods between the product lines have decreased. Manufacturing must be up to the task, otherwise the lead firms may easily exchange their sub-contractors. Distribution has to adapt as well and pick up the pace and become more efficient.

JIT is a part of broader management philosophy of Lean practices. Lean focuses on creating value by reducing waste and inefficiencies throughout a whole organizational process. Additionally to JIT, this includes other principles such as continuous improvement (Kaizen), standardization of work, employee empowerment, quality at the source, and pull-based production systems. In contrast to Lean strategies, Agile strategies focus on flexibility, responsiveness, and adaptability to change and can modify and implement JIT as well. In their 2004 article, „Lean or Agile: A Solution for Supply Chain Management in the Textiles and Clothing Industry?” Margaret Bruce et al. examine the suitability of lean and agile supply chain strategies for the textile and garment industry. They highlight the industry's complexities, including seasonality, short product life cycles, and rapid changes in consumer preferences, necessitating a strategic approach to ensure efficiency and competitiveness. Lean focuses on waste reduction and cost optimization, while agile prioritizes flexibility and quick response to customer demands. The authors emphasize that textile and garment companies must choose between lean or agile strategies based on their specific needs. They provide case studies illustrating successful implementation of either approach, while advocating for a hybrid model that combines elements of both to achieve a balance between efficiency and responsiveness. Bruce et al. stress the importance of technology and information sharing in supporting supply chain strategies, emphasizing effective communication and collaboration among partners to enhance performance (cf. Bruce et al. 2004: 153-155, 166).

The established understanding of how GVCs operate in the garment industry, particularly through the widespread use of the Just-in-Time (JIT) principle, built the fundament for this research. While JIT

offers significant advantages in efficiency, responsiveness, and cost reduction, it also exposes supply chains to vulnerabilities in the face of disruptions. The rise of fast fashion has intensified the demand for speed and flexibility, amplifying both the strengths and the weaknesses of JIT. Recent global crises have highlighted the fragility of these systems, prompting a critical reassessment of current practices. The following chapter categorizes the types of crises and portrays them separately in detail.

2.4. Background & Typology of Modern Crises

Since the 2010s global events had far reaching effects on the performance of JIT in garment GVCs. The presented information and arguments below make the necessity of a typology of modern crises necessary. The presented categorisation summarizes and portrays the differing types of crises and their varying impacts on JIT that are relevant for this research. In order to frame the term “modern crises“, this section provides and discusses a few significant examples. Their economic impact and implications for JIT using garment GVCs clarify the necessity for this research. The focus rests on the three crises of pandemics and health crises, climate change and natural disasters and political unrest and conflicts. These three types mark the most significant impacts on economies around the world since 2010.

2.4.1. Pandemics and Health Crises

- Subcategories:
 - Pandemics: COVID-19, disease outbreaks.
 - Health Emergencies: Health hazards.
- Impact on Garment Industry:
 - Reduced workforce due to illness or safety measures.
 - Supply chain disruptions and factory closures affecting production.
- Examples:
 - COVID-19 leading to factory shutdowns in Asia, affecting garment exports world-wide.
 - Health crises causing labor shortages in clothing manufacturing regions.

The first type focuses on the COVID-19 pandemic, which showcases the impact of a global health crisis. The disease and its spread led to numerous outbreaks and can be seen as an example for other health hazards even if their reach is of lesser scope.

The COVID-19 crisis transformed into a pandemic at the beginning of 2020. Its extent and hence its consequences for the global economy had not been foreseeable due to reoccurring national lockdowns, curfews, clusters in factories, closing of borders and an uneven and unsteady vaccine distribution. Uncertainty was concerning all members of markets in different kinds of ways and the desire for stability became recognisable. Regarding the given definition of soft spots from Albino & Garavelli (1995), it is understandable that COVID-19 had wide-ranging effects on the functioning of JIT and therefore on chain components. The COVID-19 pandemic made the reliance on and the weaknesses of JIT tremendously visible and presents the magnitude of the following implications (cf. Jiang et al. 2021, Pisch 2020). COVID-19 influenced functions of GVCs in different ways and some possibilities or scenarios shall be portrayed. The virus infected the workforce of specific links in GVCs and derogated their productivity or even their possibility to function. The impairment of one supplier affected the whole chain and all its abilities. Consequently, flexibility and urgency were needed to find new suppliers that could fill in and take over the required duties and responsibilities. Supplier diversification was a key factor in this case. If it was not established at all or only on a small scale, disturbances could face costly consequences. This scenario could turn out even more serious, as the virus could affect whole sectors. Furthermore, the closure of borders and stoppage of imports and/or exports by governments blocked the necessary transport of goods and disrupted any further progression within the chain. The pandemic also led to national lockdowns and the closing of shops. The consumption of goods got compromised, and the demand of retailers and brands shrank. This led to the shutdown of production sites due to the absence or cancelation of orders. These are just a few illustrative examples of how the named weaknesses of Albino & Garavelli „internal and external forces variability, such as machine and human failures, demand fluctuation, supply delays and defects, schedule errors” (1995: 71-72) may have wide-ranging economic effects.

Over the course of the pandemic, economic news outlets reported many cases of chain disruptions. The appearance of new COVID-19 variants posed as a threat to global chain structures. The journalist Onishi of the Nikkei Asia (Nihon Keizai Shimbun) newspaper reported that the government of Vietnam was appealing to its population to be more cautious to contain the spread of COVID-19. These efforts were part of trying to protect the technology sector, which was struggling with factory outbreaks (cf. Onishi 2021). As Lora Cecere reported on the blockage of the Suez Canal in spring 2021, claiming that it was an „unprecedented bad year in logistics” (cf. Cecere 2021). In an article for Forbes, she pointed out that the coincidences of the blockage of the Suez Canal by a transport ship called *Ever Given* and COVID-19 had tremendously negative effects on chain structures due to their limited status of availability and reliability. Furthermore, she expected that these events will have implications for global chains in the future (cf. Cecere 2021).

Several studies focus on the economic effects of COVID-19 in particular. Mark Anner conducted a survey in March 2020 on the impact of COVID-19 on the garment industry in Bangladesh, where many factories of suppliers are located. As partly portrayed above, he also depicted the situation as a chain reaction that was triggered by national lockdowns and led to stagnant demand, the shutdown of factories and job losses:

„As governments in wealthier countries order lockdowns to control the pandemic, demand for apparel is plummeting, leading many brands and retailers to halt production. As a result, factories around the world are shuttering, rendering millions of garment workers in Bangladesh and beyond jobless” (Anner 2020: 3).

The situation worsened as the government of Bangladesh declared a national lockdown at the end of March 2020. The dependency of the local economy on the garment sector made the situation more severe (cf. Anner 2020: 3; Teodoro & Rodriguez 2020). An article by Brakman et al. focuses on the implications of COVID-19 for the global economy and JIT. They stated that the virus led to disruptions of GSCs (Global Supply Chains) in the medical sector which resulted in local shortages. They argued that the example of Bangladesh showcases the dependency of some countries on the functioning of specific global chains and that small disruptions can cause wide-ranging consequences, e.g. in essential sectors like health-related products (cf. Brakman et al. 2020: 3). The following example elaborates on the case of China which stopped the export of domestically produced medical supplies to use it for their own people and followingly triggered global shortages and the rise of prices for these supplies (cf. Brakman et al. 2020: 3). This scenario portrays the impact of COVID-19 on vulnerable GSCs which affected GVCs or any other economic chain structures as well. For Brakman et al. JIT will probably be adjusted to a Just-in-Case principle to improve resilience to shocks among economic structures by (re-)implementing buffers and borders (cf. Brakman et al. 2020: 3). In this example, buffers are resembling storage units and borders refer to the geographical diversification across chains (cf. Brakman et al. 2020: 6). Other scholars like Alfasi and Potugali already emphasized the focal role of long-time planning and storage in their characterisation of Just-in-Case (cf. 2004: 31).

Keane et al. (2020) reflected on suggestions, which are supposed to transform and adapt GVCs towards future shocks and threats. They present a sustainable definition for the term *resilience* regarding GVCs: „[...] we use the term ‘resilience’ to characterise this ability to both maintain activity through a shock and respond, reorganise and respond” (Keane et al. 2020: 1). The idea of resilience strengthening sounds favourably to defy all kinds of shocks, but to achieve this improvement it is necessary to transform or adapt the GVC. Similar to Brakman et al. (2020), Keane et al. (2020) present possible solutions, e.g. more investment, shortening and reshoring of GVCs. Their approach suggests a combination of stock management, just-in-time strategies, investing in trading relations and supporting export diversification to improve GVCs’ resilience (cf. Keane et al. 2020: 1). This proposal

demonstrates a complex answer to the presented challenges, which require approval by many actors and transformations of existing structures that have ensured profits to many members of GVCs over the last decades. Although this solution represents a sustainable approach, further consideration must be given to whether it can be successfully implemented in the modern global economy.

2.4.2. Climate Change & Natural Disasters

- Subcategories:
 - Weather-related: Floods, hurricanes, storms.
 - Geological: Earthquakes, tsunamis.
- Impact on Garment Industry:
 - Closure of manufacturing units or warehouses or reduced infrastructure due to damage.
 - Disruption in transportation, leading to delays in raw material delivery and finished product distribution.
- Examples:
 - Floods in Bangladesh disrupting textile mills and delaying fabric shipments.
 - Earthquakes in Japan affecting factories and logistics hubs.

Climate change and its implications pose another crisis that threatens JIT in garment GVCs. Rising sea levels, increasing global temperature, augmenting natural cataclysms and other natural events arise and will affect the global economy. The Intergovernmental Panel on Climate Change (IPCC) synthesises knowledge about scientific findings by providing reports on climate change. These findings can be picked up - e.g. by policymakers or economists - in order to improve the sustainability of policies, processes and systems. Leading experts of different fields contribute to the IPCC reports and thereby support many climate-related goals, e.g. emission reduction and minimizing the rise of global mean temperatures to mitigate impacts and future risks of climate change. The IPCC's *Special Report: Global Warming Of 1,5°* states that the human-induced warming already reached 1° C and will rise above 1,5° C if the emission of greenhouse gases is not reduced within the next decades (cf. Allen et al. 2018: 51f). In 2025, the World Meteorological Organization (WMO) reports that 2024 was the hottest year recorded and that is the “the first calendar year with a global mean temperature of more than 1.5°C above the 1850-1900 average” (WMO 2025). This specific rise of temperature consequently leads to changes in climate and climate extremes. Chapter 3 of this report is called *Impacts of 1,5° C of Global Warming on Natural and Human Systems*. A subsegment focuses on climate-related hazards:

„It should be noted that the different types of hazards are considered in isolation but some regions are projected to be affected by collocated and/or concomitant changes in several types of hazards (high confidence). Two examples are sea level rise and heavy precipitation in some regions, possibly leading together

to more flooding, and droughts and heatwaves, which can together increase the risk of fire occurrence“ (Hoegh-Guldberg et al. 2018: 188).

Figure 3: Natural Hazards in Bangladesh

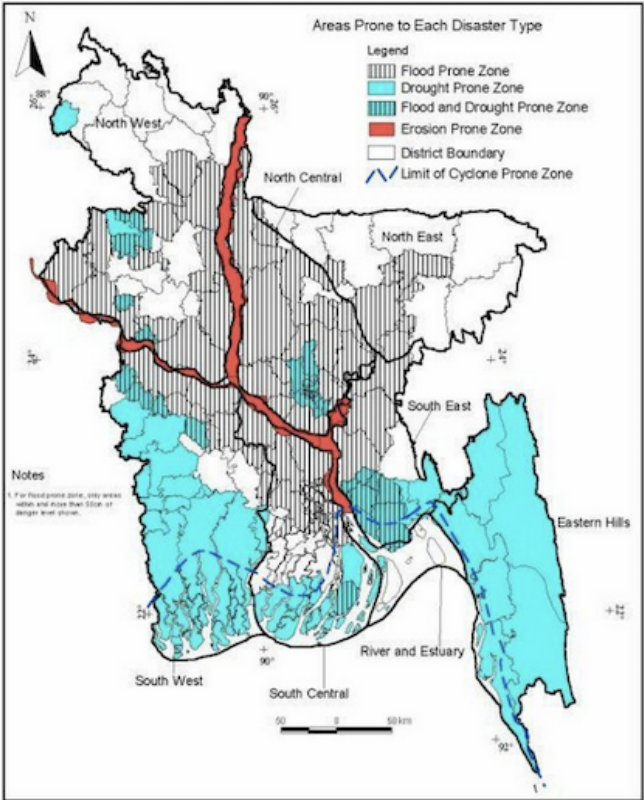
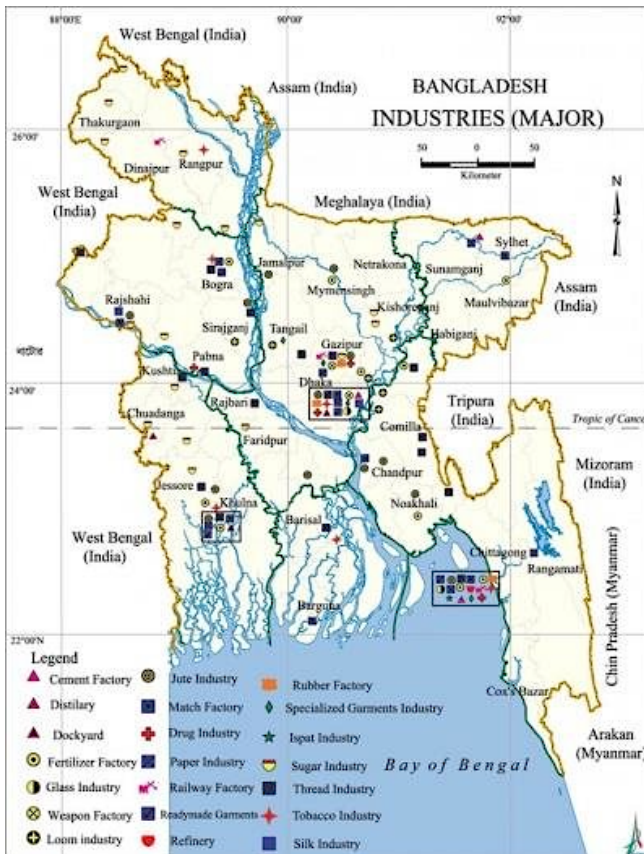


Figure 4: Industrial Map showing Mayor Industries located in Bangladesh



Therefore, climate change has many implications and affects regions in different forms. Varying areas are and will be hit by weather extremes such as wildfires, floods, rising sea levels or droughts. These natural hazards can affect economies in many ways. For instance, by damaging crops or production facilities, disrupting infrastructures and transport routes, or by endangering the livelihood of the workforce. They thus can trigger further challenges for chain participants such as labor shortages or factory shutdowns. (cf. Solingen et al. 2021: 145-146).

Bangladesh presents a prime example, especially for the garment sector, because it showcases an economy that has to cope with an amplified and prevailing occurrence of natural hazards due to climate change:

“With the evolving climate change, Bangladesh has been frequently facing extreme climatic events, such as erratic rainfall, flooding, drought, sea-level rise, cyclones, and salinity intrusion. Climate change will worsen many of the current problems and natural hazards that the country faces” (Mojid 2020: 1).

Mojid’s article forecasts a negative future regarding the impacts of climate change on Bangladesh. The country’s geography makes it susceptible for raising sea levels, higher amount of precipitation, droughts and others. These events influence and damage the agricultural sector strongly (cf. Mojid 2020: 10) and affect other sectors. The vulnerability of the country to the changing climate and its

implications are illustrated by two maps of Bangladesh: Figure 3 presents the areas that are mostly prone to natural disasters and Figure 4 presents the central locations of major industries in Bangladesh. A comparison of the two maps indicates that nearly all industrial areas are at risk of either floods, droughts, erosion, cyclones or a combination of these hazards. The collection of knowledge provided by the maps and Mojid's article provide reasons to worry about the future functionality and productivity of the Bangladeshi industry. The vulnerability of this economic location could be concerning and raise questions for many GVCs that implemented JIT practises and rely on the stability of this economy, especially garment GVCs.

Floods in Bangladesh have affected the garment sector and the involved JIT practices in GVCs in several ways. As shown in Figure 3 & 4, many garment factories in Bangladesh are located in flood-prone areas, particularly in Dhaka, where 20% of the factories are located on land less than 5 meters above sea level or within easy reach of the river, putting them at risk of regular flooding. These Floods can disrupt production processes and supply chains, leading to delays in the delivery of raw materials and finished products, which can negatively impact JIT practices. Furthermore, environmental pollution can be caused by floods and negatively impact JIT practices by increasing the risk of contamination in raw materials, finished products or endangering workers health. The infrastructure can be challenged by flooding and as a result the population faces the situation of damaged or insufficient roads, schools, utilities, housing and unstable waste services. These implications challenge the lives of the workers and possibly reduce their ability to work (cf. Labour behind the Label 2023).

Other countries offer another perspective. Japanese GVCs and JIT practices constitute a prime example of the effects that earthquakes and tsunamis can have on industries. Freund et al. discuss the impact of the 2011 earthquake in Japan on trade patterns, focusing on the automobile and electronics industries, for which Japan is a key supplier. The earthquake severely affected production of Japanese automotive equipment, leading to cascading effects on global auto producers such as Honda, Opel, and Nissan (cf. Freund et al. 2022).

Carvalho et al. supports these arguments. Their investigation of the impact of the Great East Japan Earthquake on supply chains uses data from Japanese manufacturing firms to analyze the effects of the earthquake on production, inventory, and delivery delays. The findings suggest that the earthquake led to significant disruptions in supply chains, resulting in decreased production levels, increased inventory levels, and delays in delivery times (cf. Carvalho et al. 2020).

The 2011 earthquake in Japan generated a collapse of Toyota's supply chain, leading to a revision of its JIT practices (cf. Matsuo 2015). Overall, the articles highlight the need for companies to manage

the trade-offs between supply chain efficiency and resilience to prepare for extreme events. Once more, these sources provide scientific evidence of the impact of natural disasters on GVCs and JIT practices, emphasizing the need for companies to adopt resilient supply chain strategies to mitigate risks and ensure the continuity of operations.

The vulnerability of JIT in GVCs presents itself in these cases since a single event can affect one linkage and as a result cause a chain reaction. The outage of one linkage can bring the whole GVC to a sudden halt.

2.4.3. Political Unrest & Conflicts

- Subcategories:
 - Wars and Conflicts: Border closures, trade sanctions.
 - Political Instability: Unpredictable policies affecting trade.
- Impact on Garment Industry:
 - Border closures disrupting material sourcing and finished product exports.
 - Transport route disruptions forcing adjustments, including consequences.
 - Trade disputes leading to tariffs affecting costs and market access.
- Examples:
 - Trade tensions between countries affecting fabric imports for garment production.
 - Political unrest leading to uncertainty in garment producing economies.

The ongoing conflict between Russia and Ukraine serves as an example of how geopolitical instability can disrupt global value chains (GVCs) and expose vulnerabilities. This conflict is chosen due to its far-reaching economic consequences, which illustrate the fragility of Just-in-Time (JIT) systems in the face of external shocks. The war between Russia and Ukraine started in February 2022 and since then it has had an undeniable impact on the global economy. Supply shocks, inflation and sanctions are just a few consequences of the outbreak of war, which also impacts the Global North in significant magnitude. The ensuing disruptions have profound effects on GVCs. For example, Russian exports of raw materials such as gas and crude oil present a considerable share in this sector. Therefore, shortages of these inputs cause wide-ranging implications due to limited numbers of suppliers. The vulnerability of JIT in GVCs surfaces also in this scenario. External shocks make the low levels of resilience visible (cf. Canuto et al. 2022: 2). Peixoto et al. suggest a combination of solutions to reduce the existing difficulties of a bottleneck of a few key-suppliers. Investments in infrastructure would improve trade logistics and „[E]nhanced regulatory flexibility can facilitate innovation and supply diversification, and support resilience” (2022: 6).

At the end of 2023, Baltic states Lithuania, Estonia and Latvia at least considered closing the border to Russia due to concerns about a surge in migrants weaponized by the Kremlin to create a migration crisis in Europe. Finland closed its border for some time (cf. Ellyatt 2023, Gavin 2023). Lithuania has decided to seal off two of its six checkpoints with Belarus amid growing tensions with its eastern neighbor, an ally of Russia (cf. The Associated Press 2024). These border closures are influenced by the ongoing conflict between Russia and Ukraine, leading to geopolitical tensions and concerns about security and migration flows. The sealing of these borders lead to full stoppage of trade and therefore impact GVCs. The war and its consequence of border shutdowns can interrupt the flow of materials, manufacturing and trade, affecting JIT practices. It is crucial to develop strong supply chain strategies to manage these risks and maintain business operations smoothly.

The war between Russia and Ukraine has significant impacts on the GVCs. EU production relied to a significant extent on foreign intermediates, which also come from Russia. With 400 global companies suspending their operation in Russia, the conflict has led to weaker chains. Major domestic brands have suspended their operations in Russia as well. International garment brands like H&M, Zara, Marks & Spencer, and Nike have followed suit. The conflict has also disrupted GVCs between the EU and Russia, which further complicated the situation, due to trade restrictions on import from Russia (cf. Kersan-Škabić 2023: 1).

The State of Fashion 2023 report by Amed et al. weighs in on the impact of the war between Russia and Ukraine on the garment global value chains (GVCs). The war between Russia and Ukraine has severely impacted the global fashion industry, with major domestic and international brands suspending their operations in Russia (cf. Amed et al. 2023: 32).

The exit from Russia has had an undeniable impact on sales and profits for some garment companies, such as Inditex, H&M, and LPP, as the country was an area of fast growth and high margin due to relatively low wages. However, these major garment players have the resources to focus their efforts on building growth in other regions of the world such as the Middle East and Latin America (cf. Amed et al. 2023:35). The economic impact of the war has largely been felt through a sharp rise in commodity prices, particularly food and energy prices. This inflation is likely to impact growth prospects of major economies, and the industry has had to deal with predictions of a looming recession, with supply chain challenges continuously unfolding (cf. Amed et al. 2023: 21). The State of Fashion 2023 report highlights the need for resilience in the face of uncertainty, and businesses can deploy realistic yet bold strategies to drive growth, even amid challenging times (cf. Amed et al. 2023: 16, 94).

Overall, the war between Russia and Ukraine poses challenges and uncertainties for garment GVCs. Adapting to the changing situation and implementing strategies to mitigate risks and improve resilience can help the industry to cope with the impacts of the war.

Another political conflict with consequences for trade is the instable situation in the Red Sea. Since December 2023, the Houthi rebels in Yemen attack shipments that pass through the Red Sea and disrupt this crucial trade route in support of Palestine. Consequently, global shipping companies re-routed their ships around the Cape of Good Hope to avoid the Suez Canal. Therefore, transit got more costly and took longer between Asia and Europe. Gordon's article highlights how these attacks have raised insurance premiums and lead to supply chain delays. The crisis underscores the fragility of global value chains and how instability in strategic locations like the Red Sea affect them (cf. Gordon 2023).

Other conflicts put the current geopolitical global situation at unease. The tensions between the U.S. and China are centred around trade conflicts that are triggered by prioritising their own economies through protectionist policy making, sanctions, e.g. against the company Huawei, higher tariffs, and increasing labor costs in China. The US-China trade conflict began in 2018, resulting in tariffs on different goods. This caused higher expenses for American companies and raised prices for buyers. The dispute particularly affected families with lower and middle incomes. Although the Phase One trade deal in 2020 reduced tensions, tariffs on cotton and textiles were still in place. Despite multiple rounds of exemptions and exclusion lists from both sides, trade tensions continued. The cotton sector faced challenges due to increased costs and disruptions in the global supply chain (cf. Liu et al. 2022). These tensions intensified in 2025 again, due to the newly imposed trade tariffs of the US government under the second administration of president Trump. For instance, Bangladesh and Sri Lanka, heavily reliant on garment exports to the U.S., have faced significant challenges due to tariffs of 37% and 44%, respectively, leading to fears of job losses and economic instability (cf. Paul et al. 2025). Buyers are concerned about relying too much on China for their sourcing needs since the concentration of sourcing is high and the political situation is uncertain. As a result, they „de-risk“ and adopt a „China+1“ strategy, which involves diversifying their sourcing to other countries while keeping China as a sourcing option (cf. Maile & Staritz 2023: 104). These frictions between the two most powerful economies disrupted the trade flow of GVCs and left a sustainable impact on the structure of GVCs and trade policies (cf. Siripurapu & Berman 2022). The US also puts pressure on other countries to reduce reliance on China by linking trade negotiations and tariffs to decoupling activities, including European countries (cf. Mazzocco, 2025). The EU follows its strategy of de-risking and managing its dependencies than eliminating (cf. Schüller 2023). The differing approaches of the US

and the EU led to transatlantic tensions that hit sectors like tech, textiles, and critical raw materials (cf. Lynch et al., 2023).

Brexit can be seen as European example that led to the restructuring of an economic system on a bigger scale and was followed by protectionist policies from the UK (cf. Raza et al. 2021: x). Following, these conflicts favoured the processes of re-, back-, near- and friendshoring (cf. Suzuki 2021). The risk of being affected by protectionist measures of countries that host productions sites can be limited by reducing the distance between chain links and bring manufacturing closer to the domestic market.

The garment industry in Bangladesh is facing wage protests and factory closures, which has caused worries about economic sanctions from Western partners like the United States and European Union. These sanctions could have a significant impact on Bangladesh's economy since the industry heavily depends on these markets. Some people think the threat is just a rumor, but others are concerned about the potential consequences. The upcoming national elections and political unrest have added to the uncertainty. Additionally, US officials have issued warnings, and there are ongoing labor rights problems within the industry, making the situation even more complex (cf. Mahmud 2023).

Political instability affects GVCs and highlights the importance of strategic planning and risk management. Ways to minimize political risk involve interacting with policymakers, educating staff, and fostering strong local ties. In the end, companies must weigh cost factors against the dangers linked to sourcing globally.

2.5. Alternatives to the Just-in-Time

Just-in-Time is widely implemented in the garment industry, but its lack of resilience was exposed during the crises of the last years and shall be the main focus of this paper. Resilience is the ability to respond to economic shocks and recover quickly by adapting to new conditions (cf. Coveri & Zanfei 2023: 82). Resilience in GVCs differs from robustness. Robustness means being able to continue operations during a crises, while resilience means being able to recover and return to normality after disruptions.

A collection of viable adaptations and alternatives shall be elaborated on to showcase how JIT can improve or be replaced. For the following measures presented we focus on trade-offs that improve resilience or stability, but most times reduce economic efficiency. Many factors must be considered, if GVCs change their approach from JIT to an alternative, e.g. short- and long-term effects on profitability, but the focal point lays on resilience. The most frequently discussed approaches in the discourse of economics and science will be displayed.

2.5.1. Just-in-Case

The Just-in-Case (JIC) philosophy presents an alternative to JIT that could be implemented in garment GVCs. JIC is a strategy that prioritizes risk management, larger standing inventories, diversifying the production network, and harmonizing parts to develop flexibility and redundancy. It aims to minimize the chances of goods running low in stock or falling behind the production schedule. Therefore, it is a response to the risks associated with JIT and seeks resilience. Modern crises like the COVID-19 pandemic have shown that the GVCs are unreliable, and companies need to explore alternatives like JIC to be resilient (cf. Jiang et al. 2021: 141-142).

Increased inventory leads to increased product availability. Stockouts and unexpected demand are less likely to occur because products are more likely available when needed. Satisfaction of customers is ensured by having products ready when they need them. This is particularly helpful in cases where demand is difficult to predict or when there are chain disruptions. However, higher inventory costs and the need for more storage space can reduce profitability (cf. OECD 2013: 42). Higher numbers of stock become a significant factor. JIC production can lead to reduced efficiency, increased lead times or reduce responsiveness to changes in chains because of the need to manage larger inventories (cf. Jenkins 2021). Common examples for JIC users are hospitals and militaries, since these sectors cannot risk any shortages of goods, but Canuto et al. state that companies of the automotive and electronic sector are gradually moving to JIC (cf. 2022: 3).

Nag argues that there is no clear answer as to whether JIC production is a viable alternative to JIT in garment GVCs nowadays. In his opinion, it depends on a variety of factors, including the type of product, the market demand, the chain composition, and the production process. Therefore, it is necessary to conduct a thorough analysis to determine if one inventory management philosophy would be more appropriate at this time or it would depend on the specific case (cf. 2019: p. 9, s. 38).

The work of Jiang et al. focuses on robustness in supply chains. Although the difference between resilience and robustness in GVCs was clarified above, this paper still qualifies for this research since the authors focus on an interpretation of robustness of supply chains that corresponds to the defined term of resilience in GVCs above. They introduce a theoretical model that goes beyond JIC and includes the alternative concept of Just-In-Worst-Case. They demonstrate how lead firms can approach the trade-off between efficiency and robustness to handle aggregated shocks, since they criticise that the existing literature only focuses on idiosyncratic shocks. They distinguish between two qualities of aggregated shocks: risks and uncertainty. On the one hand, risks are known, therefore their extent can be estimated, and sufficient preparations can be put in place. On the other hand, uncertainties bear the unknown and the chain must brace itself comprehensively to resist unanticipated events (cf. 2021: 145-146). Therefore, COVID-19, natural hazards, war, or political unrest can be classified as uncertainties according to this definition.

Jiang et al. state that robustness is undersupplied, but they also argue that JIT and JIC cannot provide enough resilience for chains to withstand future shocks (cf. 2021: 147, 172). They promote specific measures to increase robustness and prepare for worst-case events: the introduction of stress testing similar to the procedure that was implemented for banks after the financial crises of 2008, creating excess capacity and support through policies (cf. 2021: 174-176). Stress testing resembles an approach that could improve the resilience of GVCs without an exaggerated reduction of efficiency since the banking sector could implement it in practical way as well. The creation of excess capacity is exemplified by the postal service, but this measure cannot be translated to the private sector since it is deemed to be extremely inefficient. The provided examples on governmental support showcase how Japan and Russia incentivise diversification out of non-allied markets to achieve robustness for chains that all parties desire. In these cases, diversification is probably connected with re-shoring or friend-shoring. The governmental intervention could establish a synergy that leads to efficiency without disregarding robustness and secure longevity. This goal is of interest for all partaking parties. Just-in-Worst-Case in garment GVCs may be reasonable since many suppliers are in East and South-East Asia and face differing conditions regarding shocks/uncertainties like natural hazards, getting caught up in global geopolitical tension e.g. the conflict between the U.S. and China, or protectionist policies. In this industry, stress testing governmental support could present viable options.

2.5.2. Overview of Shoring Methods

Offshoring refers to the process of outsourcing production steps abroad. Mostly, the offshored steps concern low skill tasks, e.g. manufacturing, which are handed to suppliers. This is a key strategy of GVCs to produce goods overseas at low-cost and to reduce the cost of labor and manufacturing in order to be competitive in the market. Research, development, design, innovation, and other high-skilled task remain with the lead firm. Coveri & Zanfei support Pisano & Shih's arguments that the complete offshoring of specific steps can lead to a loss in know-how and higher-skilled jobs. The loss of know-how can take place when suppliers perform production steps for a long period and the in-house workforce leaves the lead firm due to retirement, job change, etc., without passing on the knowledge. Furthermore, the offshoring of low-skill tasks can be followed by higher-skilled tasks if the suppliers improve their skillset and offer profitable prices (cf. Coveri & Zanfei 2023: 81; Pisano & Shih 2009).

Re-, back-, near- and friendshoring indicate different chain strategies. Reshoring refers to the process of bringing production and manufacturing of goods back to the company's original country. Back- and nearshoring are two forms of reshoring. Back-shoring indicates the return of production to the country it originated from. Nearshoring is a form of offshoring in which an organization recruits employees from a neighbouring or geographically close country to complete services. It combines the benefits of onshore outsourcing and offshore outsourcing by reducing transport costs. At a more affordable cost, it is a popular choice. Organizations, states, or state unions like the EU could support or incentivize re- or nearshoring from non-members (cf. Raza et al. 2021: xi, 74-77). On the one hand, GVCs, the industrial regional location and the production of certain goods could be strengthened, and resilience increased. On the other hand, the OECD argues that the case of reshoring is weak. The risk of concentration could increase, resulting in a higher vulnerability to volatile economic activity. Furthermore, the vulnerability to domestic shocks increases in case of reshoring back to the country of origins (cf. OECD 2021: 3, 10).

Maile & Staritz observe transformations in the garment sector in regard to the development of ultra-fast fashion. Online retailers like Shein adapted the model of fast fashion and increased speed to market and variety of products by simultaneously reducing delivery times. They test the market for new products by on- or nearshoring the production of small samples and reviewing their popularity. Afterwards the well-received products are manufactured in the offshored production. Shein avoids financial constraints and puts pressure on suppliers to produce smaller quantities daily. This results in a higher turnover rate and a low percentage of unsold items. This strategy of ultra-fast fashion was

intensified by companies during COVID-19. Increased vertical integration and onshore assembly are new additions to the chain structures. The apparel sector adapts to these changes. Production and sourcing networks need to align with buyer strategies, which may require larger inventories and investment in warehousing (cf. Maile & Staritz 2023: 99). This innovation of Shein is comparable to JIC, but the whole production and delivery process is accelerated. Furthermore, increasing storage is an opposite development to JIT. Bigger inventories lead to higher costs for more storage room and management of storage. These expenses are countering the JIT philosophy, which would seek to reduce these capacities and waste to increase profitability.

Manufacturing and sourcing from countries that are geopolitical allies is called friendshoring or allyshoring. It helps to continue accessing international markets and chains while reducing certain geopolitical risks. However, friendshoring can lead to additional costs, since the economic and geopolitical relations must be in place and/or production costs may be higher. For instance, the economic infrastructure must be set up, the partnering countries must have exporting relations, workforce with the needed skillsets must be attainable and regulation must be in place. Otherwise, it is necessary to invest in these factors to build a functioning cooperation (cf. Canuto et al. 2022: 8).

The effects of re-, back-, near- and friendshoring on garment GVCs that implemented JIT production can vary. Canuto et al. support the notions that the reshoring, nearshoring, and friendshoring will not always be beneficial for businesses, since the trade-off between efficiency and resilience can be subpar (cf. 2022: 2-3). These steps may result in the opposite effect and improve efficiency and reduce the resilience of a business when the newly chosen linkage locations struggle with disruptions themselves. Therefore, the decision for a viable new production location depends on the country's political, economic, social, cultural, and climatic stability. Furthermore, near- and friendshoring often presume that all the legal conditions, necessary skills and infrastructure are given in a closer or allied location, but these circumstances are not always given. Increased storage costs, reduced efficiency, increased lead times, and reduced responsiveness to changes in demand or supply chain disruptions could be further negative factors.

Overall, the effects of these strategies on garment GVCs that implemented JIT today depend on various factors such as the specific industry, the country's political and economic situation, and the company's supply chain structure.

2.5.2.1. Shortening of Global Value Chains

Shortening of GVCs refers to the process of bringing production closer to demand. GVCs relocate specific linkages by using the strategies of re-, back-, near- and friendshoring.

This decision can be triggered by differing factors. Raza et al. mention „[...] quality issues, the importance of proximity to market, the importance of proximity between manufacturing and innovation activities, short lead times and consumer preferences for locally produced goods (‘Made-in’ effects), etc. [...]” (2021: 13). They predict that the mentioned factors will increase shortenings of GVCs and that the wish to improve resilience could have the same effect. Furthermore, they argue that this development could be boosted by EU’s reaction to climate change in the form of a green transition since offshored productions often are in countries with lower environmental standards and long transports from these locations to Europe (cf. 2021: 20).

Zhan et al. go even further in their predictions for GVCs in the year 2030 and argue that shortening of GVCs is a trend that improves resilience and will increase investments in GVCs (cf. 2020).

The below presented case of Zara represents a shortened garment GVC (cf. Taplin 2014: 256). The combination of the business model of vertical integration, JIT and relocating most of production close to the headquarters in Spain lead to higher speed and shorter lead times and form an economic efficient structure to be competitive and probably resilient for Zara (cf. Fletcher 2014: 169). In today’s fashion industry, it is important to approach JIT in a nuanced way that takes the demands of fast fashion into account. While JIT can help with speed, agility and responsiveness, it is important to scrutinize its compatibility with sustainable practices and responsible sourcing. As the industry tries to balance quick turnarounds with environmental responsibility, Fletcher’s contribution highlights the need to align the economic objectives and sustainable development of the garment industry.

The following digression gives detailed insights into Zara’s structure and approach. The company combines JIT with vertical integration, nearshoring, and partial supplier ownership. By owning over 50% of its suppliers and centralized distribution, Zara gains flexibility and can adapt to consumer demands quickly while minimizing typical JIT vulnerabilities. Therefore, this case extends the understanding of how JIT can be implemented in a garment GVC’s approach.

Case of Zara

The portrayal of varying views provides a comprehensive depiction of the fast fashion enterprise Zara and its involvement in GVCs. By presenting perspectives of researchers and economists, a coherent impression will be given.

Amy Nguyen’s article „Fast fashion’s Dirty Secret - Mapping the Global Value Chain of Zara” (2018) showcases how the fast fashion store Zara, owned by Inditex, works behind the scenes and how it affects the fashion industry and the environment. Zara’s business model is based on vertical integration, where the company controls the entire production process, allowing for faster speed, bringing items from design to stores in a few weeks. Zara makes clothes quickly and delivers them fast by going through different stages in different countries. Its success originates from its short time-to-

market since it can quickly respond to fashion trends and gets new clothes to stores fast. But the negative effects on society and the environment cannot be ignored. Zara and its suppliers are responsible for high carbon emissions, water pollution, waster generation, poor labor conditions, lack of transparency, etc.

Zara's value proposition revolves around offering fashionable merchandise at accessible prices, with garments often worn only a few times before being discarded (cf. Taplin 2014: 256). The author examines the intricacies of Zara's global value chain, from design and procurement to production, distribution, and retailing.

According to Nguyen, Zara's approach is unique as they own over 50% of their suppliers and integrate textiles into their value chain to avoid material and production bottlenecks. This allows them to adjust production based on market updates and consumer demand changes. They own Comditel, which has 200 external fabric suppliers, allowing faster processing compared to outsourcing. About 40% of their fabric comes from Comditel, and 90% of production is managed within Zara. To ensure agility, they source versatile grey fabric from Fibra color, a partially owned dyestuff producer, facilitating quick replenishment of popular items and avoiding excessive orders. Designs often come from Zara but are finished by a network of medium-term suppliers, balancing short-term costs for long-term benefits. Zara strategically invests in production, such as the higher costs in Spain and Portugal in 2001, to focus on higher-end customers and generate more value. Finished garments are sent to 450 workshops in La Coruña for sewing before being returned to warehouses. Distribution is predicated on quickness. According to the respective time zone, garments get distributed in one or two days within Europe and beyond. Producing in higher-wage countries is compensated by reduced costs for inventory, unsold items, and less need for discounting due to the high speed and short turnaround in all steps of the chain (cf. Fletcher 2014: 169; Jangid 2022: 25; Taplin 2014: 257).

Nguyen argues that the company's strategy of reducing response time and optimizing its supply chain contributes to its profitability and customer engagement (cf. Nguyen 2018). The functional combination of all these interlinkages is achieved by incorporating JIT (cf. Jangid 2022: 25). Disruptions to this constantly flowing stream of materials, fabrics, textiles, intermediaries, and finished products with only a limited amount of stock may bring the whole chain to a halt. Nonetheless, Zara established a complex system of suppliers at arm's length, which are partly owned by the company. The approach of diversification is implemented as a protection against the disruptions of the Just-in-Time concept. Furthermore, it displays the integration of re-shoring to some extent, by locating small percentages of production in Europe, e.g. Italy, Portugal and Spain (cf. Taplin 2014: 256). But it acts in complete opposition to the idea of Just-in-Case production. Furthermore, it totally disregards the impact of accelerated consumerism on the environment and society.

In 2015 Nathan Robinson, CEO of the workforce learning platform Gemba, wrote an article by the title „How Zara used Lean to become the largest fashion retailer”. This article describes Amancio Ortega Gaona’s journey and how he founded Zara. Ortega established a retail giant with 6,000 stores in 88 countries, making Zara one of the most valuable brands globally. The article focuses on five Lean techniques that Zara has used to achieve its success.

Firstly, they use JIT or Lean business model, which means they keep minimal stock levels and update collections based on customer demand. This allows Zara to prioritize popular products and ignore less popular ones. Secondly, Zara is agile in its operational approach. They use automated factories in Spain and smaller finishing factories in North Africa and Turkey. This enables rapid production of goods and reduces the risk of overproduction, leading to increased profitability. Zara also uses a pull-model or Kanban system for its design and production processes. They create up to 1.000 designs each month, influenced by store sales and trends. Customer feedback is crucial in this process, driving continuous improvement and resulting in better-fitting garment offerings. Zara’s strategy is to deliver on-trend fashion at reasonable prices. They actively gather customer feedback and use an IT infrastructure to identify emerging trends. This allows their designers to make necessary improvements and develop garments that align with customer preferences. Lastly, Zara uses the One Piece Flow approach, producing items in small quantities that match customer demand. This minimizes wasteful activities and enhances their ability to respond quickly to customer needs. As a result, products are ready for distribution within 48 hours (cf. Robinson 2015; Nguyen 2018; Jangid 2022:13, 19).

The article underscores how Zara’s effective implementation of Lean techniques has contributed to its dominance in the fashion industry and highlights the control, pace, and efficiency that such methods can offer. However, today even this pioneering approach gets challenged by Chinese newcomers, e.g. Shein or Temu (cf. Aratani 2023; Murray 2023; Rajvanshi, 2023).

Political and social developments present further motives to shorten GVCs. The EU introduced new directives and regulations to ensure the compliance of companies that are partaking in supply chains. The EU Taxonomy Regulation is a system that classifies sustainable economic activities. Companies that meet the six environmental objectives, make a positive contribution, avoid negative impacts in other areas, and meet the technical assessment criteria that can classify their activities as sustainable. The regulation aims to encourage investments in sustainable economic activities.

The Corporate Sustainability Reporting Directive (CSRD) (cf. European Parliament 2022), which was implemented in January 2023, introduces new regulations for non-financial reporting. It applies to both listed companies and large companies for the first time. These requirements still need to be incorporated into national laws of many EU members. The CSRD includes Europe-wide reporting

standards called European Sustainability Reporting Standards (ESRS) were also established to guide the structure of reporting on social and environmental information. The US Securities and Exchange Commission (SEC) implement a similar rule called the Climate Disclosure Rule and in 2024, listed companies in Japan will have to follow new rules on reporting climate information set by the Financial Services Agency (cf. Maile & Staritz 2023: 100; United States Securities and Exchange Commission 2024).

The Ecodesign For Sustainable Products Regulation (ESPR) (cf. European Parliament 2024) establishes minimum standards for the sustainability of products sold in the EU. It expands on the existing Ecodesign Directive, which currently focuses only on energy-related products. The new regulation creates a structure for implementing ecodesign requirements across various product categories, aiming to enhance their circular economy, energy efficiency, and other environmental and social sustainability aspects. These requirements are being progressively developed by the EU for each product group.

The EU's Sustainable and Circular Textiles Strategy (cf. European Commission 2022) is another measure that targets „green-washing“ by demanding verifiable sustainability claims. Therefore, lead firms are forced to be more sustainable and accountable. This strategy also aims to promote circular economy instead of fast fashion by focusing on repairability, recyclability and prohibiting discarding unsold inventory without reuse (cf. European Commission 2022; Maile & Staritz 2023: 101).

The Corporate Sustainability Due Diligence Directive (CSDDD) (cf. European Parliament 2024) requires companies to follow human rights and environmental standards in their supply chains. It mandates that large companies must exercise caution in identifying and addressing any negative impacts on human rights and the environment. This applies to their own operations, subsidiaries, and business partners. Companies must take steps to control and minimize potential environmental impacts and human rights violations in their supply chains. Additionally, companies are required to develop a plan that aligns with the Paris Agreement on climate change. The European Parliament and the Council have reached a provisional agreement on the Commission's draft, which will be formally adopted soon. EU member states will then have 18 months to implement the regulation into their national laws (cf. European Parliament 2024).

Since March 2023, a proposal for a law against „greenwashing“ has been under consideration. The Green Claims Directive (GCD) (cf. European Commission 2023) aims to clarify the guidelines for promoting the sustainability aspects of products and companies. It includes defining terms, implementing strict regulations for communicating sustainability-related product features and company objectives, and regulating the use of eco-labels (cf. European Commission 2023).

The EU taxonomy, the CSRD, the ESPR, the CSDDD and the GCD are not all in effect yet and they are not mandatory for all companies within the EU. Some of these directives and regulations only must be implemented by bigger enterprises that surpass a certain threshold of people employed or that are listed at the stock exchange market. Nonetheless many companies in the EU have to comply. These EU directives and regulations impact global value chains immensely. They bring in new requirements and standards for reporting on sustainability, designing products, checking supply chains, and promoting green practices. Following these rules may mean that companies have to change how they work in value chains, including where they get materials, make products, report on sustainability, and sell their goods. These rules can also affect how companies behave throughout the supply chain, making them more transparent, responsible, and focused on environmental and social goals. Overall, these EU guidelines help shape how value chains work, especially when it comes to sustainability and responsible business practices.

In 2025, the EU is moving to scale back its sustainability reporting rules under the CSRD, ESRS, and CSDDD. European Parliament rapporteur Jörgen Warborn has proposed limiting the CSRD's scope to companies with over 3,000 employees and €450 million in turnover. This would exclude most companies (cf. Abnett 2025). Currently, the extent of the Corporate Sustainability Due Diligence Directive (CSDDD) is already partly postponed. Some deadlines are pushed and not enforced by a "stop-the-clock" mechanism until 2028/2029 (cf. Buzeti & Daphne 2025). A reduction of the due diligence obligations only to direct suppliers is also discussed. This represents a significant step back from earlier ambitions to cover full supply chains (cf. Mehta 2025). On the one hand, supporters of these adjustments look forward to a reduction of regulatory burdens and push competitiveness. On the other hand, it is argued that they weaken the EU's climate commitments and corporate accountability. Final decisions are expected in October 2025.

Nonetheless, this shift in how companies operate also brings both challenges and opportunities for businesses within the EU. A negative aspect for businesses is administration. An increasing effort is necessary to administrate their supply chains and therefore all their suppliers. Nevertheless, they can obtain certificates by complying and market their compliance as a positive stance. Another hope for some entrepreneurs is that these measures could reduce the numbers of suppliers that offer cheap products, low quality and no compliance (cf. Eder & Moik 2024).

In Germany the passing of *the Act on Due Diligence Obligations in Supply Chains* or short *Supply Chain Act*¹ (cf. Federal Office for Economic Affairs und Export Control [BAFA].2023; Translation

¹ Lieferkettensorgfaltspflichtgesetz (LkSG) (cf. Bundesamt für Wirtschaft und Ausfuhrkontrolle 2023)

M. B.) obligates German companies to ensure „appropriate human rights and certain environmental due diligence in their supply chain” and conduct the following measures:

1. „Establishing a risk management system
2. Designating a responsible person or persons within the company
3. Conducting regular risk analyses and issuing a policy statement
4. Laying down preventive measures
5. Taking remedial action and establishing a complaints procedure
6. Documenting and reporting“ (BAFA 2023)

The BAFA implements and monitors the act and provides documents and guidelines. In 2023, this act already affected companies with at least 3.000 employees, but this number was dropped to 1.000 employees with the beginning of 2024.

Economics like Holger Görg from the Institute for the World Economy criticised the Supply Chain Act for the necessary bureaucratic effort that could lead to the discontinuation of partnerships between lead firms and suppliers from distanced locations (cf. Bickel & Freudenthaler 2023: 18-19). NGOs like Greenpeace criticised that this act is not far reaching enough since only companies with high numbers of employees are required to follow the act’s demands, but smaller companies are also able to cause significant environmental damage or violate human rights (cf. Schneemann 2022). Reshoring to Europe could be a consequence of this policy development. In this case the production in Portugal becomes more interesting since labor costs are low in European comparison and the image of brands can be enhanced by marketing their products as „made in Europe”.

2.5.3. Diversification

Diversification in Global Value Chains (GVCs) refers to the process of expanding the variety of suppliers and production locations. This may prompt opportunities for new markets and reduce risks from relying on only one or a few markets or suppliers.

Diversification can be a key strategy to reduce supply chain risks, increase flexibility, and improve responsiveness to demand or supply chain disruptions. 2022 Malacrino et al. discuss how diversification of GVCs did affect international trade during the COVID-19 pandemic. They emphasize that global trade has remained resilient despite the pandemic’s disruptions, but the risks of relying on a single supplier or country can be reduced by spreading production across multiple suppliers and countries. Diversification of GVCs is promoted over other ideas, e.g. reshoring. The article argues against dismantling global value chains (reshoring) and instead suggests that diversification of value chains

improves resilience and therefore can reduce economic losses in the event of supply disruptions. Furthermore, it reduces the impact of future shocks. Reshoring is not favoured since the risk of concentration could impact resilience negatively. Furthermore, simulations demonstrate that diversification plays a crucial role in minimizing economic losses caused by supply disruptions. Additionally, it helps stabilize economic growth in situations where multiple countries experience supply shocks. Nevertheless, it is important to note that diversification offers only limited protection when all economies are simultaneously impacted by a major disruption, as observed during the pandemic. Malacrino et al. argue that policymakers should support diversification by promoting trade agreements that reduce barriers of entry, investing in infrastructure to support trade, and providing financial support to firms that are diversifying their supply chains (cf. 2022).

According to OECD's article „Global Value Chains: Efficiency and Risks in the Context of COVID-19" diversification can help reduce supply chain risks, increase flexibility, and improve responsiveness to changes in demand or supply chain disruptions. Nonetheless, diversification can raise costs by requiring new supply chains and infrastructure investments. The article also warns that reshoring policies would reduce economic efficiency and diversification's ability to absorb shocks. While diversification can help manage risks in GVCs, it also has drawbacks and expenses (cf. OECD 2021: 3).

Coveri & Zanfei emphasized the relevance of resilience of economies that engage in a wide range of value-adding activities. They argue that these economies may be highly specialized in a few selected functions or products within GVCs and therefore the focus must shift from product level to function level. The authors contrast diversification to specialization in these economies and argue that specialization has its profitable benefits but can lead to a lack of resilience and flexibility in the face of shocks in GVCs, such as the COVID-19 pandemic. The article argues in favor of functional diversification and highlights that even in industrial sectors, economies that appear to have a diverse economic structure may have a limited set of productive and knowledge capabilities. Furthermore, diversified GVC-heavy economies are better equipped to promote innovation in processes and products. Diversification can increase costs and risks for these economies since it would require investments into establishing new sectors, new supply chains and new infrastructure. These investments could be missing in other already established places, e.g. for research and innovation. Nonetheless, a higher level of diversification would probably lead to a more resilient structure. The article also addresses the policy debate surrounding the benefits of international specialization in GVCs compared to the risks of vulnerability and instability. The need for policies that promote diversification is suggested for economies that engage vigorously in value-adding activities, while also balancing specialization to promote sustainable and inclusive growth (cf. Coveri & Zanfei 2023: 84-85).

Economies specialised in concrete GVC steps could argue for further economic diversification, but it could display a lack of confidence in the stability of the structures in place. It is not doubted that these economies would fail due to local disturbances, e.g. political unrest, natural hazards or war, but the fear of disrupted GVCs ignites the wish for more reliability. Diversification within an economy can improve the resilience of the whole economy, but the dependence on functioning GVCs would still be in place. Improving the resilience of GVCs can reduce economies' lack of confidence in their stability. The investment in the diversification of the economy could also be devoted to the activities in the GVCs and result in a profitable expense.

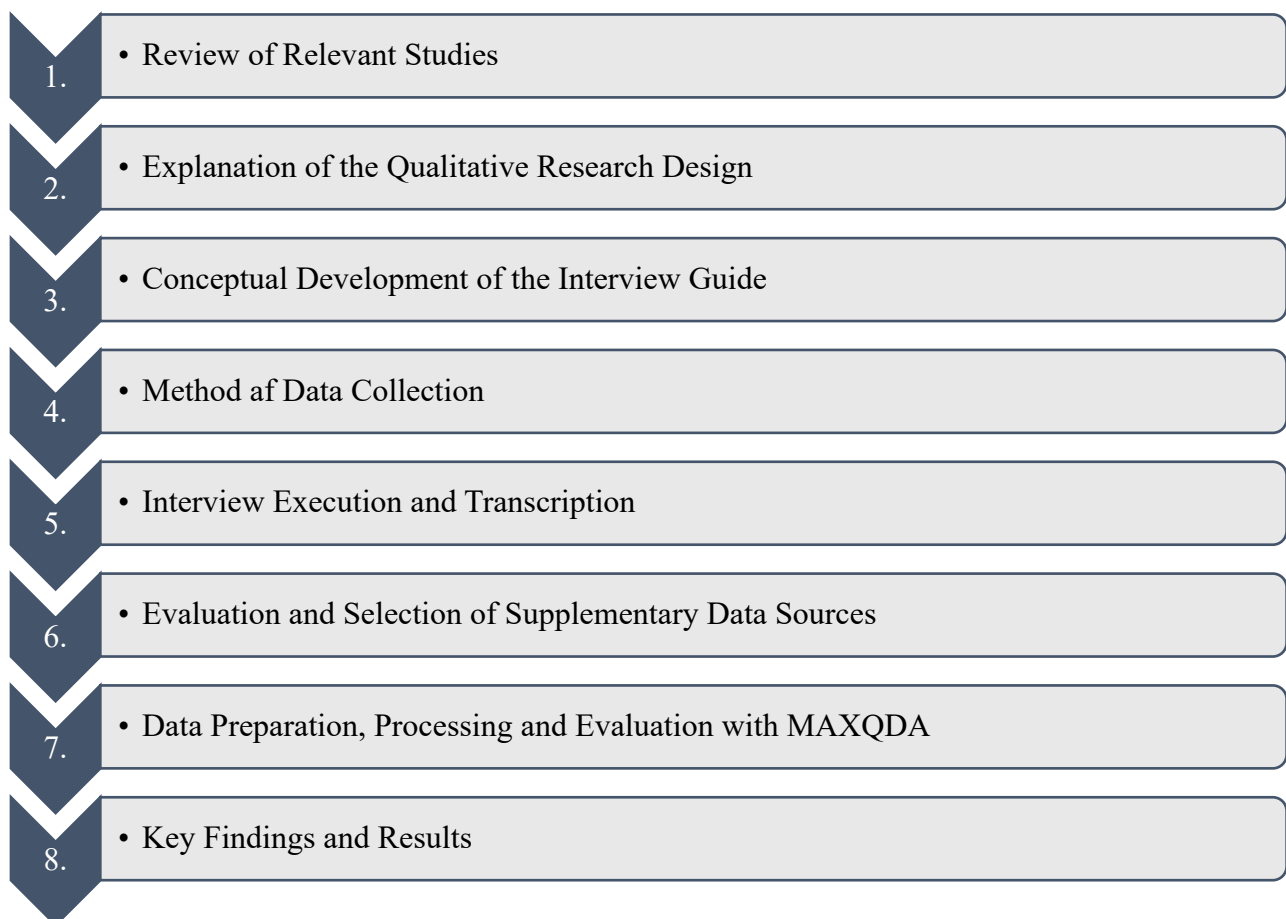
3. Methodological approach

The research question focuses on implemented forms of the Just-in-Time method in global value chains, which are affected by modern crises. It is necessary to obtain more information to conclude how these structures will cope with the complex implications and how they will overcome periods of uncertainty. The following chapter gives a detailed description of the methodological approach of the empirical investigation.

3.1. Phases of the Empirical Research

To ensure a structured and transparent research process, the empirical study follows a step-by-step approach. The research process consists of eight key phases, which are illustrated in Figure 5.

Figure 5: Phases of the Empirical Research Process



Own representation

The process starts with a systematic review of relevant studies and a brief presentation of the key findings (see Table 1). This knowledge is used to develop the interview guide and to connect state-of-the-art research with new empirical data. Next, the qualitative research approach is described,

followed by the development of interview questions based on the literature. Each question is linked to the findings in Table 1 to ensure a strong connection between existing research and the empirical research.

The next step explains the process of data collection, including the challenges that are faced during that process (see chapter 3.5.1.). The following sections describe the recruitment approach, an overview of the experts' characteristics and the interviewing process itself (see chapter 3.5.2. & 3.5.3.). Since seven interviews alone are not enough to draw concrete conclusions and reach theoretical saturation, the study was expanded with a document analysis. This included reviewing industry reports, academic papers, and online sources to back up the data and improve the validity of the results (see chapter 3.5.4.). Therefore, the study uses text-based expert interviews and further relevant documents as two sources of qualitative data. The data was be processed and analyzed using Qualitative Content Analysis (QCA) developed by Mayring (Mayring 1991: 209-213; 2014: 10-15; 2019: 2-4). By combining different viewpoints and sources, Mayring's approach allows for one thing a comprehensive understanding of how the JIT method in GVCs is affected by modern crises and for another thing, a structured analysis to identify key challenges, adaptation strategies and potential future developments within GVCs.

The next step outlines the preparation, processing and analysis of the collected data. The transcribed interviews and documents are analyzed using Mayring's QCA approach and the MAXQDA software. Mayring's method uses systematic coding of text material in a first step to develop relevant coding categories, so differences and similarities in the data can be compared (Mayring 2014: 28-30, 39-42; 2019: 2-4). This step ensures that the insights gained from the expert interviews and document analysis can be consistently linked. This enables a standardized integration of findings across all data sources. Finally, the results of the QCA are presented, and structured according to the conceptualized category system (see Appendix 3).

3.2. Explanation of qualitative research design

To create new, valuable insights and better understand how JIT supply chains adapt to crises, this study uses a qualitative research design. Supply chain disruptions are complex, involving interaction processes between different companies, suppliers, and global trade networks (Bryce et al. 2020: 881-883; Choi et al. 2023: 2335-2338; Jiang et al. 2021: 9-18; Pisch 2020: 40-43). Therefore, a qualitative approach is well-suited for examining these dynamic and interconnected processes in detail. To balance structure and flexibility in the analysis, this study uses Mayring's QCA. This method is well-

known for its systematic and adaptable approach to process and analyze qualitative data (Mayring 1991: 209-212; 2014: 39-42). QCA follows a clear, rule-based process that supports deductive and inductive coding (see chapter 3.5.1). The analysis is based on existing academic studies and frameworks while also leaving room for new insights from the data. The whole coding process will be conducted with MAXQDA software, which is designed for qualitative data analysis. MAXQDA helps organize, code, and interpret data in a structured way, making it easier to manage complex information from different sources such as interviews, reports, papers and internet sources. By combining Mayring's QCA with MAXQDA, a systematic evaluation of data from expert interviews and document analysis is possible, enabling a detailed comparison of themes and patterns across different sources. As mentioned before, the relevant data will be collected from two complementary qualitative data sources:

- *Expert Interviews*: Six semi-structured interviews with industry experts were carried out to gather firsthand, practical insights into how JIT supply chains adapt during crises. One more expert did not find the time to talk, but send back the interview guide with written answers. The interviews were designed to get a balance between flexibility and structure, enabling a deep dive into expert perspectives while keeping responses consistent and comparable (see chapter 3.3., chapter 3.4.2. and chapter 3.4.3.).
- *Document Analysis*: To back up the insights from the interviews, the study also analyzes five company reports, four academic articles, and five online sources. This step ensures the findings are not just based on expert opinions but are also supported by real-world examples, industry developments, and research from scientific literature (see chapter 3.4.4).

Both data sources are carefully analyzed using Mayring's QCA. Since the following study focuses on understanding the mechanisms and reasoning behind JIT supply chain adaptations, qualitative methods are more fitting and chosen over a quantitative approach. Numbers and statistics may show trends and relationships, but cannot explain the reasoning behind strategic decisions and how GVCs adapt to crises (Barnham, 2015: 837-839). QCA, on the contrary, allows in-depth analysis and provides the context needed to fully explore praxis-relevant industry perspectives (Mayring, 2014: 48-54; 2019: 2-4). By employing a structured analytical framework combining QCA and MAXQDA, the empirical research ensures a comprehensive, theory-driven investigation into JIT supply chains and their crisis resilience.

3.3. Conceptual Development of the Interview Guide

A wide-ranging review of relevant studies on Just-in-Time (JIT) methodologies, supply chains, Global Value Chains (GVCs) and crisis resilience is conducted to develop a broad understanding of the current state of research. The main objective is to examine the mechanisms of JIT within global value chains and global supply chains and assess how recent crises—most notably the COVID-19 pandemic—impact these systems. A systematic review is conducted to guarantee the incorporation of current and methodologically sound research, with a focus on academic publications from the last ten years.

The sources are chosen based on several factors, including citation frequency, journal impact factor, author expertise and the overall relevance of the findings to the discourse on JIT and chain management. After evaluating a wide array of studies, 16 publications are identified as particularly significant and are analyzed in detail. To organize a structured synthesis of insights, Table 1 presents a comprehensive overview of the selected studies, summarizing their main contributions to the field.

Table 1: *Overview of Relevant Studies*

Author/s (Year)	Methodology & Results
Matsuo (2015)	Matsuo combined empirical analysis and a case study approach to examine how Toyota responded to the 2011 Japan earthquake. The study applied a Supply Chain Management (SCM) framework to evaluate the disruption of semiconductor supplies and Toyota's adaptation strategies across four levels: execution, design, strategy, and sustainability. The findings reveal that Toyota moved from a strict JIT system to a hybrid model, incorporating strategic stockpiling for key parts and better supplier coordination to strengthen supply chain resilience.
Van Wyk, G. & Naidoo, V. (2016)	The authors examined JIT implementation in a South African electronics company using a case study approach. Data was collected through staff interviews, on-site observations, and company reports. Findings reveal that JIT improved inventory control and production efficiency but faced challenges like supplier dependency, frequent stock shortages, and inflexibility in handling demand changes. The study recommends balancing JIT with contingency plans to address supply chain risks.
Parveen et al. (2019)	Parveen et al. used a case study approach to explore how JIT was implemented in the sewing section of a garment factory in Bangladesh. Data was collected through observations and productivity analysis. The results show that the traditional production system had inefficiencies and JIT could improve productivity, reduce inventory, and lower defects in labor-intensive industries.
Brakman et al. (2020)	Brakman et al. analyzed structural changes in globalization from a conceptual perspective. They discuss how COVID-19 has impacted global trade and supply chains, speeding up the shift from JIT to JIC systems. They argue that companies are more likely to prioritize stability over efficiency, leading to larger inventories, more reliance on regional suppliers, and a focus on reducing dependence on global supply chains.
Bryce et al. (2020)	Bryce et al. used an organizational resilience framework to examine how the UK's National Health Service (NHS) prepared for and responded to the COVID-19 crisis. By analyzing documents and case studies, the authors show that relying too much on lean production and JIT supply chains made the NHS vulnerable to disruptions.

Author/s (Year)	Methodology & Results
	The findings point out the need for better planning, stockpiling essential supplies, and building flexibility to improve public health readiness.
Carvalho et al. (2020)	The authors used a production network model to study how supply chain shocks spread after the 2011 Japan earthquake. Using firm-level data and transaction networks, they measured disruptions both upstream and downstream. The results show that firms directly or indirectly linked to affected suppliers or customers saw major revenue losses.
Chakraborty & Biswas (2020)	The study combines two methods. First, the authors analyze texts like business reports, academic papers and market research to find common terms linked to supply chain disruptions. Second, they conduct a case study of a garment factory in Bangladesh to measure how COVID-19 increased costs. The results show that supply chain disruptions raised production costs, reduced global demand for clothing and led to factory closures and job losses.
Gereffi (2020)	Gereffi used a GVC framework to analyze how COVID-19 disrupted medical supply chains. The research focused on trade dependencies, policy gaps and how global supply networks are managed. The findings stress the importance of building more resilient and diverse supply chains to handle future crises better.
Pisch (2020)	Pisch examined the role of JIT in global supply chains using survey and administrative data from French manufacturers. The results show that JIT supply chains are more concentrated and vertically integrated compared to traditional ones. The study presents a framework where coordination issues lead to higher inventory levels and JIT improves efficiency by reducing these problems. The findings suggest that international JIT supply chains depend on strong supplier relationships to lower inventory risks.
Zhu et al. (2020)	The authors use supply chain theory to explore why JIT supply chains struggled during the pandemic. They point out key weaknesses, such as poor transparency, lack of resilience and limited adaptability. To address these issues, they suggest strategies like nationalizing critical supply chains, diversifying suppliers with a „plus one” approach and keeping more safety stock to better handle future disruptions.
Jiang et al. (2021)	The study used a theoretical model to examine how companies make supply chain decisions under uncertainty. Jiang et al. compare JIT, JIC, and JIWC strategies, showing how firms adapt to systemic risks. The findings suggest that in high uncertainty, companies focus on resilience over efficiency, using strategies like probability matching. The study concludes that strong supply chains need redundancy and diversification to handle global crises.
Freund et al. (2022)	Freund et al. analyzed trade patterns in the automobile and electronics industries after the 2011 Japan earthquake. Using trade data and a difference-in-differences approach, the authors explore whether companies diversified suppliers, brought production back home or increased offshoring. The findings show that global supply chains stayed largely unchanged, as firms kept focusing on cost efficiency and economies of scale rather than quickly diversifying locations.
Prasanna & Dalvi (2022)	The authors used a case study approach and explored how Zara’s vertical integration, JIT strategy and real-time data sharing help the company stay flexible and responsive. Key findings show that Zara’s centralized logistics, RFID tracking, and batch production enable quick manufacturing cycles. After the pandemic, Zara also shifted focus to e-commerce and reduced inventory to maintain supply chain efficiency.
Choi et al. (2023)	Choi et al. used a conceptual approach to examine how JIT supply chains are adapting to uncertainty. They highlight that JIT, traditionally focused on efficiency, now requires a hybrid model with JIC elements to improve resilience. The study recommends maintaining small buffer stocks and diversifying suppliers to reduce risks without losing the efficiency benefits of JIT.

Author/s (Year)	Methodology & Results
Coveri & Zanfei (2023)	The authors used a mixed-method approach to analyze the risks of excessive specialization in GVCs. The findings suggest that economies with diverse value-adding activities handle shocks like pandemics or geopolitical crises better. Furthermore, the study recommends selective reshoring, investing in key sectors and reducing over-dependence on global supply chains.
Wu et al. (2023)	The authors used a hybrid methodological approach, demonstrating how digital technology is transforming sustainable value chains in fast fashion industry. The findings show the critical role of eco-friendly design, digital production, and transparent information-sharing to enhance resilience if it comes to supply chain disruptions.

Own representation

Table 1 provides an overview of the strengths, weaknesses of JIT-based supply chains, particularly during global crises. Many studies highlight the vulnerabilities of JIT models, such as their reliance on lean inventories and close relationships with suppliers, which can lead to severe disruptions during shocks like the COVID-19 pandemic (Bryce et al. 2020: 880-882; Prasanna & Dalvi 2022: 1; Wu et al. 2023: 1-2; Zhu et al. 2020: 3-7). Research also shows that companies are increasingly shifting from JIT to JIC strategies to build resilience, incorporating safety stocks, alternative suppliers, and regional production networks (Brakman et al. 2020: 4-6; Jiang et al. 2021: 1-6).

Case studies in the textile and garment sectors reveal that while JIT improves efficiency and reduces costs, it can also create significant risks when supply chains lack flexibility (Chakraborty & Biswas 2020: 1-8; Parveen et al. 2019: 618-620). Similarly, studies in the automotive and electronics industries show that global supply chains often remain unchanged even after disruptions, as companies prioritize cost efficiency and economies of scale over rapid restructuring (Freund et al. 2022: 590-593; Pisch 2020: 1-7). In contrast, Coveri and Zanfei (2023: 73) emphasize the risks of over-dependence on global value chains, advocating for selective reshoring and a balanced mix of JIT and resilience-driven strategies.

The insights from Chapter 2 serve as an important bridge between existing state-of-the-art research and the new empirical data collected in this study. Furthermore, these findings provide the foundation for the conceptual development of the expert interview questions.

To consistently connect state-of-the-art-research with the empirical investigation it is necessary to explain how the questions for the interview guide are conceptualized. As the researcher knew about the know-how and background of the experts the interview guide was marginally adopted to the different experts. This approach tries to acquire specific knowledge of experts within the field of global economics, international development, and comparable fields. Their expertise on JIT, garment GVCs, the current and recent economic situation as well as future developments provide the material for further analysis. The specific research interest and question lead to this decision since literature research alone cannot provide sufficient information to specify the current situation of the combination

of GVCs and JIT. Furthermore, interviewing experts could provide further insights and valid predictions to future developments regarding these topics. Semi-structured expert interviews are the most suitable for this purpose, since in direct discussions the subjective position can be conveyed through personal conversation. Optional follow-up questions are another advantage, whereby ambiguities can be cleared up immediately and comprehensive answers can be given (Helfferich, 2019: 680-684; Mayring, 2019: 39-54).

At the beginning of the interview, a simple narrative impulse was set up, which was used to introduce oneself, the occupational career, and the experience in the field. Afterwards, questions focus on the current state of garment GVCs that use JIT in the current situation of ever-changing circumstances, differing causes of disruptions of garment GVCs and ideas for possible future adaptations. Building on these foundational questions, the interview guide was structured to directly address the research question of how JIT supply chains in the garment sector have been affected by recent crises and how they may need to adapt (see Appendix 4). To ensure a connection between empirical insights and the existing literature, the development of the interview guide is based on key findings from Table 1, particularly studies that highlight the vulnerabilities of JIT and the shift toward resilience-focused strategies (Bryce et al. 2020: 880-882; Brakman et al. 2020: 1-4; Choi et al. 2023: 2331; Jiang et al. 2021: 39-44; Prasanna & Dalvi 2022: 1-3; Wu et al. 2023: 8-11).

The first set of questions aimed to build a foundational understanding of how JIT practices are applied in garment supply chains. While existing research highlights the benefits of JIT, such as increased efficiency and cost savings, it also points to its vulnerability to disruptions (Pisch, 2020: 40-43; Chakraborty & Biswas, 2020: 4-8). To capture current industry perspectives, the interview guide began with a broad opening question (Q1) about how JIT is perceived today. This question also set the stage by getting a common understanding of JIT since definitions could vary. This was followed by more targeted questions (Q2, Q3) focusing on the advantages, challenges, and key performance metrics associated with JIT. These questions reflect the literature's focus on the trade-offs between lean efficiency and supply chain risks (Parveen et al. 2019: 624-628; Freund et al. 2022: 609-611).

The next set of questions focused on how recent crises, like the COVID-19 pandemic, have affected JIT strategies. Research has shown that JIT supply chains struggled during the pandemic, leading many companies to move toward more resilient models (Brakman et al. 2020:3-6; Zhu et al. 2020: 9-15). To find out if this trend also applies to the garment industry, the interview guide included direct questions about how JIT performed during crises like COVID-19 and the Ukraine-Russia conflict (Q4, Q5). Additionally, since supply chain weaknesses are often tied to global networks and not having enough backup plans (Gereffi 2020: 290-297; Jiang et al. 2021: 7-9), Q6 looks at the specific reasons why JIT struggles to stay resilient in garment production. Finally, the last set of questions

focuses on possible changes to JIT, based on ideas from the literature about hybrid models and other ways to manage supply chains.

Choi et al. (2023: 2336-2338) and Coveri & Zanfei (2023: 76-85) point out that many companies are now combining JIT with JIC models to improve resilience without losing efficiency. To see if similar changes are happening in garment supply chains, Q7 is about alternative strategies, and Q8 directly asks whether JIT needs to be changed or replaced. Brakman et al. (2020: 5-6) also suggest that adding more buffers and working with more suppliers could make JIT more resilient. To explore this idea, Q9 asks experts if JIT should shift toward a JIC approach.

By structuring the interview guide according to these themes, the study ensures a clear and focused exploration of the main research findings. At the same time, it leaves space for experts to share their own in-sights, which could either support or challenge what is already known in the literature (Helfferich, 2019: 676-678).

3.4. Method of Data Collection

The following section describes the process of data collection in detail and starts with outlining the challenges of the initially planned approach of just conducting expert interviews. In line with the methodological approaches of several studies listed in Table 1, a supplementary document analysis was employed to complement the expert interviews. The next step describes the recruitment strategy and sample selection, followed by an explanation of the interview execution and transcription process. Finally, supplementary data sources will be identified and evaluated in context of the research goal.

3.4.1. Challenges during Data Collection

After seven months in the field, the approach of qualitative interviews proofed to be insufficient due to the low number of replies to interview requests and even lower willingness to participate. During the field phase over 200 people were contacted. Below 2% accepted the request, around 10% declined and over 80% did not reply to the request or any follow up messages. This response rate was consistent across all contact channels: direct messaging via e-mail, directs messaging via LinkedIn or contacting people that were recommended by respondents that took part or declined. Due to this unexpectedly low response rate, the research design was expanded to include a document analysis component. This approach is chosen to ensure the credibility and validity of the study by integrating additional qualitative sources that complement the insights from the expert interviews (see chapter 3.4.4).

3.4.2. Recruiting Process and Sample

At the beginning of the research, different considerations are made about field access and sample selection. A wide variety of experts working in differing fields are considered for their distinguishable opinions and knowledge. The purpose is to conduct a mixture of expertise from distinguishable positions and their connection to the topic, for example researchers, entrepreneurs, Chief Executive Officers (CEOs), or Non-Governmental-Organization (NGOs) personnel. This idea is estimated to add a positive aspect to the research since the given expertise, views and projections provide diverse insights and can be assessed. A standardized request text is used and adapted individually to contact the experts. Information about the research topic, the researcher and the core questions of the guideline are included in advance to ensure a transparent working process to the potential participants from the beginning of the contact. Furthermore, the safe handling of the data obtained is assured and they were asked, if they agree on the publication of their name. The targeted interviewees are people, who specialize in the field of garment GVCs, JIT and their combination. Therefore, they should be qualified to answer the questions of the guideline and furthermore deepen the current state of knowledge. The expert interviews are defined by the special selection of the target group and their special expert knowledge on a problem (Helfferich 2019: 680-684).

Most of the experts are contacted via their contact E-mail addresses found on the internet or their profile on the professional networking platform LinkedIn. People with the necessary qualifications are targeted. In doing so, the researcher can find experts, who distinguish themselves through their occupation, their position, their experience, their own research and/or their teachings regarding the researched topic. Interview requests are sent to all these experts via email or text message including the uniform request text. Only a small share of the contacted experts responds and even fewer agreed to give an interview. The transcripts of all interviews are attached in “Appendix 6 Transcripts of Expert Interviews E1-E7”.

In the following section the experts are properly introduced, explaining how their knowledge may help to gain a deeper understanding and generate new valuable insights.

Felix Maile (E1) is a scientific project assistant at the institute of international development at the University of Vienna. He is a member of the research project ‘Decent Work and GVC-based Industrialization in Ethiopia’ (EthApparel). The project focuses on Ethiopia’s involvement in the global textile and clothing industry and the impact it has on suppliers and workers in the country. In his dissertation, Maile explores how financial markets and investors shape the strategies of international fashion companies and the implications for Ethiopian supplier companies (E1, 2024, Pos. 15-43). His academic work qualifies him as a relevant expert for this study. He provides specific scientific insights into the current research in garment GVCs, especially in the case of Ethiopia.

Gertrude Klaffenböck (E2) is the project coordinator for the Austrian Clean Clothes campaign (CCC) of Südwind, an Austrian NGO that focuses on promoting global justice, sustainable development, and human rights. This international campaign seeks to improve the working conditions of workers in the garment industry. Furthermore, it tries to address systematic violations of labor and human rights in the garment industry. The target is to highlight abuses and improve the situation of workers by lobbying companies. The information and public relations work from coordinators like Klaffenböck aims to raise awareness among citizens and consumers in order to win them over as supporters to work together for improvements in production facilities and structural changes. She collected working experience over 7 years with CCC and therefore has profound knowledge on the garment sector, its involvement in GVCs and the included stakeholders (E2, 2024, Pos. 28-67) She provides insights from those that are located at the lower parts of the chain. This point of view is valuable since it covers a position that is directly connected to the practical work. It adds to a more universal understanding of the research matter.

Mohammad Jahangir Alam (E3) is a seasoned logistics and supply chain professional with more than 15 years of experience, primarily in the garment industry. Over the years, he has collaborated with international brands such as Auchan, Primark, and TALLY WEiJL, overseeing supply chain operations across Asia, West Asia, and parts of Africa. In his current role, he manages global logistics for a Swiss fashion company, with a focus on key regions including Bangladesh, India, Pakistan, Sri Lanka, Turkey, and Morocco. Alam specializes in areas like vendor management, transportation coordination, delivery optimization, third-party logistics (3PL) negotiations, and cost-efficient logistics strategies (E3, 2025, Pos. 20-42). With his extensive hands-on experience in cross-border operations, he is also a great fit for uncovering fresh, valuable insights. His background gives him a unique perspective to spot opportunities, tackle challenges, and bring practical solutions to the table.

Daniel Kohlmann (E4) is a research assistant at the Institute of Transport Economics and Logistics at the Vienna University of Economics and Business and concurrently serves as the Country Director Austria for *ZUGSEIL Supply Chain Solutions AG*. *ZUGSEIL* distributes software solutions and offers consulting and services, especially in digital clothing and equipment management including supply chain management. Therefore, Kohlmann is an experienced economist with a focus on supply chain management in the academic field and the garment economy as well (E4, 2024, S. 17-27). He provides insights from both sides and represents a dual source for expertise.

Peter Lund-Thomsen (E5) is Professor with special responsibilities at the Department of Management, Society and Communication at the Copenhagen Business School. He specializes in corporate social responsibility (CSR) and sustainability in the global South, particularly South Asia. He

explores how transnational industries and local clusters impact firms, workers, and the environment. With interdisciplinary expertise in business, development, environment, and peace studies, he employs critical development theories, global value chains analysis, feminist political economy, and political ecology. Lund-Thomsen conducts in-depth studies on industries like football, garments, textiles, and leather, emphasizing ethical trade and sustainable value chains. He contributes to academic journals, engages in multi-stakeholder initiatives, and advocates for North-South dialogue on CSR and sustainability. At the moment he also represents the coordinator for the project *Climate change and global value chains in Bangladesh*. His position, teachings, research and experiences qualify him as an expert. Unfortunately, he is not available for a recorded interview during the phase of the interview conduction. Nevertheless, he provided written answers to the core questions of the research via E-Mail.

Tanmoy Debnath (E6) worked in the garment sector as a senior merchandiser for companies like Progress Apparels Ltd. and Newtimes Group of Companies for some over five years. Today he is a sourcing and merchandising associate for Pentland Brands Limited, which is a worldwide company based in the UK that owns and manages a collection of sports, outdoor, and fashion brands. Established in 1932 and headquartered in London, Pentland Brands is recognized for owning popular apparel brands like Lacoste, Speedo, Berghaus, KangaROOS, Canterbury of New Zealand, Endura, Ellesse, and more. With a global presence, the company designs, produces, and delivers its products to markets across the globe. Debnath represents an experienced and seasoned professional in the garment sector where his main activities are vendor sourcing, supplier management, production planning, cost, Supply chain coordination, market analysis and data analysis of each season (E6, 2024, Pos. 13-27). His insights bring an in-depth perspective from inside the industry, adding practical, everyday substance to the research.

Gerald Digruber (E7) is an expert in the field of global supply chain management within the sportswear industry. As Head of Global Product Supply at Adidas, he has nearly 20 years of experience in managing complex demand and supply networks, inventory strategies, and international distribution processes. His role gives him a high-level view of global sourcing, logistics, and operational decision-making at one of the world's leading apparel companies. Digruber's insights are especially valuable because they highlight the strategic challenges and adaptations of a major player in the garment industry (E7, 2024, Pos. 21-35). His expertise in supply chain resilience, risk management, and operational efficiency helps to understand how large corporations handle disruptions and implement changes as a response to global crises.

3.4.3. Interview Execution Transcription Process

To build a solid foundation for the study, the research uses a structured interview process supported by careful qualitative analysis. This example is chosen to show how transparent and adaptive methods can improve the depth and quality of the findings.

The researcher tries to adopt an open and curious mindset to suggest a neutral and objective interview atmosphere. The interview resembles a conversation that serves to clarify open questions and to give room for personal conjectures. It should also be clearly presented that their personal knowledge and projections will be used to create a broader, scientific understanding on the specific matter. Six of the seven interviews are recorded and transcribed using a suitable software. This form of analysis serves to record the manifest content of statements, to create an overview of a large amount of text and to develop a comparison of themes from the perspective of different actors (Helfferich, 2019: 671-672; Mayring, 2014: 43-47). The seventh interview participant sent his answers in a written and thus text-based form.

The analysis of the transcripts is broadened by comments about the interview situation, ambiguities in the interview and comments of the interviewees after the end of the recording. In this way, any deficiencies identified were rectified in the next interview situation and any additional insights gained can be considered in the further evaluation. The audio files of the interviews are subsequently transcribed. As mentioned above, the interviews will not be rendered anonymous in order to be able to verify and outline the expertise of the participants. The questionnaire provides the basic structure of the interview and further topics are picked up by inductive evaluation of the data material. To focus on the content of the interviews, pauses in speech, delayed words, sentence breaks or other remarks that do not change the content are removed in a revision of the transcripts. Furthermore, sentence structure errors will be corrected to smooth out the style for better comprehensibility (Mayring, 2014: 31-42). Before the collected data was analyzed, it had to be processed and cleaned using the MAXQDA-Software (see chapter 3.5.2). The next section briefly explains the selection and evaluation of the supplementary data sources.

3.4.4. Supplementary Data Sources

Document analysis offers structured insights from industry reports, academic papers, and policy documents. This approach allows for triangulation, a key quality criterion in Mayring's framework. By combining multiple data sources, triangulation strengthens the credibility and validity of the findings. It also helps to balance out gaps or limitations in the interview data by bringing in different perspectives (Mayring 2014: 39-42).

This mixed-methods approach of pairing expert interviews with document analysis has been successfully used in earlier studies on JIT supply chains and their resilience during crises. For instance, Van Wyk & Naidoo (2016: 237-244) looked at JIT implementation through case studies, on-site observations, company reports, and interviews. Chakraborty & Biswas (2020:10-14) took a similar route, analyzing business reports, market research, and academic papers alongside a factory case study. Bryce et al. (2020: 882-886) also leaned on organizational reports and secondary data to back up their expert interviews while studying the weaknesses of lean supply chains. Meanwhile, Choi et al. (2023: 2331) used a mix of qualitative case studies and document reviews to explore how companies are moving from JIT to JIC models. These examples show how valuable document analysis can be as a supporting method, particularly when interviews alone are not enough or when extra data is needed to confirm findings. By adding document analysis, this study aims to build a richer, more grounded understanding of how JIT supply chains are adapting to today's crises, using a mix of expert insights and real-world evidence to paint a fuller picture.

As additional data sources, five company reports, four scientific papers and four internet sources were identified and considered as relevant. The following section gives a brief overview of the different sources and their value proposition for this research.

Reports from the Garment Industry

Five company reports from the garment industry are analyzed to gain a deeper understanding of how JIT strategies, supply chain management, and crisis resilience are applied in global value chains (GVCs). These reports come from major players in the industry such as Adidas, H&M, Inditex, and SHEIN, offering insights into areas such as inventory management, sourcing decisions, sustainability efforts, and supply chain flexibility (Adidas AG, 2024; H&M, 2024; Inditex, 2020; Inditex, 2023; SHEIN, 2023). The most current reports are analyzed to gain most relevant insights. Reports of Inditex are included from two different years to analyze differences, especially regarding the COVID-19 responds. By examining these documents, it is possible to close the gap between theoretical perspectives and real-world corporate practices. Additionally, the reports shed light on how these companies have adapted to recent challenges, including the COVID-19 pandemic, geopolitical tensions, and changing consumer demands. Therefore, the analysis adds valuable empirical depth to this research. Nonetheless, these reports are not fully transparent and do not discuss topics as wage suppression, labor exploitation, increased outsourcing or pressure on suppliers. By leaving these topics out the companies reduce the risk of publishing information that could harm there image.

Academic Literature

In addition to the company reports, four academic papers were included in the analysis to provide a theoretical foundation and scholarly perspective on JIT strategies, supply chain resilience, and the

evolution of global value chains. These papers offer valuable insights into how companies handle uncertainty, adopt hybrid models that blend JIT with safety stocks, and use digital technologies to optimize their supply chains. By incorporating these academic perspectives, the study ensures a balanced understanding of both the theory and practical realities of JIT-based supply chains in the garment industry.

Industry and Policy-Oriented Online Sources

Finally, four online sources were included to bring in industry perspectives and up-to-date insights on supply chain disruptions, JIT strategies, and resilience in global value chains. These sources add to the academic literature by capturing current debates, emerging risks, and how companies are responding to supply chain challenges. Beattie (2020) critiques the idea that diversifying or reshoring supply chains is the only solution to JIT's vulnerabilities, pointing out the complexities involved in restructuring. Burstein (2021) looks at how disruptions in fashion supply chains can create opportunities for change, offering a closer look at how brands adapt to uncertainty and shifting consumer demands. Cantore et al. (2022), from the United Nations Industrial Development Organization (UNIDO), analyze how multiple crises impact global value chains, providing a broader, policy-focused view of supply chain resilience. Webb (2022) highlights climate change as a growing threat to the fashion industry's supply chains, stressing the need for sustainability-driven strategies. By including these industry-focused perspectives, the study paints a fuller picture of the challenges and adaptations tied to JIT in the garment sector. These sources help connect theory with real-world practices, offering valuable insights into how supply chains are evolving in the face of economic, geopolitical, and environmental pressures.

3.5. Method of Data Preparation and Processing

The next section gives an overview of the main steps in preparing and processing the data. This includes how QCA is applied following Mayring's approach, as well as how the software MAXQDA and its key features are used.

3.5.1. Steps of the Qualitative Content Analysis of Mayring

The data preparation and analysis follow Mayring's QCA method. This structured and systematic approach keeps the analysis focused on the research questions and grounded in theory, while also making it possible to extract key insights from large amounts of text. Mayring's method is known for its rule-based, step-by-step process, which ensures clarity and makes the analysis easy to replicate (see Appendices 1-6). The analysis covers not only the expert interviews but also the additional data sources discussed in chapter 3.5.4, which help to provide a fuller picture of JIT in global value chains.

The QCA follows a four-step process, whereby the first step (transcription of the interviews) is only necessary for the interview data, as the supplementary sources are already available in written form (Mayring, 2014: 39-54).

1. *Transcription of the Interviews:* To ensure transparency and traceability in the analysis, the expert interviews are recorded and transcribed using a reliable transcription tool. The transcription process follows the transcription rules outlined in Appendix 5. To facilitate precise referencing during the evaluation and presentation of findings, all transcripts are numbered line by line. This structured, step-by-step approach to transcription allows for a clear organization of the text-based data and make it easier to refer to specific statements during the analysis with MAXQDA (see Appendices 7 & 9).
2. *Analysis Process:* The QCA follows a structured multi-phase approach, where text-based data is gradually reduced to extract essential statements. In the initial step, text passages are simplified and transformed into clear statements (see Appendix 2). The second step involves filtering out redundant information and generalizing the statements to achieve a higher level of abstraction (see Appendices 2 & 8).
3. *Development of the Category System:* Creating a solid category system is a core part of Mayring's QCA and is done step by step. First, a coding guide is put together based on earlier research and tailored to the study's main questions. This guide lays out the categories, defines them, gives examples, and sets rules for how to sort text passages (see Appendix 1). Using MAXQDA, the expert interviews and additional documents are carefully analyzed, summarized, and sorted into the right categories (see Appendices 2 & 8). The use of MAXQDA makes the whole process smoother, helping to keep things consistent and making it easier to manage and interpret the data.
4. *Coding and Analysis:* The category system is adjusted and improved as the coding and analysis progressed, making sure it captures all the different ideas and details in the text. This step-by-step process allows for a thorough exploration of the material, leading to solid, well-supported conclusions. The final version of the category system is included in Appendix 3.

By following Mayring's QCA, it is possible to ensure a structured and transparent research process, and to connected theoretical and practical insights, as well as empirical findings consistently.

3.5.2. MAXQDA-Software Functions and Tools

To keep the analysis of qualitative data systematic and well-organized, MAXQDA is used as the main tool for coding and interpreting the collected material. The software comes with a variety of features that make it easier to work through and evaluate all the collected text-based data.

The first step is to import the pre-defined coding system, which is saved as a CSV file, directly into MAXQDA. This helps to ensure that the coding stays consistent across all the data. Having a structured coding system makes it easier to compare data and quickly find what is needed. The codes are based on theoretical frameworks and are adjusted as the analysis progressed. Since qualitative analysis is always dynamic, the CSV file with the coding system is also updated if needed. If new themes come up that require subcodes or existing categories need adjustments, changes are made to improve accuracy and keep the method flexible.

Once the interview transcripts are loaded into MAXQDA, the Auto-Coding feature is used to spot key themes by searching for terms like „cost reduction,” „inventory,” and „supply chain disruption.” This automated step helps to quickly sort the text into initial categories, speeding up the data analysis. After auto-coding, the results are manually checked and adjusted to fix any misclassified sections, to make sure the context is accurate, and to add subcodes where needed. This manual step is essential for keeping the coding system reliable and making sure all-important insights are properly categorized.

Once the coding is done, several MAXQDA tools are used to dig deeper into the connections between different themes. The Code Relations Browser helps to spot patterns and links between categories, like how JIT efficiency ties into supply chain vulnerabilities. By mapping these relationships visually, the analysis uncovers deeper insights into what shapes JIT-based supply chains. The Summary Grid tool is then used to pull together key points from the interviews, making it easier to compare expert views on supply chain resilience, crisis adaptation, and alternative production models. To get a sense of recurring ideas, the Word Frequencies tool highlights the most common terms used in the interviews. Finally, MAXMaps is used to create visual diagrams of thematic clusters, helping to make sense of the patterns that emerge.

MAXQDA is also used to analyze the additional text-based data, including the five company re-ports, four academic papers, and four online sources. The same coding system and analytical steps are applied to these materials to ensure methodological consistency across all data sources.

By mixing automated and manual coding, MAXQDA makes it easier to spot patterns, group themes, and connect ideas across different data sources. The next chapter lays out this analysis' results.

4. Key Findings and Results

The following chapter presents the key findings of the empirical investigation based Qualitative Content Analysis QCA. The results are structured according to the main categories and subcategories derived from the coding process, ensuring a systematic and comparable presentation of insights across data sources.

4.1. Description of the Data Presentation

The findings in this chapter derive from the category system established through Qualitative Content Analysis (QCA). Table A. 1 Coding Guidelines presents the category system (see Appendix 1). To maintain clarity and traceability, all data is systematically referenced across sources. Results are organized according to the core categories and subcategories that have been generated during the coding process (Appendix 3). Within each category, expert interview statements are reinforced-or where relevant, contrasted-with supplementary material findings, ensuring a multi-perspective analysis of the research topic. When referring to interview excerpts, the referencing format „(e.g. E1, 2024, Pos. 15-18)” is used. It indicates the interview partner E1 to E7, the year of data collection and the exact line number of the statement in the transcript that have been converted and analyzed using MAXQDA. The supplementary data is imported as PDF documents. During the analysis, reports are cited as „(e.g. Adidas, 2024: 10-11)”, scientific papers as „(e.g. Jiang et al., 2021: 1)”, and internet sources as „(e.g. Beattie, 2020: 2).” This consistent referencing approach ensures full traceability across all results, allowing direct alignment with the finalized category system.

In the following sections, each main category is examined in detail, using the citation scheme to discuss the key findings and illustrate relevant perspectives.

4.2. Just-in-Time in Global Value Chains

The first main category, Just-in-Time in Global Value Chains, explores the fundamental concept JIT and its relevance in the context of GVCs. The insights of the expert interviews and supplementary data are organized by dividing the main category into three subcategories. First, defining and conceptualizing JIT; second, exploring its implementation in garment manufacturing; and third, comparing its use across other industries (Appendix 3).

The first subcategory, Definition & Concepts, covers theoretical explanations, key terms, and conceptual clarifications provided by the experts. The code is applied whenever definitions of JIT, its

core principles, or related terminology are mentioned or explained in more detail. In doing so, the subcategory lays the conceptual foundation for understanding how experts frame JIT in the broader context of global value chains.

A recurring theme across the interviews is the discrepancy between the academic understanding of Just-in-Time and the terminology or perception within the industry itself. One expert explicitly points out that the term “Just-in-Time“ is rarely used in the garment industry, even though the underlying processes may align with JIT principles. Instead, industry professionals often refer to related concepts such as “on time in full“, when describing performance expectations and delivery accuracy (E1, 2024, Pos. 769-771; E7, 2024, Pos. 499-506). As E1 explains, “there’s not like in garment someone that is really specialized on Just-in-Time, just because (...) no one uses the term.“ (E1, 2024, Pos. 775-778). This statement illustrates the gap between academic language and industry vocabulary, making it difficult to apply theoretical frameworks directly in empirical conversations with practitioners.

E7 (2024, Pos. 190-194) highlighted that their operational goals are centered around ensuring the availability of products at the right time and in the right quantity. A concept that aligns functionally with JIT but is referred to differently in practice. From his perspective, avoiding overstock and stock-outs is the key concern, which he describes as „just-in-time for our needs from a pure product availability and sales perspective“ (E7, 2024, Pos. 190-194). This reflects a functional understanding of JIT that is detached from its theoretical label but still closely aligned with its logic.

Academic literature offers clear and structured definitions of Just-in-Time (JIT), usually focusing on its aim to improve efficiency and keep inventory levels low. Jiang et al. (2021: 1) describe it as one of the key supply chain management theories, with minimal inventory and streamlined processes at its core. The concept itself took shape in Japan during the 1940s and 1950s, largely as a response to limited space, resources, and capital (Jiang et al., 2021: 1). It later gains international attention through Toyota’s Production System (TPS), which promotes the reduction of waste, inconsistency and overloads. Core elements of this system include synchronized production, the use of pull mechanisms and close coordination with suppliers (Choi et al., 2022: 2331-2332). These ideas have become the foundation of how JIT is understood academically and have shaped production practices across many industries. Rather than being a one-size-fits-all model, JIT consists of various interconnected practices, like producing in small batches, using Kanban systems and sticking to tight schedules, which need to be adjusted to fit the specific context of each supply chain (Choi et al., 2022: 2335).

Although many processes in the garment industry follow the logic of Just-in-Time, the term itself is hardly ever used in practice. This shows a clear discrepancy between the way JIT is discussed in academic circles and the way it is perceived in the garment industry. In day-to-day operations, the focus is more on making sure deliveries arrive on time and products are available when needed. That

is why it is important to bridge the gap between theoretical models and the way JIT is understood and applied in specific industry contexts, especially when analyzing it within global value chains.

The second subcategory, Application in the Garment Industry, looks at how the Just-in-Time principle is used within the garment and textile sector. The code was applied whenever the experts share real-world examples, describe operational practices or discuss how JIT works in practice in this industry. The goal of this subcategory is to explore how JIT concepts are put into action and to see whether the core ideas behind Just-in-Time fit with the specific processes and conditions of the garment sector.

The expert interviews paint a more nuanced picture of how JIT works in the garment industry. E1 (2024, Pos. 50-68, 132-134) points out that, unlike in other sectors, there has not been a clear shift from Just-in-Case to Just-in-Time because the garment industry has essentially followed JIT-like practices all along. He explains that outsourcing and demand-driven production have been fundamental to how the sector operates, especially since trade liberalization in the early 2000s. In his view, the way the industry is currently set up makes it unlikely that companies will move back to more buffered Just-in-Case models. Instead, the focus remains firmly on speed and responsiveness.

E4 (2024, Pos. 55-65) adds how closely connected the different parts of the supply chain need to be for JIT to work in the garment industry. He explains that producing something as simple as a jacket or shirt involves many suppliers for fabrics, buttons, chemicals, etc., and that all of them need to work together and share information quickly to meet tight deadlines. According to him, JIT can be very effective, but only when the environment is stable and demand is predictable. Once disruptions occur, however, the system becomes much harder to manage (E4, 2024, Pos. 145-151).

E5 (2024, Pos. 4-9) brings in a regional perspective by pointing out that low-cost production hubs like Bangladesh are deeply embedded in JIT systems, especially in the fast fashion segment. However, he also says that this setup puts pressure on suppliers to meet tight price expectations, a dynamic often referred to as the Bangladesh price. E7 (2024, Pos. 252-260), who represents a global sportswear brand, offers a detailed look at how JIT works in practice. He describes a tightly coordinated system where production, transport and distribution are all aligned, starting with demand forecasting and ending with having the right product on the shelf at the right time (E7, 2024, Pos. 260-276). The goal is to avoid both overstock and stockouts by combining long-term planning, such as ocean freight with more flexible and faster shipping options like sea-air or trucking from nearby regions. What emerges is a hybrid approach to JIT that mixes different transport strategies with real-time demand planning to keep shelves stocked efficiently (E7, 2024, Pos. 170-194).

The expert insights are backed up by findings from the supplementary sources. One well-known example is Zara, often highlighted as a leading case of successful JIT in fashion retail. The company's

vertically integrated supply chain combines lean thinking with fast, responsive production and frequent restocking, helping to keep inventory low while still delivering products on time (Prasanna & Dalvi, 2022: 1). SHEIN also highlights the importance of strong supplier relationships and timely payments. By supporting smaller manufacturers, the company helps them keep up with rapid shifts in demand and ensures that products remain available (SHEIN, 2023: 23).

At the same time, researchers highlight some structural challenges when it comes to making JIT truly sustainable. Wu et al. (2023) point out that even though fast fashion companies like H&M Taiwan aim to create a positive impact along their supply chains, it is still difficult to measure how effective these sustainable JIT approaches really are. Their study calls for more holistic and interconnected value chain models, that do not just focus on efficiency, but also take social and environmental factors into account, especially in times of crisis like the COVID-19 pandemic (Wu et al., 2023: 3-4).

The findings show that JIT is deeply rooted in the way the garment industry operates. Even if the exact term Just-in-Time is not always used, the core principles are synchronized production and delivery, flexible shipping strategies and minimal stock levels. At the same time, making this approach work in practice requires strong planning and the ability to react to unexpected disruptions. This highlights the ongoing balancing act between maximizing efficiency and building resilience into JIT systems.

The third subcategory, Comparison to Other Industries, looks at how the garment industry compares to other sectors when it comes to using Just-in-Time. The code is applied whenever examples from other industries are discussed or analyzed. The subcategory helps to better understand what makes JIT in the garment sector unique.

Several experts point out that while the garment industry is deeply rooted in Just-in-Time practices, other sectors have been much more engaged in rethinking their strategies, especially since recent global crises. E1 (2024, Pos. 284-286) says that industries like the semiconductors and automotive industries are far more vulnerable to geopolitical risks and critical material dependencies. As a result, these sectors focus more on building resilience and introducing buffer systems. The garment industry, on the other hand, still largely relies on long-established outsourcing models and deals with less complex components. Therefore, there has only been little push towards Just-in-Case approaches and the JIT model remains dominant.

E4 (2024, Pos. 40-47) and E5 (2024, Pos. 9-13) add that JIT in the garment industry tends to be more flexible and demand-driven, compared to other industries like the automotive industry, where planning is much more detailed due to the high value and complexity of the components involved. In sportswear, for example, production is often timed around big events like the World Cup, allowing for longer lead times and more strategic coordination. E7 (2024, Pos. 248-252), who has a background

in the automotive sector, confirms that JIT in car manufacturing traditionally means the precise delivery of components just in time for final assembly. But when he compares that to the garment industry, he sees key differences. While car production depends on exact timing and complex parts, JIT in the garment industry is more about making sure that the right products are available in stores when customers want them. That is achieved through forecasting and adaptable shipping methods (E7, 2024, Pos. 134-139). Because garment production is simpler and has fewer dependencies, it allows for a more flexible and less fragile approach to JIT.

The experts' views closely match the findings of Choi et al. (2022), who take a detailed look at how JIT works in the automotive industry. They describe how Toyota's system relies on finely tuned processes using tools like Kanban, and built-in quality checks, to keep assembly lines running smoothly. However, they also point out that in more volatile settings, there is a lot of variation in products. Long distances between suppliers or unexpected disruptions make sticking to JIT much more difficult. That is why the automotive industry has increasingly started using strategic buffers and inventory reserves, which help keep operations stable when things do not go as planned (Choi et al., 2022: 2332-2336).

Cantore et al. (2022: 3-4) highlight a similar shift toward buffering, showing how the automotive sector was hit hard by the Ukraine war, which led to severe shortages of wiring harnesses and iron products. These shortages caused production stops across Europe and exposed just how fragile tightly optimized JIT systems can be, if relying too heavily on specific sources. The same issue is seen in the semiconductor industry, where Beattie (2020: 2) and Burstein (2021: 3) point out that depending on single suppliers make high-tech industries especially vulnerable during times of crisis. In comparison, garment supply chains tend to be more cost-focused and spread across multiple suppliers, giving them a bit more flexibility in sourcing. Still, the comparison also brings to light the unique challenges that fashion and retail sectors face.

Unlike the automotive industry, which can build up buffers for critical components, companies in the garment sector deal with a different kind of risk, such as fast-changing consumer preferences, short trend cycles, and constant pressure on profit margins. As Beattie (2020: 2) points out, even in less complex industries, sudden shifts in demand or changes in policy can pose serious threats to a company's survival. Burstein (2021: 3) adds that new labor regulations, especially in the wake of COVID-19, have placed even more strain on fashion supply chains that were already trying to recover.

While Just-in-Time remains a core principle in the garment industry, the way it is applied looks quite different compared to other sectors. Industries like the automotive or electronics industries rely on highly integrated and technically complex systems, whereas the fashion industry follows a more forecast-driven and flexible approach. This allows garment companies to respond quickly to changing

market demand, but also makes them more susceptible to shifts in consumer behavior, short-lived trends and especially unforeseen crisis. Overall, the comparison shows that JIT strategies need to be adapted to the specific realities of each industry, with supply chain design closely shaped by structural and sector-specific factors.

4.3. Benefits of Just-in-Time in the Garment Sector

The second main category, Benefits of Just-in-Time in the Garment Sector, highlights the key advantages associated with the implementation of JIT practices in apparel production. Insights from expert interviews and supplementary data are grouped into the four subcategories “cost savings & improved capital use, reduced inventory levels, flexibility in responding to market changes, and improved supplier performance & process efficiency” (see Appendix 3).

The first subcategory, Cost Reduction & Working Capital Optimization, focuses on financial savings and improved capital utilization resulting from JIT in garment production. The code is applied whenever experts discuss specific ways to reduce costs or refer to how working capital can be used more effectively.

Experts agree that keeping inventory low is one of the most effective ways to reduce costs (see Figure A. 3). E1 mentions that this idea has shaped apparel supply chains for decades long before the term JIT became common (E1, 2024, Pos. 102-105). In his view, companies avoid safety stocks because they tie up capital and hurt financial efficiency. E4 adds that lower stock levels not only reduce costs but also improve liquidity by freeing up working capital (E4, 2025, Pos. 73-75). While both highlight the same issue, their focus differs slightly. Furthermore, E1 highlights the role of better demand planning, which helps avoid overproduction and markdowns (E1, 2025, Pos. 819-826). He also links inventory reduction to the renewed importance of working capital (E1, 2024, Pos. 177-180).

E4 argues that working capital optimization is directly linked to the fast pace of the fashion industry. In his view, JIT helps companies stay financially agile and react more effectively to shifting consumer trends (E4, 2024, Pos. 50-55). E3 (2025, Pos. 102-106) adds a technical layer to the discussion by highlighting the value of ongoing data analysis to spot cost-saving opportunities. He sees reduced transportation costs as a practical way to apply lean principles in global supply chains, showing how logistics decisions shape the overall cost structure. E6 (2025, Pos. 234-244) shifts the focus to everyday operations in production. Without using financial terms, he describes how lean tools are used to reduce waste and avoid disruptions. While his angle is more about managing day-to-day risks, he still outlines the goal of cutting unnecessary costs.

The interview findings are backed by supplementary sources, such as Jiang et al. (2021: 3), who points out that cost reduction and working capital efficiency are key reasons for the global adaptation of JIT (Jiang et al., 2021: 3). SHEIN offers a practical example, using real-time data, automation, and demand-driven planning to cut inventory waste and lower consumer prices (SHEIN, 2023: 3). The subcategory shows that cost reduction is not just a side effect of JIT, but a key reason why it is applied in the garment industry.

The second subcategory, Inventory Reduction, summarizes all statements on how reducing stock levels can be a key advantage of Just-in-Time in the garment industry. The code is applied when minimizing inventory is discussed.

E1 explains that the industry has for a long time tried to avoid excess stock, as unsold inventory ties up capital and increases financial risk (E1, 2024, Pos. 811-813). From his perspective, JIT supports demand-driven production, which helps prevent overstocking. E4 (2024, Pos. 47-55) adds that many garments are only produced once orders come in or demand is anticipated. This approach keeps companies flexible while keeping inventory low. Furthermore, he is convinced that producing closer to the real demand naturally reduces the stock levels (E4, 2024, Pos. 71-73). E7 brings in a more practical view. While he agrees that inventory should be minimized, he also stresses the need to maintain product availability. In time-sensitive situations, some buffer stocks are necessary. For him, JIT is not about avoiding stock altogether, it is more about having the right product available at the right time (E7, 2024, Pos. 223-238).

The supplementary data backs up the experts' statements. Adidas, for example, reports a 22% reduction in inventory, which they achieve through adjusting strategies and reducing order volumes (Adidas, 2024: 61, 62, 126, 278). SHEIN similarly argues that on-demand models help to avoid overproduction and to cut down excess warehouse stocks (SHEIN, 2023: 5). The findings show that inventory reduction remains a key benefit of JIT, helping to lower risks and save costs, while still balancing availability with efficiency.

The third subcategory, Flexibility and Responsiveness to Market Trends, collects all statements on how JIT could help garment companies to adapt faster. The code is applied when adaptability, market responsiveness or fast reaction times are described as strategic benefits of JIT.

Overall, experts agree that flexibility is essential in today's fashion industry (see Figure A. 3). E4 observes that customer preferences are shifting faster than ever and notes that JIT makes it easier to switch between product types when trends change (E4, 2024, Pos. 52-55; 75-77). E5 adds that flexibility across the value chain is now expected as a basic industry standard (E5, 2024, Pos. 17-18). E7 (2024, Pos. 163-169) shares how his company applies JIT to stay responsive. Materials and production capacity are kept in reserve so they can quickly respond when demand rises. For him,

responsiveness also means delivering products at the right time to various partners (E7, 2024, Pos. 223-238; 289-301). E1 points the importance of fast lead times out and refers to the fashion industry's quick rebound after initial COVID-19 disruptions as evidence that flexible sourcing is possible (E1, 2024, Pos. 81-84; 175-177).

The supplementary data supports these insights. Adidas for example has built initiatives to boost responsiveness, which includes shorter lead times in key markets and more local decision-making (Adidas, 2024: 53, 65). Inditex also places flexibility at the core of its model (Inditex, 2020: 142). SHEIN and H&M highlight data-driven systems that allow them to adapt quickly to shifting demand (SHEIN, 2023: 12, 26; H&M, 2024: 12). Choi et al. (2022: 2335) argue that JIT systems must become more responsive under uncertain conditions, since cost-driven models often struggle in volatile markets. Prasanna and Dalvi (2022: 2-3) also illustrate this through Zara's response to the COVID-19 crisis. Zara successfully reduces inventory and cut costs to stay aligned with new consumer needs. Overall, the findings show that flexibility and responsiveness are essential outcomes of JIT when applied effectively. In the fast-paced world of fashion, being able to react quickly is as important as keeping costs low.

The fourth subcategory, Supplier Performance & Efficiency Gains, focuses on how JIT contributes to better coordination and improvements across the supply chain. The code is applied when efforts to optimize supplier networks, to increase planning accuracy, to enhance operational processes were mentioned.

E3 (2025, Pos. 416-425) points out that JIT only works when international supply partners are well aligned. Smooth collaboration between producers, logistics providers and airlines are important to ensuring on-time deliveries across borders. E1 highlights the importance of a complete local infrastructure to become part of a GVC (E1, 2024, Pos. 364-369). Reflecting on the time before COVID-19, he describes supply chains as running smoothly, with well-functioning outsourcing systems already in place (E1, 2024, Pos. 66-68). E6 explains how lean practices can help to stabilize workflows and reduce risks (E6, 2024, Pos. 234-243). E4 highlights the need for streamlined internal routines to react quickly to changes in demand (E4, 2024, Pos. 77-79). E5 argues that JIT allows more garments to be produced in less time by speeding up the production process (E5, 2024, Pos. 16-17).

E7 explains how digital tools support efficiency. He describes that advanced analytics and Artificial Intelligence (AI) are increasingly used for forecasting, production planning and internal processes. Technologies can help to improve forecast accuracy and automate internal processes (E7, 2024, Pos. 606-646). He also points out the importance of precise delivery timing. A delay of even one day can mean missed weekend sales, while early deliveries can overload store operations. Therefore,

efficiency is not just about speed, it is also about getting the right product to the right place at exactly the right time (E7, 2024, Pos. 280-296).

The supplementary data backs up these insights. Adidas explains that its global operations unit focuses on boosting efficiency across sourcing, planning and logistics (Adidas, 2024 :65). Closer coordination with retail partners would improve sales and optimize availability across all channels (cf. 53). H&M outlines similar goals, such as speeding up product development and improving availability through stronger supply chain integration (H&M, 2024: 4).

In summary, the findings show that supplier performance and process efficiency are key outcomes of JIT if supported by collaboration, lean thinking and digital tools. JIT is about reducing waste and consistently connecting all parts of the GVC, from raw materials to the Point-of-Sales (POS).

4.4. Challenges & Risks of Just-in-Time in the Garment Sector

The third main category, Challenges and Risks of Just-in-Time in the Garment Sector, focuses on the obstacles and vulnerabilities linked to JIT practices in GVCs. The category is divided into four subcategories: the issue of demand volatility and seasonality, risks related to supplier reliability and lead times, the lack of digitalization and poor data quality and finally, the strong dependence on low-cost labor markets (see Appendix 3).

The first subcategory, Demand Volatility & Seasonality, addresses the challenges arising from unpredictability or seasonality in consumer demand. The JIT concept relies on precise demand forecasting and tightly timed production schedules. The code is applied when instability in demand patterns, difficulties in forecasting, or the influence of seasonal sales cycles on supply chains are mentioned.

E1 points out that holding safety stocks offers little strategic value in fashion, since unsold products quickly lose value (E1, 2024, Pos. 105-109). This lack of flexibility clashes with the rigid timing demands of JIT, where delays or inaccurate forecasts can easily lead to overstocks or stockouts. E3 (2025, Pos. 388-394) gives a practical example and describes a so-called prior delivery approach where raw materials are flown in from Asia and finished products are shipped to Europe as soon as they are ready. While this approach shortens lead times significantly, it comes with high transport emissions and environmental costs. E4 (2024, Pos. 79-95) argues that fashion demand can be unpredictable across regions. Popular trends can always change and what may sell well in Southern Europe may not work in German-speaking markets. That is why forecasting is difficult and often inaccurate. Still JIT relies on a level of forecasting precision that is rarely realistic.

The pandemic made these issues even more visible. E6 describes how production plans fell apart when fabric deliveries from upstream suppliers were delayed. Materials did not arrive on time, forcing

production lines to stop and workers to be paid without output. In some cases, entire factories had to close temporarily. These experiences show how fragile JIT systems are when even small delays occur (E6, 2024, Pos. 73-93). E7 offers another perspective and highlights the consequences of misreading short-term demands. During the COVID-19 period, products like mountain bikes and other outdoor equipment experienced a sudden boom and many brands mistakenly interpreted this as a permanent shift. As a result, they overstocked massively and realized later that the rising demand was only short-lived. This left companies with excess inventory and weakened margins (E7, 2024, Pos. 84-101). E7 also stresses the general problem of low forecasting accuracy in retail. It is hard to predict what specific product a customer will want, when they walk into a store, which makes true JIT implementation a constant gamble (E7, 2024, Pos. 547-559).

Company reports reflect similar concerns. Adidas, for example, sees sudden demand shifts as a major risk (Adidas, 2024: 175). Inditex reports that during the pandemic, it had to adjust staffing to stay flexible during shifting sales cycles (Inditex, 2020: 93). The results show that unstable and unpredictable demand in the garment industry does not match well with the precision and stability that JIT needs. Even though some companies try to react with faster transport or flexible supply strategies, the uncertainty remains a built-in risk that lean systems alone cannot fully manage.

The second subcategory, Supplier Reliability & Lead Time Risks, captures challenges related to the timeliness and dependability of suppliers within JIT production systems. The code is applied, when delays in material deliveries, unreliable supplier behavior or disruptions in upstream processes were mentioned.

Across the expert interviews, it becomes clear that long lead times and insufficient supplier integration are substantial threats to JIT-based systems (see Figures A. 1 & A. 2). Several experts explain how globally spread sourcing networks increase vulnerability. E1 stresses that risk now plays a bigger role in sourcing decisions (E1, 2024, Pos. 300-309). Using Ethiopia as an example, he notes how promising sourcing hubs can quickly become unstable due to political or trade-related setbacks (E1, 2024, Pos. 327-347).

E2 describes how stronger supplier relations may help to stabilize production through trust (E2, 2024, Pos. 344-368). E3 reports that costs and lead times increased by 20-30% during crises and points out climate-related disruptions as a growing threat. Events like typhoons and port closures force companies to re-schedule or re-route, which causes additional uncertainty (E3, 2025, Pos. 151-308). Strategic relocation, such as production shifting to Bangladesh, may help but also brings new risks (E3, 2025, Pos. 278-284). E4 argues that strong, trust-based supplier partnerships are essential for flexible JIT models. But recent disruptions have shown how fragile these relationships can be (E4, 2024, Pos. 162-248). From a manufacturing point of view, E5 notes that tight production timelines often pressure

producers to boost output without fair compensation (E5, 2024, Pos. 18-20). E6 shares examples from Bangladesh, where delivery delays led to production halts and factory closures during the pandemic. He also points to broader systemic issues like weak forecasting and increasing buyer demands, which caused shipment cancellations and ongoing delivery issues (E6, 2024, Pos. 295-301; 399-412; 425-443). E7 (2024, Pos. 101-107; 296-316; 440-454) explains that traditional wholesale models with long lead times are out of sync with market needs. While efforts are underway to diversify and shorten planning cycles, disruptions still cause reallocation issues or product write-offs. However, he sees value in learning from fast fashion players by involving suppliers more in development and improving responsiveness (E7, 2024, Pos. 349-359).

The supplementary data supports these findings. Jiang et al. (2021: 3) warns that JIT's main weakness lies in its dependence on suppliers who may lack the flexibility or resilience of the buyer. Therefore, developing supplier capabilities is crucial. Choi et al. (2022) adds that global supply chains with long lead times and limited face-to-face interaction make disruptions harder to detect and may lead to delays and quality issues that go against JIT's goals (cf. 2336).

The findings show that JIT in the garment industry depends heavily on reliable suppliers and stable lead times. While some firms are responding with stronger partnerships or stronger diversification the overall balance between efficiency and vulnerability remains fragile.

The third subcategory, Lack of Digitalization & Poor Data Quality, focuses on the technological and informational barriers. The code is applied when missing digital infrastructure, limited use of data-driven tools, or issues related to inaccurate, outdated or incomplete data are mentioned as severe challenges.

E4 points out that many small and mid-sized manufacturers still operate in areas with weak digital infrastructure. Without the right technology and data systems, JIT becomes difficult to implement. He also notes that the available data is often of poor quality, making planning even harder (E4, 2024, Pos. 95-104; 248-251).

E6 (2024, Pos. 45-60) compares factories using complex ERP systems like SAP with companies relying on handwritten notes or basic calendars. He explains that digital tools improve workflows and reduce human error. However, he also argues that having tools is not enough, because many employees do not know how to use them properly (E6, 2024, Pos. 110-115). During the pandemic, the reliance on paper-based processes and manual signatures brought some operations to a standstill (E6, 2024, Pos. 99-103).

The supplementary data backs this up. Inditex lists digital disruptions, like cyberattacks and system failures as major risks (Inditex, 2023: 92, 161). Adidas also highlights its strong dependency on IT systems, stating that technical or cybersecurity issues could cause significant problems (Adidas, 2024:

178). Wu et al. (2023: 1) criticizes in this context that the industry often prioritizes marketing over investments in digital infrastructure.

These findings show the importance of sufficient digital infrastructure and data in the garment sector. Without reliable systems, high-quality data and proper training for employees, JIT strategies can quickly fall apart and even the best tools will not deliver their full potential.

The fourth subcategory, Dependence on Low-Cost Labor Markets, focuses on the reliance of the garment industry on production in countries with low wage levels. The code is applied whenever reducing labor costs are mentioned.

E1 outlines how production has gradually shifted from high- to low-wage regions over time. While early outsourcing stayed within national borders global, trade liberalization in the 2000s led to relocation to low-cost labor countries (E1, 2024, Pos. 52-72). Despite rising wages, China remains central to GVCs due to its strategic importance (E1, 2024, Pos. 228-229). E1 stresses that sourcing is not only about wage levels. Higher wages in Kenya, for example, may be outweighed by lower productivity. In new sourcing countries, untrained labor often leads to a learning curve, with efficiency gains only appearing over time (E1, 2024, Pos. 369-381). E2 sees this cost-first approach as a core part of fast fashion, where low prices, fast turnarounds, and high volumes naturally drive production to low-wage countries. This model increases vulnerability in times of crisis (E2, 2024, Pos. 92-95). E6 illustrates this during COVID-19, when delays in material deliveries forced many factories in Bangladesh to pause production. Workers still had to be paid, and some factories shut down entirely. The disruptions exposed how fragile JIT becomes when concentrated in regions with weak infrastructure and social safety nets (E6, 2024, Pos. 73-93).

Supplementary data supports this view. Wu et al. (2023: 1) argues that the focus on cost and speed has contributed to environmental damage and a lack of long-term sustainability.

In summary, the findings show that on one hand low-cost labor markets enable cost-effective production and support JIT. On the other hand, they also introduce significant structural risks, including political instability and vulnerability to crises. Although productivity differences and regional dynamics are increasingly considered in sourcing decisions, cost remains the dominant driver.

4.5. Impact of Crises on Just-in-Time

The fourth main category, Impact of Crises on Just-in-Time, explores how external shocks disrupt the functioning of JIT systems in the garment industry. It includes four subcategories covering the effects of the COVID-19 pandemic, geopolitical conflicts, climate-related disruptions and challenges in global shipping & logistics (see Appendix 3).

The first subcategory, COVID-19 Pandemic & Supply Chain Disruptions, focuses on the effects of the global pandemic on the stability of JIT supply chains. The code is applied when delivery delays, production halts, labor shortages or broader supply chain breakdowns because of the COVID-19 crisis are discussed.

All experts recognize the disruptive impact of the pandemic (see Figures A.1 & A.2). E1 and E2 criticize the imbalance of responsibility, noting how retailers canceled orders and suppliers had to deal with significant financial losses, resulting in factory closures and consequently hardships for the workers (E1, 2024, Pos. 73–84; E2, 2024, Pos. 173-186). Furthermore, E1 observes that most companies stayed focused on short-term gains without adopting long-term risk strategies (E1, 2024, Pos. 486-492).

E3 and E6 describe major production delays in countries like Bangladesh, Cambodia and Myanmar due to their strong reliance on Chinese materials and disrupted transport routes (E3, 2025, Pos. 48-50; E6, 2024, Pos. 73-93). E4 and E5 describe a shift in mindset, as the crisis exposed the fragility of optimized GVCs (E4, 2024, Pos. 159-162; E5, 2024, Pos. 42-46). E7 adds how companies reacted in real time by prioritizing e-commerce, shifting stock between markets and diversifying sourcing structure within existing JIT frameworks (E7, 2024, Pos. 74-84; 421-435).

Supplementary data confirms these insights. Inditex (2020: 466), for example, reports that delayed deliveries and factory shutdowns led to greater reliance on local sourcing and flexible inventory. As a result, new initiatives promoted coordinated crisis response, although cooperation remained limited (Inditex, 2020: 248). Jiang et al. (2021: 3) argues that models built for efficiency failed under widespread disruption, revealing the trade-off between lean operations and resilience. Anti-price-gouging laws limited companies ability to pass on costs and even diversified companies saw little financial benefit (Jiang et al., 2021: 16-18, 45).

UNIDO data shows that over 70% of globally integrated firms faced input shortages. Many responded by adopting new technologies or adjusting sourcing models to become more resilient (Cantore et al., 2022: 6-7). Nevertheless, Beattie (2020: 3) and Choi et al. (2022: 2336) highlight that reshoring and diversification are not without risk. Instead of abandoning GVCs, they call for smarter designs that balance efficiency with robustness.

The second subcategory, Geopolitical Conflicts, captures how political instability and global tensions influence JIT systems. The code is applied whenever conflicts, wars, political risks or instability that affected the ability to source materials or uphold reliable global supplier relationships are discussed. All experts agree that geopolitics play a bigger role in sourcing and logistics, although they approach the issue from different angles. E1 and E3 focus on long-term shifts, particularly in sourcing diversification. E1 points to the rise of “China+1” strategies, influenced by policies and fears of a Taiwan

conflict (see Figure A.2). E3 confirms this trend from a regional view, noting how EU bans pushed production out of Myanmar and into more stable neighbors like Vietnam and Cambodia (E1, 2024, Pos. 233-240; E3, 2025, Pos. 123-145). E2 explores the social impact of war, using Ukraine as an example. Although factories remained open, wartime labor deregulation led to more worker vulnerability. E2 describes this as a systemic issue where exploitation is accepted only to keep production running (E2, 2024, Pos. 193-223). E7 discusses corporate reactions to conflicts, such as rerouting around the Suez Canal or reallocating products from Russia. He notes that unpredictable events like Houthi attacks show the limits of even strong risk management (E7, 2024, Pos. 107–111; 655-662). E5 interprets geopolitical conflict as part of a broader shift towards global instability. According to E5, the industry has entered a new moment where JIT alone is not enough anymore (E5, 2024, Pos. 42-46).

The supplementary data supports these insights. Adidas reports that conflicts in Ukraine and the Middle East disrupted global demand and supply chains. H&M is more diversified and therefore showed more flexibility in adapting to disruptions, despite ongoing uncertainty (Adidas, 2024: 124, 163-187; H&M, 2024: 4). Inditex (2023) notes that while geographic diversification adds resilience, it also increases exposure to complex legal and political frameworks, particularly regarding tax and labor laws (cf. 92). Cantore et al. (2022) and Choi et al. (2022) show how the Ukraine war disrupted global trade and caused transport bottlenecks, turning geopolitical friction into a lasting driver of instability in GVCs (cf. 2-3; cf. 2331).

The findings show that geopolitical conflicts have become a constant threat. Some companies are trying to build resilience through regional diversification or scenario planning, but many are still affected by local instability and unclear regulations. The industry's ability to adapt will depend on how well it can evaluate geopolitical risks into everyday operations and decision-making (see Figures A.1 & A.2).

The third subcategory, Climate Change & Natural Hazards, focuses on how environmental disruptions such as extreme weather events pose risks to JIT systems and GVCs. The code is applied whenever climate-related hazards or natural disasters are mentioned.

All experts agree that climate change poses an increasing threat to JIT systems, highlighting a range of different issues, such as physical disruptions and supply chain instability to worker safety and broader systemic challenges caused by natural hazards (see Figures A. 1 & A. 2). E1 and E3 describe concrete climate risks and their impact on JIT. E1 notes that factories in countries like Bangladesh face long-term threats from flooding and rising sea levels. Yet large-scale relocation remains unlikely due to high costs and limited accountability. Instead, brands tend to focus on short-term fixes like cooling systems rather than real structural change (E1, 2024, Pos. 260-271). E3 shares that opinion

and states that Bangladesh faced six cyclones and China eight typhoons causing major delays and port closures (E3, 2025, Pos. 295-355).

E2 and E6 stress the human impact of climate change on factory workers (see Figure A. 2). E2 describes extreme heat in poorly ventilated factories and repeated flooding that destroyed workers' homes. Despite these circumstances either at the workplace or at home, many were expected to return to work without medical support or extra protection. Furthermore, she criticizes the lack of supply chain policies addressing, rising temperatures, frequent storms and unsafe infrastructure, which are all risks that threaten worker safety and production continuity. Both experts argue that brands must take more responsibility, as these risks cannot longer be passed onto suppliers alone. E6 adds that unpredictable heatwaves and flooding complicate workforce planning. While their company informs clients early about possible delivery delays, he admits that weather-driven disruptions often remain beyond their control, posing a direct challenge to the time-sensitive design of JIT supply chains (E2, 2024, Pos. 234-283; E6, 2024, Pos. 425-443).

Despite growing awareness, E1 and E3 observe that little has been done to prepare for climate-related risks in a meaningful way. E1 notes that such risks still are not seen as urgent enough to take major structural change, even though JIT systems are poorly suited to handle long-term threats (E1, 2024, Pos. 508-528). E3 adds that while companies increasingly rely on air freight to offset delays, this approach undermines sustainability goals (E3, 2025, Pos. 388-394).

The supplementary data supports these insights. Adidas (2024: 81, 180-184) highlights climate-related risks like extreme weather and rising temperatures, which threaten infrastructure, productivity and supply flows. That is why their strategy includes scenario planning and decarbonization. Inditex (2023: 92, 204, 223) saw climate risks also as key threats to sourcing and logistics. While their roadmap includes risk mapping and environmental goals, they focus to address these remains internally, with limited collaboration across the supply chain (Inditex, 2023: 92, 204, 223). Webb outlines an example from Pakistan where 40% of the cotton harvest was wiped out and droughts in Texas cut U.S. cotton exports by 28%. Other fibers like cashmere and silk face similar risks, which threaten the material availability for effective JIT systems (cf. 2022:3-5).

The findings show that climate change and natural hazards pose a complex threat to global garment supply chains impacting infrastructure, workers health, regulations and material availability. JIT systems are vulnerable on all fronts. Although some actors are investing in adaptation, most of the burden still falls on local suppliers and workers. Without integrating climate risks into sourcing and shared strategies, JIT will remain exposed to uncertainty and disruptions (see Figures A.1, A. 2 & A. 12).

The fourth subcategory, Shipping & Logistic Challenges, captures how disruptions in transportation systems influence the smooth flow of goods within JIT networks. The code is applied whenever

specific logistical challenges are mentioned. The challenges are strongly related to external shocks like pandemics, geopolitical tensions or extreme weather events and often result in longer lead times, higher costs, or the need for reactive logistical adjustments (see Figures A. 10-A. 12).

Experts agree that disrupted shipping routes and rising logistics costs pose a serious challenge to JIT (see Figures A.1 & A.2). However, the types of disruption and responses varied. E1 and E3 focus on structural issues and rerouting. E1 describes a spike in shipping costs caused by container imbalances and route disruptions. While geopolitical hotspots like the Suez Canal and Red Sea remain risky, E1 notes that major powers are unlikely to allow lasting blockades. Still, longer routes and higher fuel use increase costs and delay deliveries (E1, 2024, Pos. 597-614). E3 adds that Red Sea tensions extended transit times by up to 20 days, forcing some fashion firms in Southeast Asia to re-route goods via Cambodia and Bangkok to access air freight more easily (E3, 2025, Pos. 67-97). E6 and E7 highlight how companies are adapting to uncertainty through digital tools and flexible transport planning. E6 points to real-time shipping alerts and notes that delays often lead buyers to push for earlier deliveries, which also adds pressure on production and increase the risk of cancellations (E6, 2024, Pos. 183-197 & 399-412). E7 describes a more agile logistics strategy, using sea freight for long-term stock and air, truck or rail for urgent deliveries. Switching to trucking from Jordan or tapping into Euro-Asia rail links were examples of how his company builds resilience within a JIT framework (E7, 2024, Pos. 396-407). E3 (2025, Pos. 111-116) points out that the war in Ukraine disrupted rail routes through Russia, cutting off a key link between China and Europe. Temporary solutions like air hubs or cross-border routes offered some relief but cannot replace long-term reliability. E3 and E6 also note that extreme weather continues to affect delivery timelines. Although factories now warn buyers of delays in advance, unpredictable climate-related disruptions remain hard to manage (E3, 2025, Pos. 111-116; E6, 2024, Pos. 425-443).

The supplementary data supports the experts' view. H&M (2024: 3, 9) links longer delivery times directly to the Red Sea crisis, mentioning impacts on inventory and delayed seasonal launches. The company also sees logistics availability as a key risk, alongside cybersecurity and geopolitical tensions (H&M, 2024: 13). Inditex shares this perspective and outlines its reliance on logistics hubs and third-party transport partners that make it vulnerable to bottlenecks and external shocks (Inditex, 2023: 92). Jiang et al. (2021: 2-3) argue that the pursuit of efficiency in JIT networks generally increase exposure to large-scale disruptions.

The insights make clear that logistics disruptions are no longer rare exceptions and have become a systemic risk, which puts JIT networks under constant pressure. Many companies are experimenting with agile rerouting, digital freight tracking and multimodal transport solutions. Anyhow, these steps are often reactive rather than part of a long-term shift.

4.6. Alternative Strategies to Improve Just-in-Time-Resilience

The fifth main category, Alternative Strategies to Improve JIT Resilience, focuses on alternative strategies of companies to strengthen resilience of their JIT systems. Within this main category four strategic approaches are outlined, including nearshoring, diversification of supplier bases, the integration of digital technologies and the use of minimal buffer stocks (see Appendix 3).

The first subcategory, Nearshoring & Regional Production Hubs, captures the strategic relocation of manufacturing activities closer to consumer markets. This strategy reduces lead times and improves supply chain responsiveness. The code is applied whenever the use of regional hubs or a shift away from distant offshore production are discussed.

Across all expert interviews, nearshoring comes up as a key topic and is seen as a complex, multi-layered trend. While everyone agrees that recent crises have pushed companies to re-think their sourcing strategies, views differ on where nearshoring makes the most sense and how important it really is (see Figures A.1 & A.2).

E1 offers a critical view, arguing that much of the nearshoring talk is more rhetorical than reality. Initiatives like U.S. incentives in Central America or the European Union's interest in Turkey and Egypt are visible, but major production shifts are still limited (E1, 2024, Pos. 402-436). E3 highlighted growing interest in regions like Bangladesh, Vietnam or Cambodia, where lead times from China are still acceptable. He also talks about rising investment in North Africa and Central America but warned that effective nearshoring strategies highly depend on political stability and solid infrastructure (E3, 2025, Pos. 140-207; 231-234). E2 focuses mainly on labor issues and says that even when production shifts to Europe, often poor working conditions remain intact. In her point of view, relocation alone does not ensure social sustainability (E2, 2024, Pos. 329-339).

Several experts, including E4, E5 and E7, position nearshoring as a key strategy to support flexibility and reduce lead times (see Figures A. 10-A. 12). E4, for instance, highlights the trade-off between responsiveness and higher production costs in European countries (E4, 2024, Pos. 303-307). E5 stresses that brands increasingly integrate warehousing with nearshored production to build more resilience against global disruptions (E5, 2024, Pos. 36-70). E7 offers a highly strategic interpretation, linking nearshoring to end-to-end lead time reduction. He points out that nearshoring supports responsive production flows and demand-driven restocking (E7, 2024, Pos. 112-336). E6 shares a hands-on example of replacing offshore materials with local ones like swapping Hong Kong-made Care labels for locally produced versions. This shows that nearshoring is not just about moving factories, but also about localizing parts of the supply chain (E6, 2024, Pos. 255-263).

These insights are also backed up by several supplementary data sources. H&M (2024: 4, 9) reports growing investment in nearshoring to improve supply flexibility and in-season responsiveness. Inditex (2023: 65) highlights their geographic diversification and flexible use of stores, hubs and warehouses. SHEIN (2023: 32) also uses nearshoring strategies to speed up delivery and lower emissions by shifting from air to sea and ground transport. Adidas (2024: 68) outlines its global distribution network as key to agile fulfillment. Choi et al. (2022: 2338) argues that combining local production with strong supplier relationships is vital to reduce JIT fragility.

The findings show that nearshoring is gaining importance as a practical way to deal with ongoing disruptions. However, it is essential not to oversimplify this trend. On the one hand a nearshoring strategy may shorten lead times and boost local resilience. On the other hand, it also demands major investment, supportive regulations and consistent integration into existing value chains.

The second subcategory, Supplier Diversification (China+1 Strategy), reflects efforts by companies to decrease reliance on single-source countries, particularly China, by expanding their supplier networks. This code is used when discussing diversification tactics, such as “China+1” approaches, alternative sourcing locations, or multi-supplier structures designed to reduce geopolitical and logistical risks.

Experts agree that diversification is a crucial strategy to mitigate geopolitical, pandemic-related or climate-related risks. Their perspectives differ in terms of scope and practical implementation (see Figures A. 1 & A. 2).

E1 and E4 stress geopolitical risks as the main driver for diversification. For example, E1 says that the Taiwan tensions and Uyghur labor laws have been pushing firms towards Bangladesh, Vietnam and Turkey since 2022. But he also scrutinizes if risks were truly reduced, as many suppliers still had Chinese ties (E1, 2024, Pos. 233-260). E4 adds that diversified sourcing is worth the cost and an effective way to protect chains against unforeseen disruptions (E4, 2024, Pos. 295-303).

E3, E6, and E7 also give some practical examples. E3 (2025, Pos. 278–284) explains how denim sourcing moved from China to Bangladesh and Pakistan, with backup suppliers ensuring continuity. E6 (2024, Pos. 363-379) adds that Bangladesh must expand beyond basic garments and improve capabilities to stay competitive. E7 (2024, Pos. 421-435) shares that Adidas proactively re-routed shipments and re-allocated inventory during crises. He also claims that building flexibility into sourcing networks is vital to be able to endure supply shocks. E2 warns that reshoring to Eastern Europe often replicates Asia’s poor labor conditions without improving worker rights (E2, 2024, Pos. 329-339). Meanwhile, E5 sees diversification as an organic shift from JIT models after repeated supply chain failures (E5, 2024, Pos. 33-36).

The supplementary sources support these insights. Adidas and Inditex prioritize multi-country supplier networks to mitigate single-source risks (Adidas, 2024: 179; Inditex, 2020: 538). H&M (2024: 4) states that regional diversification can help maintain continuity during crises. The academic literature frames this as part of a JIC-approach, which reduces the exposure to supply chain shocks. Government actions like Japan's China-exit subsidies further validate diversification's strategic importance (Choi et al., 2022: 2337-2338; Jiang et al., 2021: 46).

The findings show that diversification plays a vital role for risk reduction but also reveal a gap between symbolic moves and meaningful structural change. Real supply chain resilience requires more than geographic diversification. It needs more control over production, adaptable and flexible networks and lastly a more efficient long-term planning strategy.

The third subcategory, Technological Integration & Innovation, identifies how digital tools and systems are being adopted to enhance supply chain and production efficiency in the garment industry. The code is used for any discussion of technology adoption aimed to improve JIT operations or building resilience.

E4 and E6 discuss how digital tools enhance supply chain precision. E4 describes the platform of his company that enables companies to manage highly individualized uniform supply chains for thousands of employees. The platform integrates demand planning, ordering and return processes within one system. He states that for this level of individualization advanced IT is essential (E4, 2024, Pos. 256-279). Similarly, E6 describes the Maersk's Nexus tool which prevents shipping errors through real-time alerts, showing how advanced technology supports daily JIT operations (E6, 2024, Pos. 183-197). E7 provides a couple of examples on how advanced analytics and AI are used across value chains. Digital tools are used to stage materials and launch production before traditional demand signals even occur (E7, 2024, Pos. 359-373; 606-617). Furthermore, E7 mentions the use of AI tools to transform static manuals into complex process models using the software Signavio and he demonstrates the potential of generative AI for internal optimizations (E7, 2024, Pos. 621-646).

E4 and E6 also state that digital tools may help to reduce supply chain disruptions, because lean methods are getting better through the implementations of modern technologies (E6, 2024, Pos. 234-243). E4 (2024, Pos. 485-502) adds that continuous staff training is essential for effective technology adoption. E1 (2025, Pos. 680-685) points out that many big data providers mainly focus on shipping analytics and he questions their strategic relevance for redefining classical JIT approaches. Nonetheless, E1 sees the potential of improved consumer forecasting which could help to reduce unsold inventory and markdowns (E1, 2024, Pos. 819-826).

The supplementary sources confirm the digital shift in JIT operations. Adidas (2024: 175-182) uses predictive analytics for leaner inventory and faster turnaround, while Inditex, H&M and SHEIN

leverage digital tools to enhance forecasting and cut waste (H&M, 2024: 4; Inditex, 2023: 29; SHEIN, 2023: 42). Choi et al. (2022: 2337) and Wu et al. (2023: 3) add that Technology can help boost visibility, transparency and sustainability. Burstein (2021: 4) shares that view and notes that technology enables companies for more ethical sourcing.

Overall, the findings show that despite skepticism about technological hypes, digital tools are gaining more and more relevance in optimizing JIT and effectively manage different risks.

The fourth subcategory, Strategic Buffer Stocks vs. Pure JIT, examines all statements about the tensions between a pure JIT approach and strategic buffer stocks. The code is applied whenever the trade-off between stock minimization and the need for safety buffers in the context of uncertainty or disruptions are mentioned.

All experts agree that the traditional JIT model is under pressure due to increasing risks of supply chain disruptions. Therefore, hybrid approaches were developed combining lean methods with strategic buffers and diversified sourcing (see Figures A.1 & A.2).

E1 and E2 underline the long-standing dominance of JIT in the global garment industry. E1 argues that large-scale inventory holding was avoided due to high costs (E1, 2024, Pos. 96-105). He further says that the industry always worked with JIT and dismissed the effectiveness of JIC (E1, 2024, Pos. 132-134). E2 shares that view and suggests that most production models rely on stable order planning (E2, 2024, Pos. 518-522).

In contrast, E4, E5 and E6 acknowledge the growing interest in hybrid strategies that include minimal buffer stocks. E4 notes that risk management practices such as dual sourcing and safety stocks are increasingly common in uncertain environments (E4, 2024, Pos. 307-311). Similarly, E5 points out that JIT is no longer the only operating model for many brands in response to recent crises (E5, 2024, Pos. 50-52). E6 adds that it is always good to have a Plan B to reduce lead time risks and support JIT performance (E6, 2024, Pos. 145-158). E7 presents a more flexible approach. While keeping the philosophy of JIT, he describes how buffer stocks are strategically held for unpredictable or seasonal products (E7, 2024, Pos. 223-238; 547–559). He highlights that demand uncertainty requires selective buffering for high-demand or trend-sensitive products (E7, 2024, Pos. 563-572).

The supplementary data supports these insights. Choi et al. (2022: 2336-2337) explain that JIT systems need specific adaptations with links to inventory buffers to mitigate risk. Jiang et al. (2021: 47) suggest a complementary JIWC approach to prevent catastrophic disruption. Adidas (2024: 68) already used such a hybrid approach in practice, but faced excess inventory levels in North America in 2023. This example shows the challenges of a hybrid approach under volatile market conditions (Adidas, 2024: 124).

All points considered, it becomes clear that the industry is slowly shifting from a strict JIT strategy to a more flexible hybrid approach. A hybrid approach includes elements such as regional production alternatives, stronger supplier collaboration or smarter inventory buffers, which allow companies to strengthen their resilience against crisis without relying solely on JIT precision.

4.7. Fast Fashion and Ultra-Fast Fashion

The sixth category, Fast Fashion & Ultra-Fast Fashion, captures the impact of fast fashion and ultra-fast fashion models on labor conditions and suppliers. By prioritizing speed and low costs, they create systems that exploit workers and often overwhelm suppliers. The category explores these impacts through three subcategories (Appendix 3).

The first subcategory, Wage Suppression & Labor Exploitation, focuses on abusive practices in the garment industry with focus on wage suppression and labor exploitations. The code is applied whenever exploitative labor practices and wage suppression are discussed.

All experts agree that the increasing production speed and volume intensifies exploitation risks (see Figures A. 1 & A. 2). E2 (2024, Pos. 87-123) reveals how fast fashion systematically exploits workers. Factories use short-term contracts and pay unlivable wages, forcing many to take additional jobs. Especially women face harsh abuse under production pressures. Many suppliers outsource work to hidden home workshops, pushing families, including children, into informal labor (E2 2024, Pos. 140-163). Furthermore, E2 states that the working conditions are so bad that workers faint from heat exhaustion in unsafe factories (E2 2024, Pos. 235-241, 273-283). During the pandemic many brands refused to pay for completed orders, owing Asian workers over 10 billion USD (E2 2024, Pos. 183-193). Other crises like the war in Ukraine made things even worse by extending working hours and cutting job security (E2 2024, Pos. 193-223). E1 and E5 confirm that these problems are industry wide. They point out that workers often work under harsh conditions and endure extreme heat without protection (E1 2024, Pos. 265-271; E5 2024, Pos. 20-24).

In contrast to this empirical data, corporate reports from major brands like Adidas, H&M, Inditex or SHEIN never mention things like wage exploitation, unsafe labor conditions or gender-based violence. Burstein (2021: 2) highlights the issue of forced labor in China's cotton production. Risks of labor exploitation or wage suppression are not mentioned in any of the company reports. This may reflect a strategic choice by the companies to protect their reputation and brand image. Another explanation for not mentioning any labor or wage issues would be a lack of transparency or accountability within their supply chains (see Figures A. 5 & A. 6)

On the one hand, the empirical findings show that labor exploitation is a huge problem in the fast fashion industry. On the other hand, big brands chose not to address these problems in their brand communications. The gap between practice and reporting raises serious questions about transparency and accountability in the GVCs of the fast fashion industry.

The second subcategory, *Pressure on Suppliers & Increased Outsourcing*, focuses on how fast fashion brands shift pressure and financial risk onto suppliers. The code is applied whenever cost-cutting measures or unethical outsourcing practices are discussed.

E1 and E2 reveal how brands made crises like the COVID-19 pandemic even worse by suddenly canceling orders without paying suppliers (E1 2024, 76-80, 271-275; E2 2024, 406-419). E1 (2024, Pos. 271-275) explain how retailers protected their own cash flow by withholding payments. E2 (2024 Pos. 406-419) mentions cases where unrealistic order volumes pushed factories into unsafe subcontracting, further increasing insecurity for workers. At the same time, E2 outlines a few examples of more cooperative buyer behavior, where certain brands even supported suppliers with extended lead times or health protection measures (E2, 2024, Pos. 346-351). However, both experts agree that these positive cases remained exceptions. E1 (2024, Pos. 169-171) also observes brands pressuring Asian suppliers into investing in Latin America to maintain cheap labor while pretending to diversify.

Interestingly, the corporate reports from Adidas, Inditex and SHEIN describe complex audit systems and supplier training, but do not contain concrete information on issues such as order cancellations or financial compensation mechanisms during crises. There is also no information about subcontracting risks or how brands handle order volumes that go beyond factory capacity, even though these are key concerns raised in the interviews. This gap highlights the fact that companies ignore or overlook buyer-supplier-dynamics in their reports (see Figures A.4 & A.5).

The findings show that the fast fashion industry systematically disadvantages suppliers. Fast fashion generally encourages brands to offload risks to the supplier while still demanding flexibility from manufacturers, who most of the time are operating with minimal financial buffers.

The last subcategory, *Impact on Worker Rights & Labor Conditions*, documents the broader consequences of fast- and ultra-fast fashion production models. The code is applied whenever issues or opportunities tied to worker rights and labor conditions are mentioned.

Experts agree that the fast fashion and ultra-fast fashion model continues to erode labor rights and weaken working conditions, across GVCs (see Figures A. 1 & A. 2). Many of the statements in this subcategory overlap with the first subcategory, *Wage Suppression & Labor Exploitation* (see Figures A.1, A.2 & A.9). To avoid redundancy, they will be presented in a shortened form.

E1 and E2 observe that during COVID-19 ethical sourcing concerns were raised, but unequal power dynamics blocked real reform. E1 (2024, Pos. 271-280) explain how brands abruptly canceled orders

during lockdowns, passing financial losses to suppliers and workers. E2 (2025, Pos. 87-123) argues how cheaper and faster production in fashion industry increases pressure on factories and workers. As a result, employment becomes increasingly unstable, working hours rise, and conditions often turn exploitative or even violent especially towards women. Many workers are left with no choice and have to look for additional sources of income to survive. Furthermore E2 (2025, Pos. 140-163) describes how time pressure in fast fashion industry leads to subcontracting and informal labor, which can affect entire families. She explains that when parents work long hours, children often have to take over household responsibilities, which she referred to as indirect child labor.

Furthermore, E6 (2025, Pos. 425-443) and E2 (2025, Pos. 235-241) argues that climate change leads to higher risks for workers in poor infrastructure regions. Furthermore, E2 (2025, Pos. 332-339) challenges reshoring myths, showing that wages in Eastern and Southeastern Europe are sometimes lower than in Asia. She concludes that true sustainability must include not just environmental concerns, but also social factors like labor protections (E2, 2025, Pos. 605-613).

In contrast to the empirical data, company reports from Adidas and Inditex paint a controlled approach to labor rights. Adidas outlines initiatives, showing wages that exceed industry averages (Adidas, 2024: 100-101). They report progress on gender equality through surveys and monitoring mechanisms like the *Workers Voice* platform, which handled over 40.000 labor rights complaints in 2023 (Adidas, 2024: 104). Inditex highlights its collaboration with *Better Work* and its focus on protecting migrant workers from exploitation and forced labor (Inditex, 2020: 242-243).

However, these measures appear to be disconnected from the issues raised by the experts. It seems that all negative aspects are being ignored while positive developments such as the implementation of health programs for corporate employees are being emphasized (Adidas, 2024: 74). SHEIN also highlights expanded supplier audits, framing labor rights as part of risk management, but did not provide any data on wages or working hours (SHEIN, 2023: 3).

Overall, the findings show a gap between expert perspectives and what companies report. Although brands outline their awareness and monitoring efforts, they tend to avoid addressing the deeper structural problems that allow poor working conditions to persist. Without stronger regulations, better worker representation and real changes in buyer behavior, experts remain doubtful whether meaningful progress on labor rights will be made.

4.8. Sustainability and Circular Economy in the Garment Industry

The seventh main category, Sustainability & Circular Economy in the Garment Industry, explores how principles of sustainability and circular economy are reshaping production and sourcing

strategies in the global garment industry. It includes three subcategories focusing on the 2030 roadmap of the EU for sustainable textiles, the carbon footprint, and strategies that aim to extend the product lifespan or improve the quality (see Appendix 3).

The first subcategory, *European Textile Strategy 2030*, focuses on references regarding the European Textile Strategy, which includes creating a more sustainable future in the garment industry by 2030. The code is applied whenever sustainability regulations, policy or compliance requirements linked to the EU are discussed.

E1 and E2 agree that the European Textile Strategy marks a crucial first step towards sustainability in the fashion industry but they differ on its real-world impact. E1 (2024, Pos. 460-471, 654-664) calls it a “good starting point” for its specific rules like mandatory recycled materials and due diligence laws. However, he also points out that current measures judge companies by their intentions and not by their results (E1, 2024, Pos. 625-649).

E2 (2024, Pos. 375-412) states that brands need more accountability but doubts the strategy’s real impact. She questions if EU laws or shorter supply chains would change buying practices, noting that ongoing harmful behaviors are still hurting workers. While governments must enforce these laws, E2 warns that current oversight is too weak and legislation needs real control to protect workers across the whole value chain (E2, 2024, Pos. 375-393). E4 (2024, Pos. 187-195) focuses on infrastructure challenges and says that shifting to a circular textile model demands major investment. He highlights that it is difficult to find the right balance between competitiveness and redesigning how clothes are made and recycled.

In the company reports, EU policy is only mentioned vaguely - mostly in relation to compliance or general ESG statements. There is no direct reference to the European Textile Strategy 2030 or to specific goals around circularity. This makes it clear that there is a discrepancy between what policy-makers are aiming for and what companies are addressing in their reporting. It raises questions about how seriously these firms are engaging with long-term sustainability frameworks (Adidas, 2024: 97-104; Inditex, 2023: 93; SHEIN, 2023: 3).

Although the *European Textile Strategy 2030* is recognized as a necessary step toward greater sustainability, its impact remains uncertain. Experts outline the need for stricter regulations and higher investments. At the same time, corporate reporting tends to treat the strategy as a formality rather than a guiding framework. The analysis makes it clear that there is a disconnect between what the policy sets out to achieve and how the industry is responding. Without real accountability, the full potential of the strategy is unlikely to be reached by 2030.

The second subcategory, Reducing Carbon Footprint, focuses on the environmental implications of global and local production models in the garment industry. The code is applied whenever efforts are

discussed, which help reduce emissions, carbon-intensive practices and move towards a more environmentally sustainable value chain.

Experts agree on the need to reduce emissions, but disagree on how to achieve it. E1 argues against the common view that local production significantly lowers emissions. He notes that ocean shipping accounts for just a small portion of the industry's carbon footprint (E1, 2024, Pos. 180-186). Furthermore, E1 identifies fiber production and manufacturing as the main sources of emission and says that switching to clean energy in production countries could have far greater impact (2024, Pos. 192-195). E6 (2024, Pos. 363-379) has a more practical take, focusing on local improvements. He points to Bangladesh's progress in eco-certified factories and how making different products could boost both, green efforts and profits. E3 (2025, Pos. 313-339) brings up climate risks, pointing out how rising sea levels and port shutdowns could mess with shipping worldwide. He pushes for better teamwork between the East and the West on green energy and building methods. E1 (2024, Pos. 449-461) also notices more companies investing in eco-friendly materials such as recycled and organic fabrics. But he is not convinced that these solutions could be scaled profitable without significant changes in the whole market.

The company reports suggest that brands are taking steps toward decarbonization. Adidas (2024: 84-86) aims to cut supply chain emissions by 30% by 2030 through cleaner energy and better tracking. Inditex (2023: 201-202) mentions greener stores and supplier programs in key production countries to promote more sustainable infrastructure. SHEIN (2023: 32) highlights the investment in solar panels and has taken steps to push energy-saving measures. Although the efforts sound promising, the reports do not explain how these measures relate to overall emissions. This supports E1's point that isolated actions are not enough to replace the need for a broader energy reform.

The findings show that both experts and companies recognize the importance of reducing carbon emissions. The expert interviews offer a more critical view, outlining the need for systemic changes like clean energy use in production countries and stronger collaboration across regions. In contrast, the company reports mostly highlight isolated efforts, without clearly showing how these contribute to cutting emissions on a broader scale. The experts stress that real progress will not come from isolated efforts alone and needs a strategic shift across the whole supply chain.

The third subcategory, Extended Product Lifespan & Quality Improvement Strategies, focuses on initiatives to improve garment durability and quality. The code is applied whenever strategies such as improved material standards, repair services, or upcycling efforts are discussed.

E1 and E4 note that new regulations and consumer demands are pushing brands toward recyclable materials. E1 highlights growing investments in innovative organic garment options (E1, 2024, Pos. 449-461). Nonetheless both experts doubt that these solutions will work on a bigger scale. E4 (2024,

Pos. 195-227) adds that making clothes last longer is not just about better materials. It also requires a shift in consumer behavior. Without such systems in place, the circular fashion economy will not move beyond good intentions.

E2 (2024, Pos. 542-550) outlines the role of brands in sustainability and says that newer companies like Zalando might be more adaptable because of their flexible startup culture. But she also observes that many online retailers just copy traditional fast fashion models and keep the same throwaway mentality (E2, 2024, Pos. 572-576). Although E2 thinks there is potential for improvement, she is not convinced that online retailers would make meaningful changes when it comes to strategies that aim to improve the lifespan and quality of their product.

The supplementary data backs up these points to some extent. Inditex, for example, states that they invested in quality improvement projects, which include a so-called “Sustainability Innovation Hub” and partnership with the company BASF to develop fiber recycling technologies (Inditex, 2023: 234-236). H&M Taiwan also points to its long-running clothing recycling initiative. As Wu et al. (2023: 3-4) note, the program started in 2013 and by 2019 had already collected over 20,000 tons of used garments and textiles. The goal is to help close the loop in their supply chain by reducing waste and promoting reuse. In their 2024 report, H&M outlines broader sustainability goals like becoming climate-positive, ensuring fairness across the value chain and leading change in the fashion industry (H&M, 2024: 4). Although their ambitions sound promising, the report does not clearly show how progress is being controlled.

Overall, the results show that companies are beginning to invest in strategies to improve longevity and quality, but many of their actions appear to be symbolic rather than transformative. The experts highlight that using better materials is not enough and real change depends on rethinking how clothes are produced, sold and consumed. Many brands highlight efforts in recycling and innovation. Nonetheless, it remains unclear to what extent these initiatives contribute to long-term change. There is a lack of concrete data on their effectiveness, which makes it difficult to evaluate real progress. Greater transparency and a genuine commitment to circular practices throughout the entire value chain are essential for making GVCs more sustainable.

4.9. Measuring Just-in-Time Effectiveness

The eight main category, Measuring Just-in-Time Effectiveness, analyzes how the performance of JIT systems is assessed across the garment industry. Insights are included that did not perfectly fit the categories 4.2., 4.3. or 4.6. It is divided into four subcategories, which are presented in the following sections (see Appendix 3). Before presenting the results, it is worth mentioning that this main category

has a noticeably lower coding frequency compared to the other main categories (see Figures A. 3 & A. 7).

The first subcategory, Inventory Turnover & Lead Time Efficiency, focuses on the speed and reliability of delivering goods. The code is applied whenever inventory cycles or the control of lead times are mentioned.

E1 notes that vertical integration and nearshoring could cut lead times by avoiding overseas shipping delays (2024, Pos. 171-175). However, despite JIT goals, inventory efficiency has dropped since 2008, sparking debates about needing a hybrid JIT approach with regional production (E1, 2024, Pos. 813-819). E4 (2024, Pos. 113-119) and E5 (2024, Pos. 27-28) focus on key metrics like stock levels and total order-to-delivery time as crucial supply chain measures. E6 highlights how Product Lifecycle Management (PLM) software improves supply chain visibility and lead time control (2024, Pos. 125-129). Supplementary data from Adidas (2024: 122) points out the operational focus on inventory control, particularly through metrics like Inventory Days Lasting (IDL) that track pre-sale stock duration to reduce capital strain and risks.

The findings show that lead time and inventory turnover are key indicators for JIT performance. The experts highlight nearshoring and digital tools as means to improve efficiency. Data from Adidas reflects a shift toward more precise tracking. However, the broader industry still lacks standardized metrics, which makes it difficult to compare performance across companies and track real progress in JIT optimization.

The second subcategory, Supplier Performance & On-Time Delivery Metrics, captures how supplier performance in JIT systems is measured. The code is applied whenever key performance indicators (KPIs) such as on-time delivery rates or supplier responsiveness are mentioned.

Experts stress that supplier evaluation must go beyond basic metrics. E4 (2024, Pos. 120-123) highlights that suppliers should be assessed by punctuality alongside their ability to adapt quickly. E6 (2024, Pos. 130-133) adds a technical perspective, noting the use of internal systems and algorithms to evaluate factory performance. E7 (2024, Pos. 276-280) points to a shift towards more precise KPIs driven by more complex customer demands. Furthermore, E1 (2024, Pos. 348-350) notes that despite existing systems, competitive pressure often limits further innovation in supplier development. Adidas (2024: 66) confirms that supplier delivery and efficiency are regularly monitored. Their system offers a structured way to assess social and performance-related criteria. (Adidas, 2024: 107).

Although companies like Adidas already use advanced supplier tracking systems, the experts reveal a more complex picture. Tools may be in place, but challenges like responsiveness and limited data integration persist and need to be addressed in the future.

The third subcategory, Cost Metrics: Procurement, Logistics, and Production Costs, focuses on the financial performance of JIT chains. The code is applied whenever specific cost factors, such as procurement and logistics expenses or production-related costs are mentioned.

Experts address both strategic challenges and practical cost-saving measures along the value chain. E1 (2024, Pos. 168-169) mentions the high capital requirements for upstream investment and notes that a single textile mill can cost around 80 million euros. E3 (2025, Pos. 256-265) points to simple but effective solutions such as optimizing carton space and reducing polybag use to optimize logistics costs and support sustainability goals. E4 (2024, Pos. 123-125) highlights the importance of continuous cost tracking, because it is essential to be able to evaluate the overall supply chain performance. Supplementary data from Adidas (2024: 121–122) reveals that cost-control is built into corporate performance tracking. The company monitors working capital in relation to net sales. However, it says little about cost-saving measures at the supply chain level.

The findings show that experts see cost control as more than just tracking numbers. It is about combining long-term planning with simple, practical solutions to keep operations efficient. In contrast, Adidas focuses on formal KPIs and financial metrics but offers little detail on how costs are managed in everyday supply chain processes.

The fourth and last subcategory, Product Quality & Defect Rates, focuses mainly on product flaws and quality issues managed within a JIT framework. The code is applied when KPIs about product quality or defect rates are discussed.

Only E4 speaks in detail about this topic and argues that defect rates and regular quality checks are essential for evaluating JIT performance. For him, quality assurance plays a key role in maintaining standards and protecting brand reputation in fast-paced supply chains like the garment industry (E4, 2024, Pos. 125-129).

Company reports support his findings. Adidas (2024: 66) tracks product quality using defect claims and related metrics. SHEIN (2023: 35) points out internal testing standards for durability and optimizes product components based on customer feedback. The brand cites customer surveys, which show that many garments are worn over 10 to 30 times. However, this contrasts with the brand's ultra-fast fashion model and raises doubts about whether customer-reported longevity reflects the real product durability. Overall, the findings show that monitoring tools are already in place, but the real challenge is maintaining quality without slowing down operations in a fast-paced environment like the garment industry.

4.10. Further Insights

The last main category, Further Insights, captures further contextual observations, which are not specifically coded but still enrich the overall understanding of JIT implementation in the garment industry. The code is applied whenever further insights and shifts in the industry mindsets are mentioned (see Appendix 3).

E3 and E4 have different perspectives on what causes supply chain disruptions. E3 (2025, Pos. 367-373) claims that most problems come from human mistakes and poor planning, not necessarily from natural disasters. He stresses that companies could avoid many delays simply by improving their preparation and coordination. E4 (2024, Pos. 447-455), on the other hand, argues that today's biggest threats come from rare but devastating events. Instead of just planning for everyday risks, E4 insists that businesses must develop flexibility to handle these unexpected crises. He points out that too many firms still ignore the extreme "tails" of risk, where the most severe disruptions happen.

When it comes to supply chain strategy, E4 and E6 highlight the need for constant adaptation. E4 (2024, Pos. 363-375) argues that businesses must regularly evaluate their models to keep up with competition. E6 (2024, Pos. 459-472; 484-492) adds that the integration of lean methods is a good way to measure and improve factory efficiency. E6 mainly focuses on the operational side and explained how internal assessments may help factories build stronger partnerships. He also argues that in manufacturing, small, steady upgrades work better than significant shifts. Furthermore, E4 (2024, Pos. 414-419) speculates that buyers might eventually pay more for longer-lasting clothing and companies should meet more sustainable demand. E7 (2024, Pos. 655-662) explains how big companies deal with known risks by using formal risk frameworks and scenario planning. But he admits that even the best systems sometimes did not work during the red sea crisis. Nonetheless, he is convinced that risk and continuity management are essential to build better resilience and navigate better in case of unexpected events.

Supplementary data from Adidas or Inditex shows a more structured approach and focuses on governance and sustainability frameworks. Adidas (2024: 79) ties bonus mechanisms directly to ESG targets and keeps its board constantly updated on climate progress. Inditex (2020: 317), on the other hand, pushes innovation through sustainability programs and tries to transform its entire supply chain. Although companies are making efforts, not everyone is convinced that they are doing enough. Jiang et al. (2021: 42) points out that supply chains still lag behind other parts of the business when it comes to building real resilience. They argue that JIT systems are generally efficient, but often collapse under major disruptions, unless they are redesigned or supported by a more hybrid approach.

The findings show that JIT systems true effectiveness strongly depends on balancing flexibility with strategic foresight. Although corporate reports highlight measurable improvements, the experts reveal

gaps in operational readiness. It becomes clear that building resilience in the garment industry means being able to manage everyday challenges and unexpected disruptions. This ability is essential to remain competitive, even in times of crisis.

4.11. Analysis of cross relations between themes

To complement the results of the sections 6.2. to 6.10., the following section takes a closer look at how the different themes are connected. Visual outputs in form of Code Clouds, Code Relation Browsers and MAXMaps are used to identify meaningful links and overlaps between the developed categories (see Figures A.1.-A. 12.; Appendices 8 & 9).

The Code Clouds offer a valuable first look at key themes before exploring their interconnections. Figure A.4. shows four themes, which dominates the expert discussions, namely geopolitical conflicts, supplier reliability & lead time risks, nearshoring & regional production and flexibility in responding to market trends. The high frequency of these codes show that the experts prioritize strategic sourcing decisions and outline the urgent need for adaptable operations in volatile conditions caused by crises (see Figure A. 4.).

Figure A.8. tells a different story based on the supplementary documents. Climate threats, pandemic disruptions and tech innovation dominate these reports. Operational issues on the other hand get little attention. The pattern shows that corporate disclosures prefer discussing worldwide crises and innovation over day-to-day supply chain realities (see Figure A. 8.). The two Code Clouds reveal a gap between operational and strategic perspectives. The experts focus on practical supply chain solutions and real-time adjustments. In contrast, supplementary data such as the company reports prioritize long-term strategic positioning and environmental commitments. The differences in narrative also influence the thematic relationships explored in the Code Relation Browsers.

The expert interviews reveal that geopolitical tensions force companies to diversify their supplier networks and find alternative suppliers besides China. Furthermore, shipping and logistic challenges are a big issue and are often connected to unpredictable demands or seasonality and lead time risks. The co-occurrence of this topic shows that JIT systems might look good on paper, but when logistics break down due to crisis, companies risk getting fully paralyzed. Therefore, it is understandable that most experts call for the implementation of more hybrid approaches with safety buffers or other alternative strategies such as nearshoring or diversification (see Figures A.1. & A.2.). The supplementary data shows a smaller set of connections. Climate risks, geopolitical tensions and new technologies show a strong connection and are often mentioned together. It becomes clear that businesses are paying more attention to outside threats and future opportunities than to their own operational

problems. Important operational concerns like supplier issues, labor costs, wage suppression or labor exploitation are hardly mentioned (see Figures A. 5. & A. 6.).

Overall, certain patterns stand out. The data shows strong connections between the impact of global crises and the move towards alternative strategies such as nearshoring or diversification and generally increases the demands for more flexibility. The connections demonstrate how global crises like COVID-19, climate change and geopolitical tensions continue to shape GVCs and force companies to build more adaptable or hybrid approaches. However, the analysis also reveals a gap in how companies approach other critical issues. Metrics related to worker rights and environmental sustainability show surprisingly weak links. The separation suggests that companies continue to treat social responsibility and ecological impact as secondary concerns rather than making them central to how they evaluate their overall performance (see Figure A. 9.).

Lastly, the three MAXMaps visualize the links between global crises and other themes. The impact of each crisis is analyzed in detail to outline the possible structural and operational adjustments to overcome the supply chain disruptions caused by the various events.

The patterns in Figure A.10. show that COVID-19 did not just cause fatal supply chain disruption, but has also led to significant changes within the garment industry. Shipping problems, unreliable suppliers and unpredictable demand all exploded at the same time during the crisis. Companies responded by making three major changes. They spread their supplier networks wider, kept less inventory on hand and upgraded their technology systems. The tight connections between the categories show that many businesses saw the disruption as opportunity to be more flexible and tech driven in the future. The most revealing part is that some companies started keeping small safety stocks again, proving even the most committed JIT systems needed adjustments during and after the pandemic (see Figure A. 10.).

The patterns in Figure A.11. reveal that geopolitical conflicts also exposed deeper cracks in the JIT system. The map shows links between political tensions and growing pressure on suppliers, rushed outsourcing and worsening labor conditions. Events like the war in Ukraine or the tensions between the US and China often pushed factories or workers into even tougher situations. Companies reacted by implementing alternative strategies such as nearshoring or diversification in the sense of a China+1 strategy. However, the reliance on low-cost labor in the fast fashion industry raises concerns that these shifts might simply repeat old patterns instead of tackling the core issues of exploiting labor and push sustainable ideas across the whole supply chain (see Figure A. 11.).

Figure A.12. shows how climate change is already shaping the way brands think about their supply chains. What really stands out is the strong connection between climate-related disruptions and the shift toward sustainability and circularity strategies. Environmental pressures are forcing companies

to rethink their long-term goals. At the same time, the weaker links to issues like poor data quality and unreliable suppliers suggest that many brands still have trouble managing these risks in practice. Thus, while the strategic direction is moving toward sustainability, the tools to make it work on the ground are often still missing (see Figure A. 12.).

Overall, the MAXMaps make clear that all three crises put serious pressure on the JIT model and call for the implementation of alternative strategies. The COVID-19 pandemic led to sudden short-term disruptions. Furthermore, the outlined geopolitical tensions revealed deeper structural dependencies and raised ethical concerns regarding working conditions and labor exploitation. Climate change and natural hazards force companies to rethink how resilient their supply chains really are. The MAX-Maps reveal that themes such as flexibility, diversification and technological innovation consistently appear across all three crisis contexts. These findings show that companies are already exploring different strategies to adapt and start extending their classical JIT approach. Still, because each crisis presents its own challenges, it is unlikely that a single extended approach will be enough to address them all.

5. Conclusion

This research focuses on the way the JIT approach works in the garment industry when GVCs are faced with major disruptions. By analyzing expert insights, company reports, academic sources and internet sources this research highlights that JIT only works well when things are running smoothly, but tends to be vulnerable when unexpected events occur and disrupt supply chains.

The research reveals a complex reality about JIT in today's turbulent environment. In calm market conditions, it helps companies cut storage costs as well as to stay flexible and responsive to changing customer demands. That is one of the reasons it had become widespread in the fast fashion industry. But the expert interviews make it clear that things change fast in times of crisis. The COVID-19 pandemic, natural disaster or the war in Ukraine exposed how fragile JIT can be. Delays in fabric deliveries, factory closures or wrong demand forecasts can cause fatal chain reactions along the whole supply chain. Some stores ended up with empty shelves, others with far too much stock. The main issue is that JIT leaves no room for error. If one part of the system fails, the rest of the chain often feels the impact as well.

Several factors are standing in the way of making JIT more resilient and sustainable in today's dynamic business environment. Both the interviews and supporting data point out overlapping problems. One of the biggest issues is the reliance on just a few sourcing countries such as China. This problem makes supply chains even more fragile, especially when they are combined with weak infrastructure in many production regions and constant pressure on suppliers to deliver quickly and cheaply, this makes supply chains even more fragile. Climate-related risks such as floods, storms and shortages of raw materials add to that challenge. Furthermore, the experts point out that poor digital integration and a lack of skilled workers often slow down the coordination along GVCs. At its core, the fast fashion business model pushes for low costs and fast turnover. That is why companies often focus on short-term fixes rather than building long-term resilience. The industry also faces a tough balancing act between efficiency of JIT and the growing pressure to act sustainably and socially responsible. Although, many brands showcase recycled fabrics or solar-powered factories in their reports, a closer look reveals that these efforts seem to rather be a marketing move to polish their reputation than to be measures taken seriously in a more sustainable direction. Behind the communication, there is still the reality of overworked suppliers, poor labor conditions and wage suppression. The analysis of the expert interviews even exposes a broader disconnect. Usually, all big companies track their performance with KPIs like lead times, supplier scores or cost ratios. But these metrics rarely reflect what is happening, especially at the bottom end of the supply chain. When crises hit, the response is often improvised and companies try to keep their own losses as small as possible by not paying suppliers or cancelling big orders. Despite all the talk of resilience and risk management,

many firms fall back on quick fixes, which again shows how fragile their systems are in times of crisis.

When looking at how the fashion industry is reacting, it becomes clear that companies are not giving up on the JIT model, but they are starting to change the way they use it. The expert interviews and supplementary data show that many brands are starting to rethink their JIT models. JIT helps reduce storage costs and keeps things moving quickly, which is useful in fast fashion. Nonetheless, the recent crises have shown that relying only on speed, low-cost labor and efficiency can backfire severely. That is why companies are slowly starting to build more flexible systems. For example, they keep a small amount of backup stock, work with suppliers closer to the consumer markets in a nearshoring way or use digital tools to improve planning or demand forecasting. Such changes do not mean that JIT is being replaced. It is rather a modern hybrid version or approach, which may help to temporarily secure companies from unexpected supply chain disruptions caused by crises or other unforeseen events. In this regard, the expert interviews show that the companies which struggled the most during the pandemic or the Red Sea crises were the ones that did not have strong backup plans. Meanwhile, companies with more flexible supply networks and better communication with suppliers were able to handle the situation better. Being solely focused on efficiency and ignoring all other aspects in a fast-paced environment like the garment industry is not up to date anymore. In the end, it seems that the future is not about picking one system and sticking with it. Instead, companies will have to mix different ideas and find hybrid approaches, which combine JIT methods with better risk planning, more flexible sourcing and closer supplier relationships. This way, they can stay efficient but also be prepared if crises lead to significant supply chain disruptions.

To put it in a nutshell, the results of this thesis show a detailed picture of the struggle within the fashion industry. On the one hand, companies need to stay fast, flexible and cost-efficient to be profitable. On the other hand, there is more pressure than ever to act in an environmentally and socially responsible way, especially in times of crisis. Unfortunately, the original JIT philosophy does not offer solutions for abrupt supply chain disruptions. Therefore, it is essential to modernize JIT systems with more room for flexibility and risk management. Only then will the fashion industry be able to handle future disruptions effectively and take the urgently needed steps towards a more sustainable future.

6. Outlook

While this paper examines the extent to which JIT is exposed to the effects of global disruptions, research into other new shocks that will increasingly test the resilience of global value chains is and will continue to be necessary. Other disruptions such as cyberattacks, power outages, and digital infrastructure collapse will play a significant role in the future. For example, the 2023 DP World's CP Port cyberattack revealed how a single digital disruption can shut down high-volume logistics activities. Similarly, regular power outages in key production hubs would severely damage time-sensitive JIT chains, particularly in the fashion industry.

The study clarifies how recent crises brought JIT's weak points to the forefront and which adaptive strategies can be considered or are implemented. Nonetheless, questions remain regarding the long-term effectiveness of these adaptations and the applicability in other sectors. Further research could also address other companies or stakeholders that are not based in Europe. expanding the geographical scope, increasing the number of industry voices, and including longitudinal data to track structural shifts over time would benefit this field of research.

Empirical studies can provide a valuable approach to conduct and evaluate the comparative efficiency of hybrid chain schemes to balance resilience and efficiency. A study on how companies are integrating buffers of smallest possible sizes, local sourcing, and digital solutions into their JIT strategy can provide valuable lessons for innovative global value chain designs.

In addition, escalating geopolitical conflicts, such as the ongoing war in Ukraine or potential escalations involving Iran and the Strait of Hormuz, showcase the constant importance of strategic bottlenecks in global trade. These scenarios call for more detailed scenario-based research to assess how JIT models could withstand shipping disruptions or critical resource shortages.

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Figure 1: Simplified definition and portrayal of a GVC. Source: The World Bank (2020): World Development Report 2020: Trading for Development in the Age of Global Value Chains, Washington DC: World Bank.

Figure 2: Simplified and universal Just-In-Time. Source: Own representation.

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Figure 4: Industrial Map showing Mayor Industries located in Bangladesh. Industrial Map Showing Major Industries Located in Bangladesh. Source: Proshad, R.; Kormoker, T.; Mursheed, N.; Islam, M.; Bhuyan, I.; Islam, S.; Mithu, T. N. (2018): Heavy metal toxicity in agricultural soil due to rapid industrialization in Bangladesh: a review. International Journal of Advanced Geosciences, Vol. 6, No. 1, pp.:83-88.

Figure 5: Phases of the Empirical Research Process. Source: Own representation.

9. List of Tables

Table 1: Overview of Relevant Studies 43

10. List of Abbreviations

CEO	Chief Executive Officer
CCC	Clean Clothes Campaign
CSR	Corporate Social Responsibility
GVCs	Global Value Chains
JIC	Just-in-Case
JIT	Just-in-Time
JIWC	Just-in-Worst-Case
NGO	Non-Governmental-Organization
NHS	National Health Service
SCM	Supply Chain Management
UNIDO	United Nations Industrial Development Organization
QCA	Qualitative Content Analysis

11. Appendix

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Appendix 1: Coding Guidelines

Table A. 1

Coding Guidelines

Category	Definition	Coding Rule
Definition & Concept	Covers theoretical explanations, key terms and conceptual clarifications.	Code when definitions or key terms are explained.
Application in the Garment Industry	Describes how the JIT is applied specifically to the garment/textile sector.	Code when content refers to real-world examples in the garment industry.
Comparison to Other Industries	Involves contrasts or parallels with other sectors.	Code when other industries are compared with garment industry.
Cost Reduction & Working Capital Optimization	Focuses on lowering costs and improving financial efficiency.	Code when financial savings or capital use are discussed.
Inventory Reduction	Efforts to reduce stock levels while maintaining performance.	Code when minimizing inventory is addressed.
Flexibility & Responsiveness to Market Trends	Ability to quickly adapt to changes in demand or market shifts.	Code when adaptability or responsiveness is discussed.
Supplier Performance & Efficiency Gains	Evaluation or improvement of supplier effectiveness.	Code when supplier KPIs or efficiency are covered.
Demand Volatility & Seasonality Issues	Unpredictable or seasonal demand fluctuation.	Code when instability or seasonal effects in demand are discussed.
Supplier Reliability & Lead Time Risks	Risks related to delivery time and trustworthiness of suppliers.	Code when late delivery or unreliable suppliers are mentioned.
Lack of Digitalization & Poor Data Quality	Missing digital tools or inaccurate/incomplete data.	Code when lack of tech or bad data is discussed.
Dependence on Low-Cost Labor Markets	Reliance on regions with cheap labor.	Code when focus is on outsourcing to low-wage countries.
COVID-19 Pandemic & Supply Chain Disruptions	Effects of the pandemic on global supply chains.	Code when COVID-19 impacts on supply are mentioned.
Geopolitical Conflicts	Political instability affecting logistics or sourcing.	Code when conflicts or political risks are mentioned.
Climate Change & Natural Hazards	Environmental threats to supply chains.	Code when climate events or risks like floods and storms are discussed.
Shipping & Logistics Challenges	Transport issues affecting flow of goods.	Code when delivery delays or freight bottlenecks are mentioned.

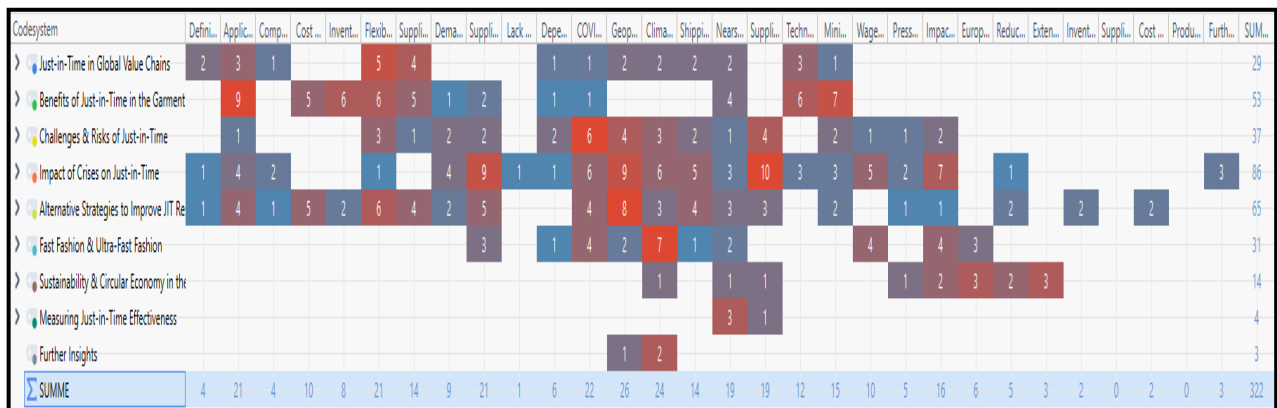
Category	Definition	Coding Rule
Nearshoring & Regional Production Hubs	Relocation of production closer to consumer markets.	Code when local/regional production is discussed.
Supplier Diversification (China+1 Strategy)	Broadening sourcing beyond a single country.	Code when supplier spread or “China+1” is mentioned.
Technological Integration	Implementation of digital tools in SCM.	Code when systems or digital tools are discussed.
Minimal Strategic Buffer Stocks vs. True JIT Approach	Stock strategies between safety buffer and JIT.	Code when JIT vs. buffer stock is debated.
Impact on Worker Rights & Labor Conditions	Effects on labor standards and employee well-being.	Code when rights, safety, or working conditions are mentioned.
Ecological Impact	Environmental damage caused or worsened by fast fashion practices.	Code when fast fashion is linked to ecological damages.
Pressure on Suppliers & Increased Outsourcing	Shifting burden onto external producers.	Code when suppliers face increased pressure.
Wage Suppression & Labor Exploitation	Unfair payment and exploitation of labor.	Code when underpayment or labor abuse is described.
Psychological & Physical Pressure on Factory Workers	Mental and physical strain due to working conditions.	Code when stress or exhaustion of workers is discussed.
European Textile Strategy 2030	EU sustainability goals for the textile sector.	Code when EU roadmap or 2030 targets are discussed.
Impact of Nearshoring on Sustainability Goals	Environmental and social effects of nearshoring.	Code when nearshoring is linked to sustainability.
Carbon Footprint of Global vs. Local Production	Emissions from sourcing locally vs. globally.	Code when emissions or footprint comparisons are made.
Extended Product Lifespan & Quality Improvement Strategies	Measures to make products last longer and improve quality.	Code when durability or improvement efforts are discussed.
Inventory Turnover & Stock Levels	Frequency of stock use and volume held.	Code when stock rotation or inventory size is analyzed.
Lead Time Efficiency	Speed and reliability of delivery times.	Code when reduction or control of lead time is mentioned.
Supplier Performance & On-Time Delivery Metrics	KPIs measuring punctuality and output of suppliers.	Code when supplier delivery performance is evaluated.
Cost Metrics: Procurement, Logistics and Production Costs	Financial KPIs for supply chain-related expenses.	Code when detailed cost components are discussed.
Product Quality & Defect Rates	Evaluation of product defects or quality issues.	Code when flaws, rework or quality metrics are discussed.
Further Insights	Captures general reflections that do not fit into specific categories but add value to the overall analysis.	Code when content contextual insights that enhance the understanding of the topic.

Own representation

Appendix 2: MAXQDA-Outputs

Figure A. 1

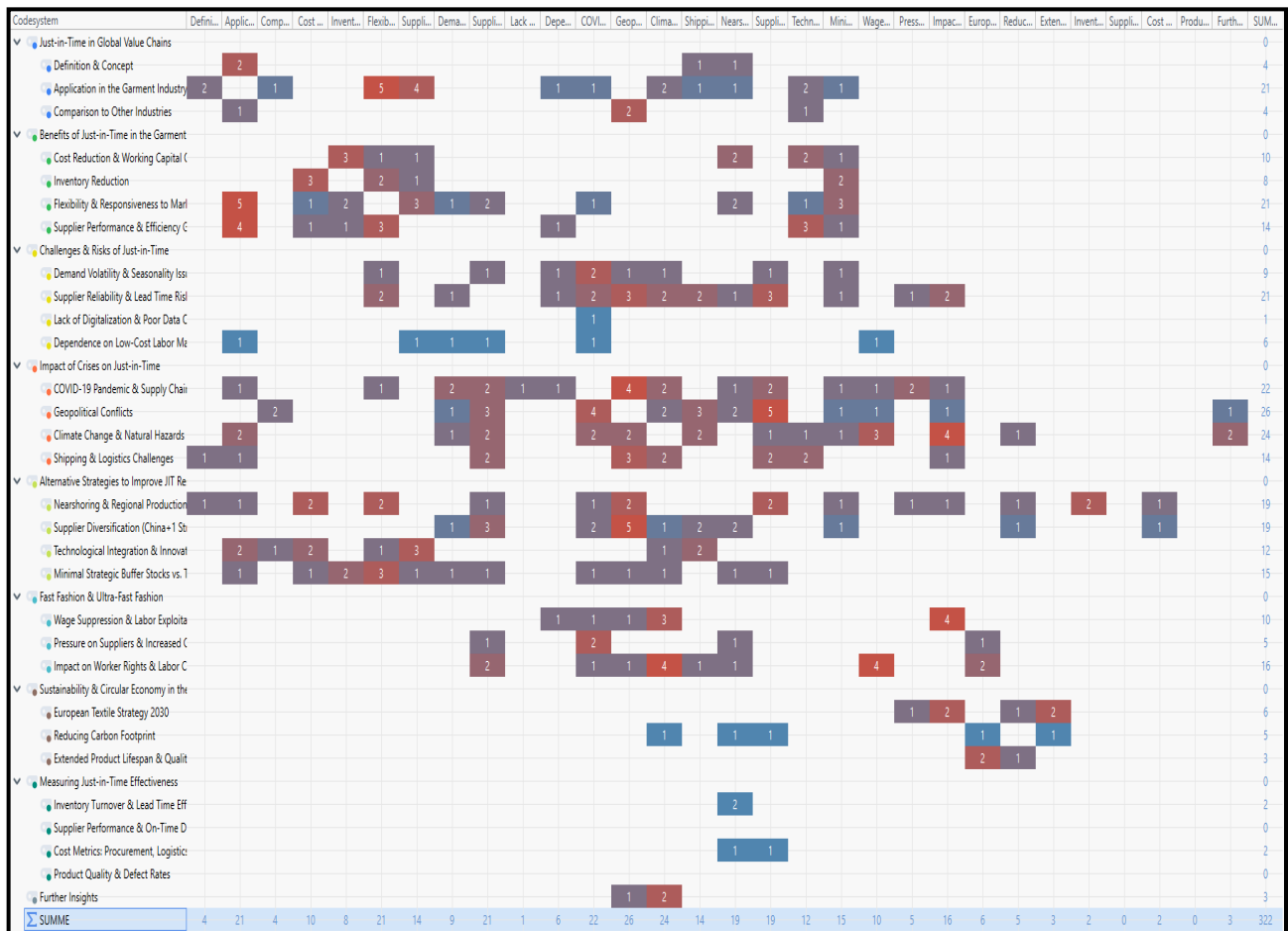
Code Relations Browser: Heatmap of Co-occurring Main- and Subthemes across Expert Interviews



Own representation. The number and colors indicate the frequency of co-occurrence between main themes. High numbers and red color represent stronger thematic connections based on how often two themes were mentioned together across the expert interviews. MAXQDA-Output.

Figure A. 2

Code Relations Browser: Heatmap of Co-occurring Subthemes across Expert Interviews



Own representation. The number and colors indicate the frequency of co-occurrence between sub themes. High numbers and red color represent stronger thematic connections based on how often two subthemes were mentioned together across the expert interviews. MAXQDA-Output.

Figure A. 3

Summary Grid Heatmap of Subtheme Frequencies across Expert Interviews

Codesystem	E1, 2025	E2, 2025	E3, 2025	E4, 2025	E5, 2025	E6, 2025	E7, 2025	SUMME
Background of Interviewpartner	1	1	1	1		1	1	6
Just-in-Time in Global Value Chains								0
Definition & Concept	2						3	5
Application in the Garment Industry	5			2	1		6	14
Comparison to Other Industries	2			1	1		2	6
Benefits of Just-in-Time in the Garment Sector								0
Cost Reduction & Working Capital Optimization	5		1	2		1		9
Inventory Reduction	2			2			1	5
Flexibility & Responsiveness to Market Trends	3	1		2	1		12	19
Supplier Performance & Efficiency Gains	2		1	1	1	1	7	13
Challenges & Risks of Just-in-Time								0
Demand Volatility & Seasonality Issues	1		1	2		1	6	11
Supplier Reliability & Lead Time Risks	3	2	3	2	1	4	6	21
Lack of Digitalization & Poor Data Quality				2		3		5
Dependence on Low-Cost Labor Markets	3	1				1		5
Impact of Crises on Just-in-Time								0
COVID-19 Pandemic & Supply Chain Disruptions	4	4	2	1	1	2	4	18
Geopolitical Conflicts (Ukraine-Russia War, Red Sea Crisis)	12	2	3	1	1		4	23
Climate Change & Natural Hazards	5	4	6			1		16
Shipping & Logistics Challenges	5		3			3	2	13
Alternative Strategies to Improve JIT Resilience								0
Nearshoring & Regional Production Hubs	5	1	5	1	4	1	5	22
Supplier Diversification (China+1 Strategy)	7		2	1	1	3	3	17
Technological Integration & Innovation	3			4		3	5	15
Minimal Strategic Buffer Stocks vs. True JIT Approach	4	1		2	2	2	4	15
Fast Fashion & Ultra-Fast Fashion								0
Wage Suppression & Labor Exploitation	1	8			1			10
Pressure on Suppliers & Increased Outsourcing	4	4						8
Impact on Worker Rights & Labor Conditions	3	11				1		15
Sustainability & Circular Economy in the Garment Industry								0
European Textile Strategy 2030	4	3		1				8
Reducing Carbon Footprint	4		1			1		6
Extended Product Lifespan & Quality Improvement Strategies	2	2		3				7
Measuring Just-in-Time Effectiveness								0
Inventory Turnover & Lead Time Efficiency	2			1	1	1		5
Supplier Performance & On-Time Delivery Metrics	1			1		1	1	4
Cost Metrics: Procurement, Logistics, and Production Costs	1		1	1				3
Product Quality & Defect Rates				1				1
Further Insights			2	6		2	1	11
SUMME	96	45	32	41	16	33	73	336

Own representation. The heatmap displays the frequency of coded subthemes across the seven expert interviews. Each number represents how often a given theme was mentioned. Redder cells indicate higher frequencies. MAXQDA-Output.

Figure A. 4

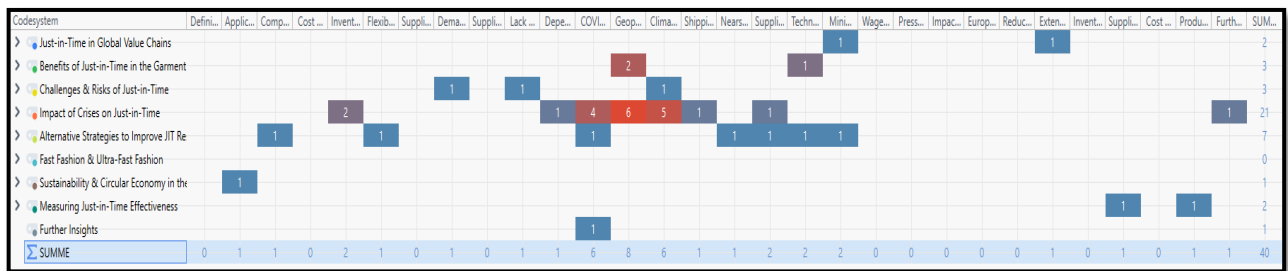
Code Cloud displaying the most Frequent Subthemes across Expert Interviews



Own representation. Larger terms indicate higher coding frequencies. The visualization includes only codes, which were mentioned 8 times or more across all expert interviews. MAXQDA-Output.

Figure A. 5

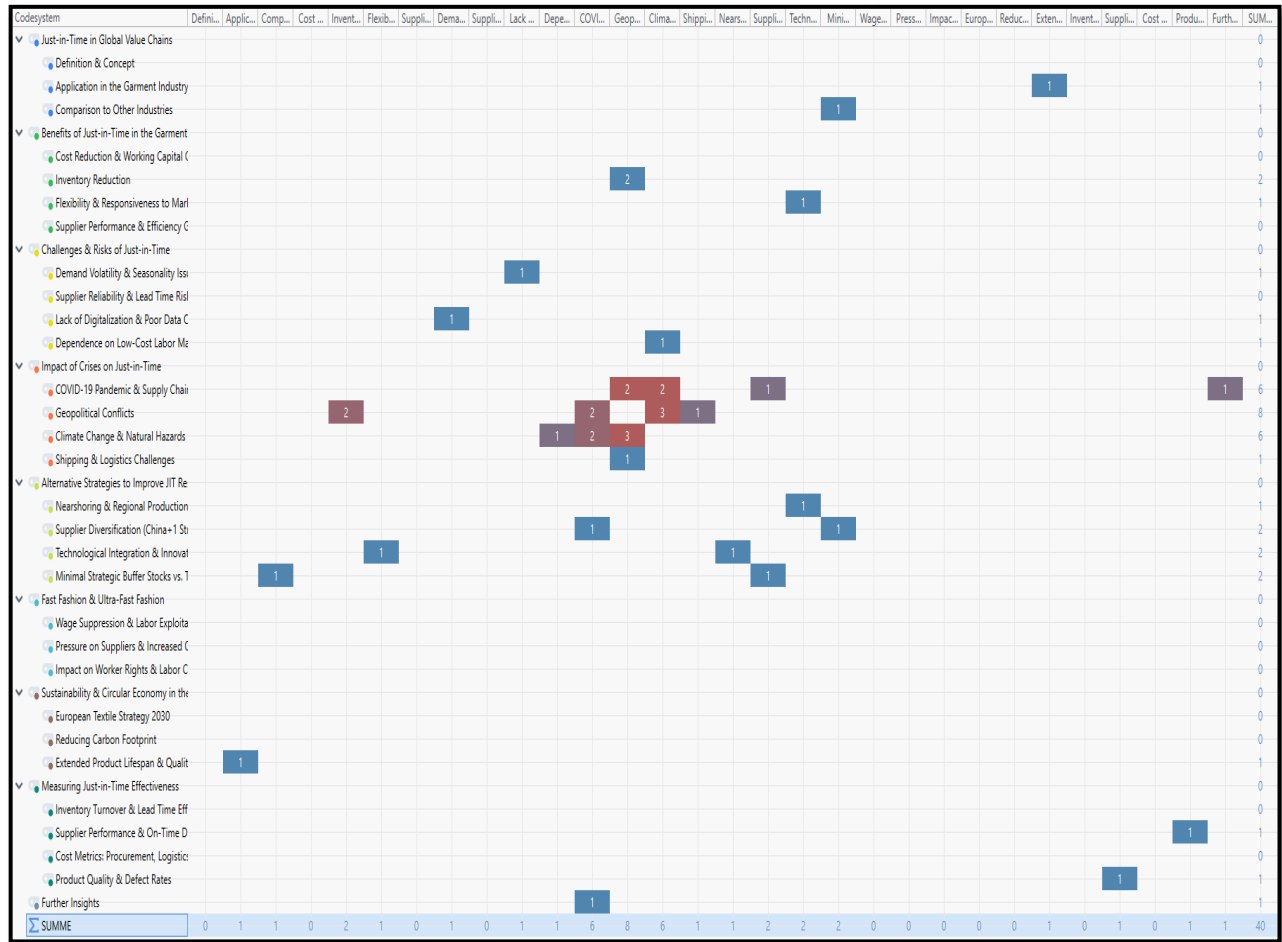
Code Relations Browser: Heatmap of Co-occurring Main and Subthemes across Supplementary Data



Own representation. The number and colors indicate the frequency of co-occurrence between main themes. High numbers and red color represent stronger thematic connections based on how often two themes were mentioned together across the supplementary data. MAXQDA-Output.

Figure A. 6

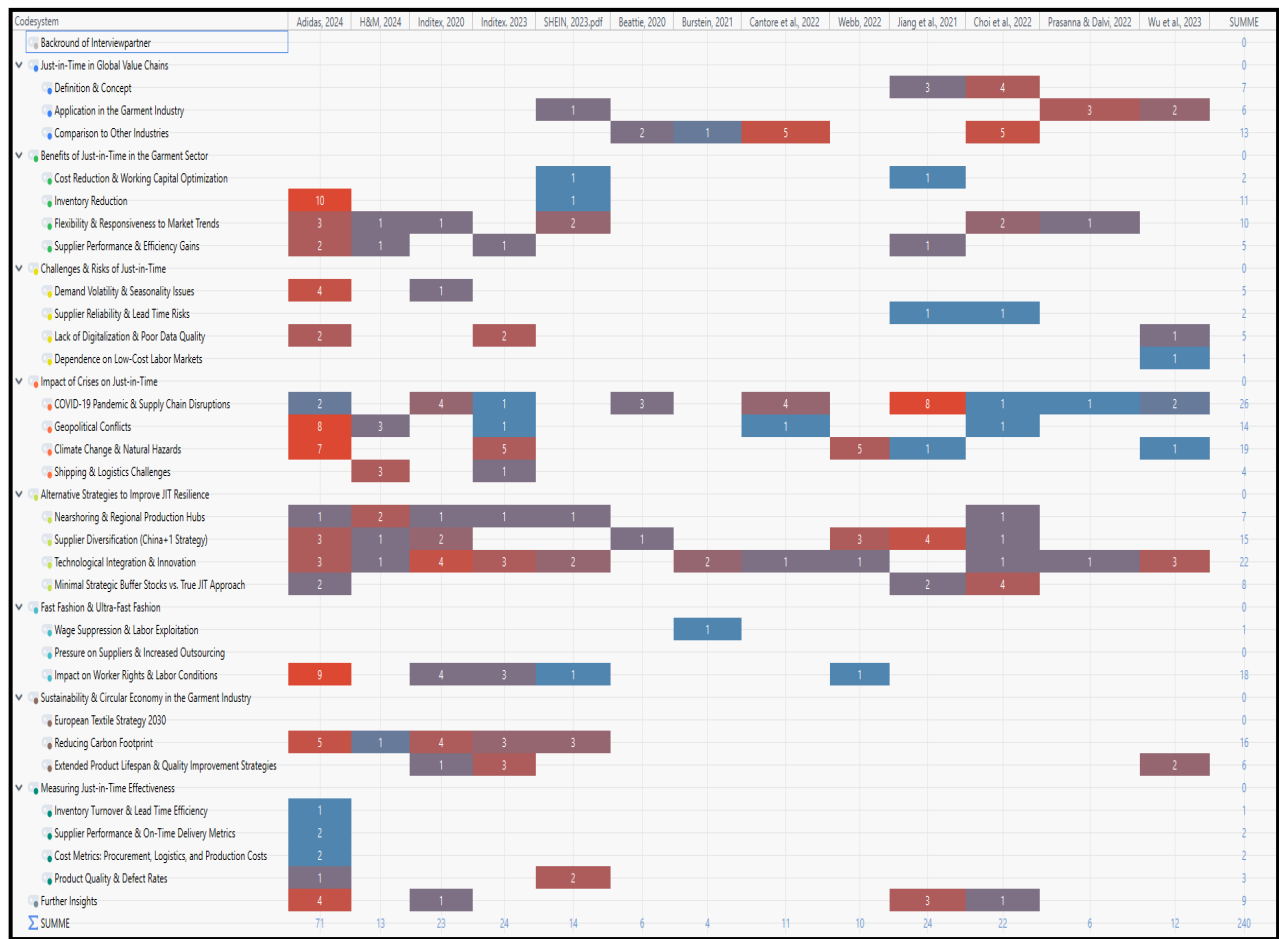
Code Relations Browser: Heatmap of Co-occurring Subthemes across Supplementary Data



Own representation. The number and colors indicate the frequency of co-occurrence between sub themes. High numbers and red color represent stronger thematic connections based on how often two subthemes were mentioned together across the supplementary data. MAXQDA-Output.

Figure A. 7

Summary Grid Heatmap of Subtheme Frequencies across Supplementary Data



Own representation. The heatmap shows the frequency of coded subthemes across the supplementary data. Each number represents how often a given theme was mentioned. Darker or redder cells indicate higher frequencies. MAXQDA-Output.

Figure A. 8

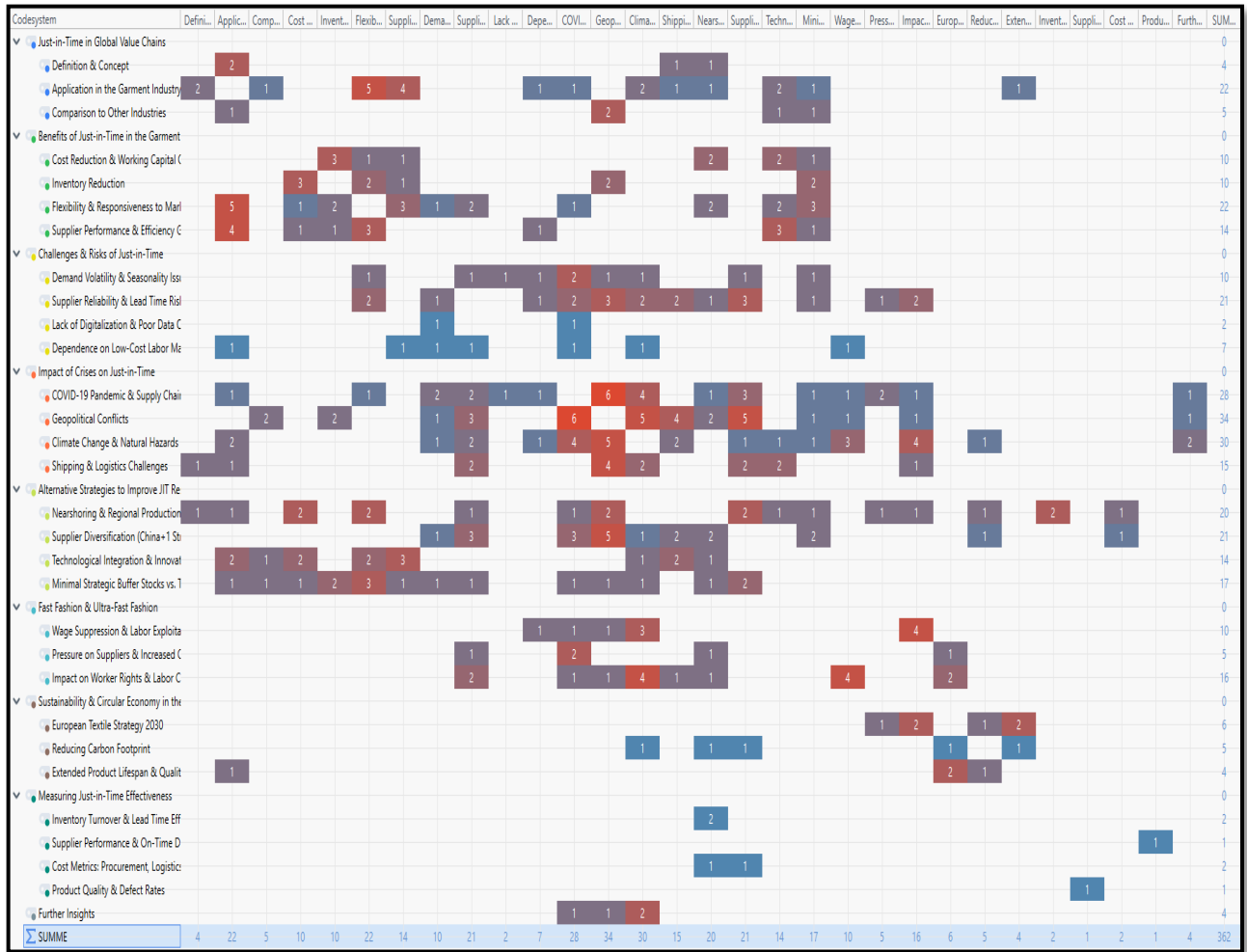
Code Cloud Displaying the Most Frequent Subthemes across Supplementary Data



Own representation. Larger terms indicate higher coding frequencies. The visualization includes only codes, which were mentioned 8 times or more across all supplementary data. MAXQDA-Output.

Figure A 9

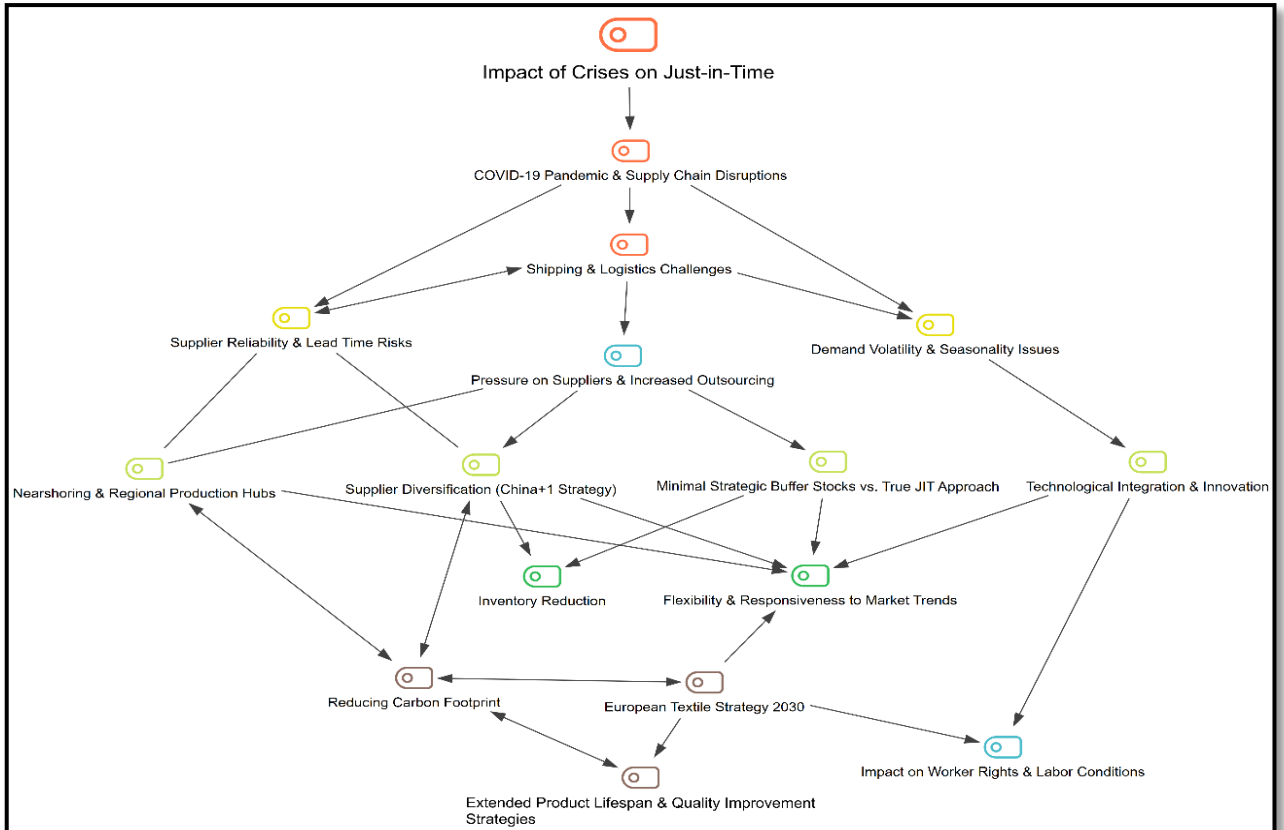
Code Relations Browser: Heatmap of Co-occurring Subthemes across All Data



Own representation. The number and colors indicate the frequency of co-occurrence between sub themes. High numbers and red represent stronger thematic connections based on how often two subthemes were mentioned together across all data. MAXQDA-Output.

Figure A. 10

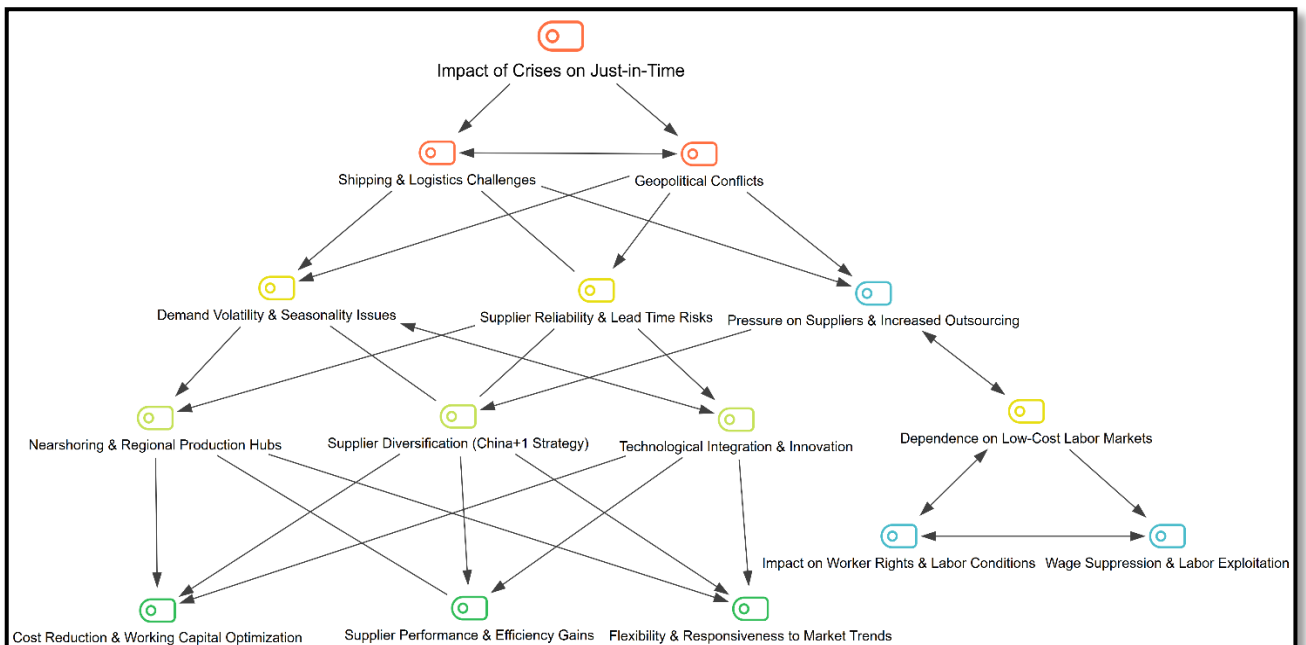
Impacts of COVID-19 Pandemic & Supply Chain Disruptions on Strategies in the Garment Industry



Own representation. Made in MAXQDA24.

Figure A. 11

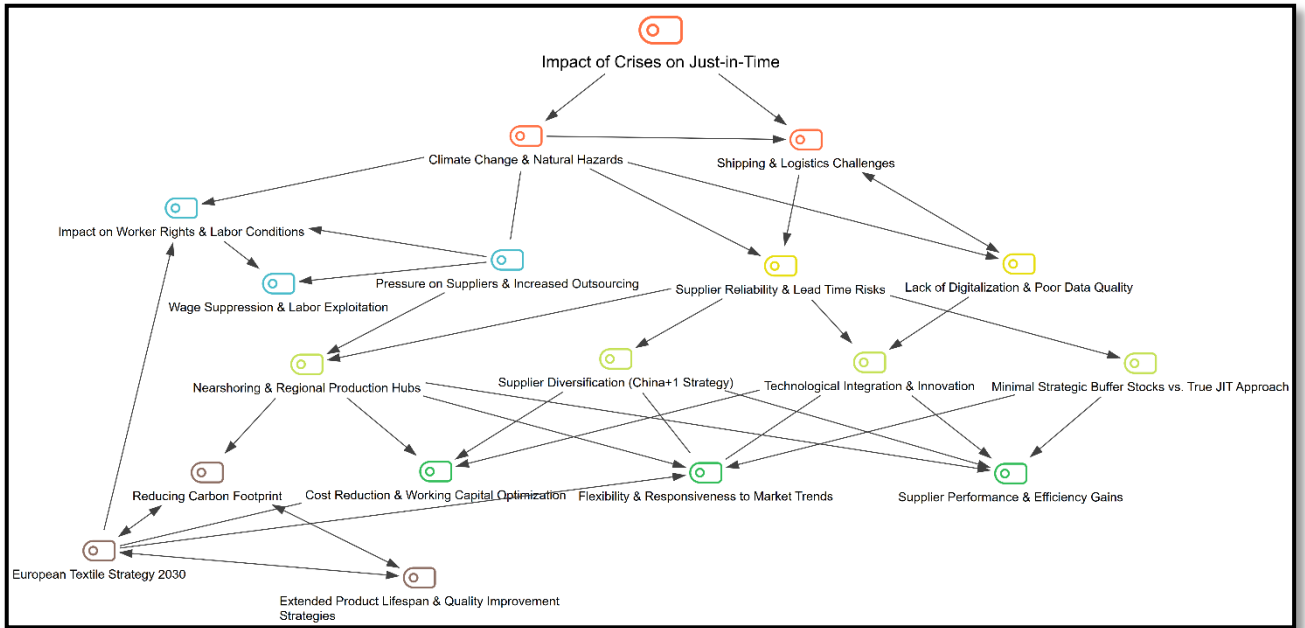
Impacts of Geopolitical Conflicts on Strategies in the Garment Industry



Own representation. Made in MAXQDA24.

Figure A 12

Impacts of Climate Change & Natural Hazards on Strategies in the Garment Industry



Own representation. Made in MAXQDA24.

Appendix 3: Final Category System

Table A. 2

Final Category System

Main category	Sub-Category	Definition	Coding Rule
Justin-in-Time (JIT) in Global Value Chains	Definition & Concept	Covers theoretical explanations, key terms, and conceptual clarifications.	Code when definitions or key terms are explained.
	Application in the Garment Industry	Describes how the JIT is applied specifically to the garment/textile sector.	Code when content refers to real-world examples in the garment industry.
	Comparison to Other Industries	Involves contrasts or parallels with other sectors.	Code when other industries are compared with garment industry.
Benefits of Just-in-Time in the Garment Sector	Cost Reduction & Working Capital Optimization	Focuses on lowering costs and improving financial efficiency.	Code when financial savings or capital use are discussed.
	Inventory Reduction	Benefit of inventory reduction while maintaining performance.	Code when minimizing inventory is addressed as benefit.
	Flexibility & Responsiveness to Market Trends	Ability to quickly adapt to changes in demand or market shifts.	Code when adaptability or responsiveness is discussed.
	Supplier Performance & Efficiency Gains	Evaluation or improvement of supplier effectiveness.	Code when supplier performance or efficiency gains are mentioned.
Challenges & Risks of Just-in-Time	Demand Volatility & Seasonality Issues	Unpredictable or seasonal demand fluctuations.	Code when instability or seasonal effects in demand are discussed.
	Supplier Reliability & Lead Time Risks	Risks related to delivery time and trustworthiness of suppliers.	Code when late delivery or unreliable suppliers are mentioned.
	Lack of Digitalization & Poor Data Quality	Missing digital tools or inaccurate/incomplete data.	Code when lack of tech or bad data is discussed.
	Dependence on Low-Cost Labor Markets	Reliance on regions with cheap labor.	Code when focus is on outsourcing to low-wage countries.
Impact of Crises on Just-in-Time	COVID-19 Pandemic & Supply Chain Disruptions	Effects of the pandemic on global supply chains.	Code when COVID-19 impacts on supply are mentioned.
	Geopolitical Conflicts	Political instability affecting logistics or sourcing.	Code when conflicts or political risks are mentioned.
	Climate Change & Natural Hazards	Environmental threats to supply chains.	Code when climate events or risks like floods and storms are discussed.
	Shipping & Logistics Challenges	Transport issues affecting flow of goods.	Code when delivery delays or freight bottlenecks are mentioned.
Alternative Strategies to	Nearshoring & Regional Production Hubs	Relocation of production closer to consumer markets.	Code when local/regional production is discussed.

Main category	Sub-Category	Definition	Coding Rule
Improve JIT Resilience	Supplier Diversification (China+1 Strategy)	Broadening sourcing beyond a single country and supplier.	Code when supplier spread or "China+1" is mentioned.
	Technological Integration	Implementation of digital tools to optimize processes.	Code when systems or digital tools are discussed.
	Minimal Strategic Buffer Stocks vs. True JIT Approach	Stock strategies between safety buffer and JIT.	Code when JIT vs. buffer stock is debated.
Fast Fashion & Ultra-Fast Fashion	Impact on Worker Rights & Labor Conditions	Effects on labor standards and employee well-being.	Code when rights, safety, or working conditions are mentioned.
	Pressure on Suppliers & Increased Outsourcing	Shifting burden onto external producers.	Code when suppliers face increased pressure.
	Wage Suppression & Labor Exploitation	Unfair payment and exploitation of labor.	Code when underpayment or labor abuse is described.
Sustainability & Circular Economy in the Garment Industry	European Textile Strategy 2030	EU sustainability goals for the textile sector.	Code when EU roadmap or 2030 targets are discussed.
	Carbon Footprint of Global vs. Local Production	Emissions from sourcing locally vs. globally.	Code when emissions or footprint comparisons are made.
	Extended Product Lifespan & Quality Improvement Strategies	Measures to make products last longer and improve quality.	Code when durability or improvement efforts are discussed.
Measuring Just-in-Time Effectiveness	Lead Time Efficiency	Speed and reliability of delivery times.	Code when reduction or control of lead time is mentioned.
	Supplier Performance & On-Time Delivery Metrics	KPIs measuring punctuality and output of suppliers.	Code when supplier delivery performance is evaluated.
	Cost Metrics: Procurement, Logistics, and Production Costs	Financial KPIs for supply chain-related expenses.	Code when detailed cost components are discussed.
	Product Quality & Defect Rates	Evaluation of product defects or quality issues.	Code when flaws, rework, or quality metrics are discussed.
Further Insights		Captures general reflections that don't fit into specific categories but add value to the overall analysis.	Code when content contextual insights that enhance the understanding of the topic.

Own representation

Appendix 4: Interview Guide

Table A. 3

Interview Guide

Item	Question
Q 1	How would you characterize the current state of global value chains in the garment sector regarding Just-in-Time practices?
Q2	What are the primary benefits and challenges associated with implementing JIT specifically within garment supply chains?
Q3	From your experience, what are some key indicators or metrics used to assess the effectiveness of JIT implementation, particularly during turbulent times?
Q4	In your view, how has Just-in-Time production performed within garment supply chains during recent modern crises like the COVID-19 pandemic and the Ukraine-Russia conflict?
Q5	When comparing JIT performance in the garment sector during times of crisis versus more stable periods, what observations or insights can you share?
Q6	What factors, in your opinion, hinder the resilience and sustainability of JIT production within the garment industry when confronted with global turbulences such as those mentioned?
Q7	Are there alternative production strategies or methodologies that you believe could improve the resilience and sustainability of garment supply chains during times of crises?
Q8	Do you think there's a need for JIT to evolve, adapt, change or be replaced by alternative approaches to better navigate modern crises and ensure sustainable operations? What are your reasons for this viewpoint? (e.g. Just-in-Case, Just-in-Worst-Case, GVC shortening, diversification, reshoring, etc.)
Q9	Brakman et al. suggest that Just-In-Time could be transformed into Just-in-Case management and advocate for increasing buffers and borders to enhance economic resilience. Do you agree with this perspective? Why or why not?

Own representation

Appendix 5: Transcription Rules

Table A. 4

Transcription Rules

Item	Rule
Line Numbers	Line numbers were added to enable precise traceability and referencing specific statements during the analysis.
Speaker Labels	Speakers are labeled using the initials of their first and last name (e.g., FM for Felix Maile, MB for the interviewer).
Language	All interviews were conducted and transcribed in English. Grammar and sentence structure were slightly corrected for better readability, as long as the original meaning remained unchanged.
Filler Words	Words like “uhm,” “mhm,” “eh,” “you know,” etc., were removed unless they added relevant meaning.
Non-verbal expressions	Sounds like laughter (e.g., “haha”), sighs or similar expressions were left out unless important for understanding tone or reaction.
Incomprehensible Speech	Passages that were not comprehensible despite repeated listening were marked with [incomprehensible] in the transcripts.
Pauses and Repetition	Short pauses and repeated words were removed to make the transcript easier to read, unless they were important for interpretation.
Accent and Dialect	Minor accents and dialectal expressions were smoothed into standard English to ensure clarity and consistency across all interviews.

Own representation

Appendix 6: Transcripts of the Expert Interviews E1-E7

E1, 18.03.2024

1	MB:
2	[00:00:00 - 00:00:44] So, Felix, thank you for your time and thank you for
3	taking part in the interview. Today we are going to talk about Just-in-Time, the
4	Just-in-Time principle in global value chains, especially in the garment sector.
5	Before we start, I just want to assure you that the data will be safely stored.
6	I want to ask you if it's okay to use your name as an expert to verify the
7	interview and your expertise?
8	FM:
9	[00:00:45 - 00:00:46] Sure.
10	MB:
11	[00:00:46 - 00:01:08] Okay, perfect. So first off, can you please introduce
12	yourself briefly and provide an overview of your expertise and experience in the
13	field of global value chains, just-in-time practices or the garment sector?
14	FM:
15	[00:01:09 - 00:03:50] Sure. So I also did my Master's in International
16	Development, like I think it is the case for you, where I began to work on
17	global value chains. Mainly in the case of cash crops, so in the cocoa industry,
18	where I was primarily interested in the role of sustainability certifications
19	and then also the impact of financial markets on inequality along global value
20	chains. And from there I started to do a Ph.D. and now I'm doing a case study on
21	the role of financial markets in global value chains and how, so to say, the
22	short-termism of capital markets impacts the way in which lead firms that sit on
23	top of global value chains govern their supply chains and how they source from
24	their suppliers. I'm doing a case study on the global garment sector, so I'm
25	looking at the largest ten global apparel corporations and how they source from

26 key supplier firms. Yeah, and I also wrote this report with the colleagues on
 27 current shifts in the garment industry. So, yeah, I would say I am a social
 28 scientist or a political economist, but for three or four years I've been
 29 looking a lot at the global garment industry. And also, and I think that's
 30 really important, you have to understand the industry. So that's why I really
 31 also participated in industry meetings, read a lot of industry journals, like
 32 that could be also useful for your article. You have to actually read it, like
 33 sourcing journal just style, like all these industry magazines where you really
 34 see where shifts in the industry happen. Yeah, so I would say my expertise is
 35 that. I'm actually a social scientist and try to understand these or macro
 36 processes and process between states and firms and labor in different regions. I
 37 also try to understand industry logics. These industry logics are mainly related
 38 to what are the main drivers of the geographies of production, which is
 39 primarily labor costs and also preferential market access, meaning like lower
 40 tariff costs. But it's also about the capabilities that certain companies have
 41 to implement certain things on the factory floor. And that also plays into these
 42 debates about, for instance, nearshoring, whether it's possible or not. Yeah, so
 43 that is my background.

44 MB:

45 [00:03:51 - 00:04:19] Okay, thank you. Regarding global value chains, how would
 46 you characterize the state of global value chains that use the Just-in-Time
 47 principle in the garment sector today? Are they fully functioning or do they
 48 experience specific problems?

49 FM:

50 [00:04:20 - 00:10:23] So I think what you saw over the past 30 years was that
 51 there has been outsourcing. If you want to say, like the split of end markets
 52 and consumer markets already since the 1950s. I mean, even before that, you had
 53 always, like based within countries, always moves to lower labor costs regions.
 54 So for instance, in the US to the south, from the UK to Ireland, and then what
 55 you had in like 50 years from the 50s to around 90s or 2000s, was that there was
 56 gradual outsourcing because obviously it was cheaper. There were East Asian
 57 countries that could deliver on outsourcing, but you still had a significant
 58 apparel, so clothing assembly. But then also textile, where you do the fabric,
 59 which I think is very important to separate these two processes, conceptually
 60 and analytically. Where you had debt still to a certain extent in the main end
 61 markets, which are Europe and the US. And since early 2000s, that has completely
 62 been dissolved or almost mainly because there was trade liberalization. So that
 63 quota system that was in place from the early 60s until the mid 2000s to protect
 64 these industries was fully abandoned, and obviously there were more and more
 65 entrants from global South countries, most notably China and Vietnam in the
 66 2000s. So the period from the early 2000s to the COVID crisis, to the pandemic,
 67 were really characterized by fully fledged outsourcing and quite smooth supply
 68 chains from a logistical standpoint. I think the basic mode was to have already
 69 a lot of competition in a textile segment, but still concentrated in some
 70 countries that had these capabilities like China mostly, but then also Taiwan,
 71 sometimes Korea. And then some textile capabilities in the main apparel assembly
 72 countries, but then the apparel assembly really took place all over the globe.
 73 And then with COVID I think it's important to not over emphasize the shock in
 74 terms of the supply chain disruption, because what you had in a lot of countries
 75 were some factory closures. In March to April, where I think in Vietnam, then
 76 also China and also other countries, there were closures. But the real story was
 77 really these unilateral order cancellations by fashion brands and retailers that
 78 happened from March to April, since they shut down their stores. They just
 79 didn't want to pay for the orders that were already in process for the next
 80 three or four months. So the disruption was rather from the retailer side. And
 81 then the process you actually had in let's say the second half of 2020,
 82 especially in 2021, was a quick rebound, because the lockdown was not everywhere
 83 that strong, and you actually had a very quick rebound in terms of the sourcing
 84 volumes,. But you also had very high shipping prices that was not only related
 85 to apparel, but virtually for all industries, because you had these shipping
 86 route disruptions, because the containers weren't where they should have been.
 87 They were like less in terminals, so you had around a quadrupling, or an

88 increase of shipping route prices by five hundred percent. And I think in the
89 industry, that made a lot of people think that they might need to near-shore
90 some of their production, and here Central America became quite central in the
91 story. So that one aspect, where a lot of sourcing managers and people in the
92 industry thought that it might be better to shorten the supply chains to some
93 extent for some goods. But the real discussion you see now with nearshoring is
94 much more linked to China plus one (China+1), which became very apparent with
95 the Youth Labor Prevention Act in 2021, and it's especially linked to online
96 sales and to working capital managers. So it doesn't come out of this ratio of
97 like we need to have secure supply in case there's a supply chain disruption,
98 but it's more about different things coming together, which a lot of people then
99 project towards more nearshoring. So that's the story, because if you think
100 about it in terms of moving from Just-in-Time to Just-in-Case, that would mean
101 that as a retailer you have this gigantic inventory cost, and no one wants to
102 have that. So since 20, 25 years, basically since 40 years, retailers try to
103 reduce their inventory costs, and since 20 years you hear everywhere that they
104 want to reduce costs, and the last thing that retailers would want to have is to
105 hold safety stocks. Also because, the garment industry is not something that is
106 of strategic importance. If you store something for three months, especially
107 fashion items, you can be quite sure that you cannot sell these at the full
108 price, or that you can't sell it at all. I think there's really no incentive to
109 hold safety stocks in the garment industry.

110 MB:

111 [00:10:24 - 00:11:03] Okay. Do I understand correct that you would assess the
112 performance of Just-in-Time, in garment global value chains, as still a viable
113 option, even though crises occur and disrupt the chains? The disruptions don't
114 have that immense effect on them, that it is worth to neglect Just-in-Time?

115 FM:

116 [00:11:04 - 00:12:58] I think there is no other option than Just-in-Time. And
117 the industry never used any other mode than Just-in-Time. Obviously, we can
118 think about alternatives and sustainability, but I'm just talking about what the
119 industry might consider. So maybe we can later discuss whether, also now with
120 the European sustainable textile strategy and so forth, and how a more circular
121 economy could look, but just from what is discussed in the industry among
122 fashion brands and suppliers and so forth. There is no space for Just-in-Case
123 logic. And even if you look at other industries, they also shifted from this
124 Just-in-Case discussion. That was really something that was there in 2020, 2021.
125 It's really much more in automotive or in microelectronics or even now more in
126 geopolitics. It's about geopolitical risk but it's not about that the supply
127 chain may be disrupted by a pandemic or by some, by that source. And in terms of
128 the garment industry, Just-in-Time really comes out of the Japanese automotive
129 industry that at the time tried to emulate something that one person saw in the
130 food industry in the US. So for the automotive industry it really made sense at
131 the time to make it more flexible and save a lot of working capital and avoid a
132 lot of unutilized capacity. So there was actually this shift from, not from a
133 Just-in-Case or a not Just-in-Time industry to Just-in-Time, but the global
134 garment industry, the outsource garment industry always worked with Just-in-Time.

135 MB:

136 [00:13:08 - 00:13:14] Sorry Felix I think I lost you for the last sentence. Yes,
137 now I can hear you again. I lost you for the last sentence.

138 FM:

139 [00:13:16 - 00:13:19] So you didn't get the last part or?

140 MB:

141 [00:13:19 - 00:14:30] Yes, just the last sentence, but it's fine. So you already
142 touched on a few points I wanted to discuss regarding alternatives to
143 Just-in-Time that could be Just-in-Case. If I understand your point of view
144 correctly, you would say that it's not really an alternative in most economic
145 sectors to implement it because it's not profitable in comparison to
146 Just-in-Time. You also already touched on a few alternatives that could improve
147 Just-in-Time or be valuable adaptations like nearshoring, shortening, reshoring,
148 diversification. What is your point of view regarding global value chains in the
149 garment sector: which of these alternatives are valuable there and are

150 considered?

151 FM:

152 [00:14:32 - 00:14:37] From my perspective or from the perspective of the

153 industry?

154 MB:

155 [00:14:39 - 00:14:46] Please give me first the perspective of the industry and

156 then just comment on that with your personal point of view.

157 FM:

158 [00:14:49 - 00:18:19] I don't know whether you read the report but what we try

159 to say in that is that if you look at trade data, you don't see that much shift

160 because for investments to culminate in production numbers, it takes one to two

161 years and that they need to be reported in exports. But what you can see is that

162 some companies invest in some near- or onshoring facilities, meaning like in the

163 periphery of Europe or the U.S. or within the U.S. to do some assembly

164 activities or to try to have verticality, which basically links the textile

165 spinning and weaving or knitting in one region with assembly in the same region.

166 That mostly means that you invest in those countries where you already have

167 assembly, which is very less capital intensive with these highly

168 capital-intensive textiles. One textile mill is like an easy 80 million

169 investment. So what a lot of brands do, is that they try to convince their

170 supplier firms from East Asia to invest for instance in textile mills in

171 Guatemala or El Salvador. So that that reduces the overall lead time, because

172 then if you had like 180 days for putting the order in and then you have the

173 fabric produced and shipped from let's say like China or Vietnam to Nicaragua,

174 that would be another 30 to 45 days and with verticality in nearshoring, you

175 reduce that time. But the key motivation is here to be able to cater for

176 instance online sales where you have much shorter lead time and especially to

177 reduce working capital. In the end it's about working capital, especially now

178 where interest rates increase again so the key debates are really that it's

179 nearshoring. I think the question is to which extent is it actually happening

180 and the other question is then what really drives it. Because you could make

181 that argument about online sales and working capital, some people also say that

182 it's about sustainability, which I don't believe because the argument of saying

183 that you have nearshoring to reduce emissions that doesn't really make sense

184 because if you look at the overall emissions along the value chains transport by

185 ship are only two percent so the real source of emissions is if you run a very

186 energy intensive fiber production or textile production. So the spinning mill

187 with energy sources that are based on fossil fuels, that really accounts for the

188 majority of emissions. I mean that's on a discursive level discussed that that's

189 also a driver of nearshoring but I just don't believe it and also if you see

190 these investments in reducing emissions in textile production in countries that

191 are quote-unquote offshoring so in East or South Asia you also see that there

192 are a lot of investments to shift the source of energy. So I think in terms of

193 the sustainability standpoint we're not seeing geographical locations to reduce

194 emissions because if you would do that it wouldn't reduce the emissions. You

195 really have to change the energy supply for production.

196 MB:

197 [00:18:21 - 00:20:20] Okay, I get the feeling that there is not really a

198 motivation to change anything about the current construct of Just-in-Time and

199 garments global value chains. In my thesis I'm focusing on a term I call modern

200 crises, which I define as crises that occurred over let's say the last 10 to 15

201 years, which would include for instance the COVID-19 pandemic, also now the

202 Ukraine and Russia war but also climate change. Climate change is a specific

203 case because climate change leads to natural hazards and they become more

204 frequent with climate change and more intense. So let's say we have Bangladesh

205 as a country that provides one piece of a chain in a garment global value chain

206 and they experience flooding very often or even more often in the future with

207 the progress of climate change. Do you think there are any possible adjustments

208 to improve resilience of global value chains that have them prepared for other

209 modern crises like the ones named? The pandemic is a global health emergency,

210 the conflict in Russia and Ukraine is in classic political conflict and climate

211 change is probably a case for itself.

212 FM:
 213 [00:20:21 - 00:20:28] So you think whether from the perspective of companies?
 214 Whether they do this risk analysis or more?
 215 MB:
 216 [00:20:28 - 00:20:29] Yes.
 217 FM:
 218 [00:20:32 - 00:27:59] A lot of people sum that up under this term poly crises
 219 which I find a bit irritating because it then often tries to link different
 220 processes that are not quite causally related. So I think it's very important to
 221 separate these processes. I would say that where I see change is, that companies
 222 now more care about geopolitics and you could also subsume the conflict in
 223 Russia and Ukraine obviously under that. If you talk about global value chains I
 224 wouldn't talk so much about Russia and Ukraine, only if you talk about grain and
 225 energy. The real impact that Russia and Ukraine had on policymakers and on
 226 companies is that you can take this surprise that happened two years ago and
 227 quite kind of project it onto the China/US issue. There you really see that
 228 China is at the center of almost all global value chains and also remains so
 229 even though labor costs have increased. You have an incredible ecosystem there.
 230 So if you can talk about garment but also about electronics, automotive and a
 231 lot of other manufacturing industries that are now coming with solar, with wind,
 232 with other clean tech energies.
 233 You really see that there's a de-risking strategy away from China and that has
 234 been going on already since the early 2010s. Back then it was driven by higher
 235 labor costs but also by simply reducing the share of China. For instance, by the
 236 early 2010s China accounted for 40% of all global exports and already in that
 237 era of geopolitics some garment buyers wanted to diversify. We also see that in
 238 electronics, but what really happens since early 2022 is that a lot of sourcing
 239 officers kind of projected what happened in Russia and thought, okay what
 240 happens if there's a conflict over Taiwan and there's a war or a sea blockade.
 241 That's why a lot of companies try to diversify away from China. It doesn't mean
 242 decoupling but trying to source from other countries, which are in apparel
 243 mostly Bangladesh and Vietnam. Also in Central America, some countries like
 244 Turkey. Here I think two points are really important. The first point is, is it
 245 a shift of the entire ecosystem, which is now the competitive advantage of China
 246 with having integrated component suppliers, fabric suppliers, or is it just that
 247 a Chinese company invests in Vietnam or India or Bangladesh. Then it's not in
 248 their territory but it's also not de-risking from China. They would still source
 249 from a Chinese company. The other thing is, are you trying to de-risk or really
 250 decouple and I don't think that the decoupling is going to happen. I think that
 251 makes the situation even more complicated because China is also very big end
 252 market for a lot of buyers. I don't know whether you read about it but for
 253 instance three years ago there was an attempt by European or US brands to reduce
 254 sourcing from China. They criticized the human rights situation in the Xinjiang
 255 region and then the Chinese government just blocked them from any access via
 256 [incomprehensible] to consumer markets. In a nutshell I think sourcing officers
 257 want to get off like this kind of geopolitical shocks but now they have to
 258 somehow get along with it and what you see is diversifying but not decoupling
 259 and at the center of this risk is really China and you also mentioned the other
 260 crisis of climate change I think. Yeah I think the point with Bangladesh is
 261 really good because obviously there was this mapping by one buyer and then there
 262 was also one study where they basically showed that in 30 or 40 years all
 263 factories will be under water. But I don't think that in terms of floods there's
 264 any big shifts because you would need to relocate a lot of capital expenditures
 265 and who would pay for that. So what you see now is rather adoption in the sense
 266 of how can you actually guarantee working in a factory if there's 50 degrees and
 267 how do you create factories with an AC or some other element of cooling that you
 268 can actually continue work. A lot of production already takes place in tropical
 269 or subtropical climates so that's going to be a big issue and then with the
 270 COVID crisis I don't think that it had a long-lasting effect in terms of
 271 sourcing. What were the implications? I think that the issue there was just that
 272 it sparked this debate on, if there's a big supply-demand crunch which was the
 273 case during COVID, who's actually gonna pay for that and the COVID-19 crisis

274 shows that just everyone pushes the pressure down the chains. Orders were
 275 cancelled and then the suppliers had to lay off their workers. So it's just
 276 going to get pushed down and in the aftermath of that we had some discussions on
 277 a more sustainable garment industry and also more sustainable sourcing practices,
 278 which would mean that buyers pay on time, that they pay earlier, that the
 279 sourcing practices are designed in a way that working conditions are better. It
 280 didn't go anywhere so far also because the power relations are just in the way.
 281 There's a lot of dialogue, but there's so much pressure in the industry that you
 282 don't see these fundamental shifts. At least it is it's discussed so that's
 283 already an advantage.

284 I think at the center these geopolitics are not as strong as in other industries
 285 like in semiconductors or automotive, but it also plays a role so I would say
 286 that's really the biggest crisis at risk analysis.

287 MB:

288 [00:28:00 - 00:28:28] Okay so the main real change to this taking place is
 289 diversifying as much as possible in order to be safe if any disturbance comes up
 290 so you are able to source from somebody else and continue working within the
 291 chain and to like out-manuever the disruption.

292 FM:

293 [00:28:31 - 00:30:18] Well it's not about like one big disruption but it's
 294 rather broader long term risk. For instance the issue with diversifying from
 295 China due to the Uyghur Forced Labor Prevention Act is not about shutting down
 296 but rather not importing to the US, if you cannot verify that the cotton was not
 297 from Xinjiang. So you kind of diversify but it's not related to one-time events
 298 but rather broader risks that are broader processes. So that's what some
 299 companies do but it's really important how big that element is that it
 300 ultimately influencing the decision. You still have other parameters like is it
 301 actually available in location, what is the cost, how is it linked to the rest
 302 of the strategy, does it really make sense, if we don't have the same component
 303 suppliers to source from in that country because then maybe there's no
 304 disruption but then we don't have the components that we need to for instance
 305 establish a fast fashion business segment for certain product category in
 306 country XYZ. So I think risk becomes one parameter in sourcing and more
 307 important but then you still have these other parameters like I said earlier.
 308 You have the issue with working capital, with pricing. And I think it plays a
 309 role but I still think it's not that the major role.

310 MB:

311 [00:30:18 - 00:30:19] Okay.

312 FM:

313 [00:30:19 - 00:30:41] You always have to see these other costs, quality, price,
 314 reliability parameters and I think the debates are there, but I don't think that
 315 it's now overarching. It's just one of the many sourcing criteria factors.

316 MB:

317 [00:30:41 - 00:30:56] Okay understood. You're also a bit of an expert at least
 318 in the African region regarding this sector. Is this right?

319 FM:

320 [00:30:57 - 00:30:57] Yeah.

321 MB:

322 [00:31:00 - 00:31:23] I also heard that it is considered by some due to work
 323 costs to move production from some parts from South Asia, East Asia, to African
 324 countries like I guess Ethiopia is maybe in the running as far as I remember.
 325 Can you comment on that?

326 FM:

327 [00:31:28 - 00:37:41] Yes, I think here the rationale started mostly in 2013. It
 328 was actually a big shock after the Rana Plaza building collapsed in Bangladesh.
 329 Some buyers wanted to diversify and the logic was clearly that the industry
 330 always had like new sourcing frontiers East Asia, then Southeast Asia, then some
 331 Central American countries and then Africa really started to enter the global
 332 export industry in the early 2000s with these preferential trade agreements with
 333 the U.S. But the industry was never really big and it was only a handful of
 334 countries, so Mauritius, Madagascar, Lesotho, Eswatini and then you had like in
 335 East Africa, Kenya and now more recently also Ethiopia. So I think the strongest

336 growth was in Ethiopia, where you had at the time in the mid of the last decade
 337 a government that really wanted to kick-start industrialization based on the
 338 apparel industry. So what they did is build these industrial parks, get some
 339 global fashion brands investing there, which actually meant that they brought
 340 their supplier firms from South and from East Asia. So there are a lot of
 341 investments by supplier firms not from Ethiopia, because they don't have the
 342 capabilities, but from Hong Kong, from Korea, from Sri Lanka. But I mean the
 343 Ethiopian story has somewhat like a caveat because you had a change in
 344 government in 2018 and then also a civil war three years ago. So there are still
 345 these industrial parks, but the whole thing has really altered. There are still
 346 some exports, but you also don't have many because of the human rights
 347 violations you don't have the preferential trade agreements to the US, which was
 348 a major factor. I think what you see is that there are some investments, but
 349 it's not very dynamic, and that has to do with the fact that there is already a
 350 lot of competition. It rather makes sense from the perspective of African
 351 governments or industry representatives because it is the one of the key entry
 352 industries because it has no entry barriers in terms of the capital investment.
 353 It sucks up a lot of labor and it's really the industry to start but at the same
 354 time it's very difficult to really gain a lot of market share because you still
 355 have a lot of competition in other countries. I also think the environment
 356 changed a lot to compare it to the industrialization story in East Asia in the
 357 60s and 70s, where there was a lot of demand for supplier firms because
 358 competition was limited with the trade restrictions. Some of these supplier
 359 firms could gain more orders but then also grow to other industries because for
 360 a successful industrialization strategy you don't stay in a parallel assembly
 361 for decades because it's always the lowest value segment. You use it to build
 362 competitive firms to export, generate revenues, to build an industrial workforce
 363 but then you move eventually somewhere else. Especially you need a textile
 364 sector not only a parallel assembly. So I think a lot of countries still try to
 365 enter You have this industrial park concept in Togo, a bit in Ghana, still some
 366 efforts in Kenya but I think you only become a competitive sourcing location if
 367 you also have the ecosystem. Which is already difficult, if you're small,
 368 because then it's difficult to get a textile mill investment if you only have
 369 five supplier firms that buy there. If you have 200 supplier firms and there's a
 370 lot of competition from East Asia still and I think that's also important so the
 371 wages are low but it really depends on the country. For instance in Kenya you
 372 pay 200 dollars per month, which is still very low, especially if you try to
 373 survive in Nairobi. But then it's still more than in Bangladesh. When in
 374 Ethiopia, the wages were like 40-50 dollars a month and there it's different,
 375 but then it really depends from country to country, where you have these big
 376 labor cost differences is because you always need to link it to productivity. So
 377 it's not about labor costs per se, but labor costs for a certain output of work
 378 and if your labor cost is double but then the efficiency or productivity is only
 379 half of it that kind of equals that. The challenge in a lot of new sourcing
 380 locations always that you have untrained labor so it always takes four to five
 381 years at least to reach efficiency levels from established sourcing locations.
 382 You're right like there's a lot of talk in general in GVC's and then also in
 383 garment in shifting from China to Africa, but I think just empirically we don't
 384 see this big shift yet and it's also quite complicated because it's not only
 385 about labor but also about political stability about, about the industry
 386 ecosystem and about really about the demand. I mean it's apparently still
 387 growing but it's also not the fastest growing industry globally. So these are
 388 all factors that play in. I debated a lot with different colleagues and I still
 389 think for some countries it makes sense. I just don't think that you're going to
 390 see this big shift of all factories from China moving to African countries.
 391 MB:
 392 [00:37:41 - 00:38:12] Okay regarding this: there was also some kind of movement
 393 regarding reshoring in garment GVCs from South Asian countries back to Europe
 394 regarding some manufacturing steps were taking were taken back to factories in
 395 Portugal or Eastern Europe. How do you assess that?
 396 FM:
 397 [00:38:13 - 00:38:19] Are you referring to a specific study or is it more like

398 newspaper article?
399 MB:
400 [00:38:20 - 00:38:22] Articles mainly.
401 FM:
402 [00:38:23 - 00:42:02] I mean there were always regional suppliers. Regional
403 suppliers played a bigger role especially in the US in the mid 1990s to early
404 2000s. Also when you had NAFTA with Mexico and then China entering the WTO and
405 then you had like the share of global suppliers decreasing. But it always
406 remained at like 15 percent for both for the EU and for the US. If you define
407 regional suppliers as countries that are in relatively close locations so
408 Central America or Northern Africa or Europe or Eastern Europe for Europe. There
409 were always these locations also because you needed them for instance for fast
410 fashion I don't see the empirics for this big move. I see investments and
411 probably they going to be visible in trade data one or two years. Portugal is
412 very much a niche story. There are some textile mills and you read it all over
413 the place, but the volumes are just very low. So I think one always needs to see
414 what is the story and there are also a lot of people talking about this is kind
415 of sustainable fashion, whatever that means. But then I looked at the absolute
416 volume and it's even not without Portugal it was like, I don't know, 0.01
417 percent of global volume. What you see actually for Europe is more Turkey,
418 because there you can really produce in big volumes and a lot of large global
419 fashion brands already sources from there, like Inditex has a big hub there. I
420 think there was the idea to get more textile mills. And then also for Egypt
421 because the location is just very favorable, but there was also the question
422 whether there are enough textile mills and whether you can actually use the
423 domestic cotton. You're right there's also a discussion for southeastern Europe,
424 but one always has to see what is actually an article where some trade
425 representative stresses that that's the new sourcing location and what is
426 actually the absolute and relative shift that you see in the trade data. So we
427 can kind of conclude it in the report, it's mainly in some countries in the
428 European periphery, like Turkey, but then the biggest shift is really to Central
429 America with US buyers. And that is also bit of like a political story because
430 the US government tried to label that as doing something against migration in
431 terms of creating jobs, this classical development corporation story, where I
432 don't think the causality actually makes sense, but that's another question. But
433 they basically try to encourage US based firms to invest in Central America as a
434 business opportunity and also with labeling that as reassuring and supply chain
435 security, de-risking from China, but then also sell that investment for
436 political purposes. It's much more about Central America.
437 MB:
438 [00:42:03 - 00:42:25] Okay just to summarize: In your estimation we're probably
439 not seeing major shifts in the garment sector and global value chains in regards
440 to Just-in-Time or overall within the new near future.
441 FM:
442 [00:42:26 - 00:46:25] No I don't think so. I mean what I'm currently trying to
443 actually understand with another colleague is, what these shifts to different
444 fibers actually may entail because here you have a lot of investments by fashion
445 brands and also by a lot of startups to produce fibers that have a significantly
446 lower to CO2 Footprint print. For now you either have cotton, which is very bad
447 in terms of water, in terms of using fertilizer, not speaking of the problems
448 for smallholders or you have oil-based fibers. In both cases the spinning
449 process and also just the feedstock creates a lot of CO2 emissions. And what you
450 see now is that because of some regulations and the supply chain due diligence
451 it's a mix. It's some regulation but also this perception that consumers want
452 like the most "sustainable fashion" and also because some companies see it as a
453 business model. You have increasingly this shift of promoting these tiny
454 collections, where you have these recycled fibers. All fibers from biobased
455 sources, for instance if you grow mycelium that is shroom, and then you have
456 like this feedstock that's not as intensive as other feedstocks. And that's
457 quite interesting because you see a lot of investments, also by venture capital
458 firms or by global brands, into companies that really try to scale these
459 technologies because the technology is often there, but the question is can you

460 scale it and can you make it commercially profitable. For that you need a lot of
461 buyers. These companies are mainly based in the US and in Europe and some in
462 Northeast Asia and there the question is, do these companies create fibers and
463 then they ship it to the existing “offshoring textile mills” and garment
464 suppliers or does that also create, especially in Europe, like a stronger
465 European textile industry again. I’m not sure yet. These companies are still
466 like in the commercialization phase and the way it looks now is that they just
467 try to build the demonstration plants in Europe and then also create, once
468 they’ve shown kind of to the market that they can produce it at scale and at
469 cost, then to establish facilities in East or Southeast Asia. Some people also
470 from the industry see it like a revival for the industry in Europe especially,
471 because now with the sustainable and circular textile strategy. There you really
472 have this with extended producer responsibility, you see these investments into,
473 recycling infrastructure in the way that fashion brands now need to pay that you
474 also have these facilities where you can actually give back your clothes. So the
475 question is, if there’s already a lot of feedstock from Europe, is there then
476 also a lot of this recycling activity, which becomes so to say a completely new
477 actor the value chain. Is that then also taking place in Europe? But for now
478 we’re just seeing that some demonstration plants are built in Europe, but once
479 the industry really integrates that on a large scale I would assume that that
480 then again takes place closer to the textile and apparel factories and not
481 closer to the consumer and markets.

482 MB:

483 [00:46:25 - 00:46:54] But this would rather be a change from the category of
484 innovation I would say and not an economic change.

485 FM:

486 [00:46:54 - 00:47:47] Yeah but it still a economic change. I think these risks
487 everyone talks about it now but a lot of businesses just don’t have time to
488 speculate so much about risks. So there was COVID and everyone just tried to
489 deal with it. But I don’t think that most companies have a COVID strategy or if
490 something like this happens again. I think that the key driver is always to
491 secure your immediate and future earnings and not so much to mitigate any
492 potential risks. That was also what I wanted to say at the beginning, so I think
493 for your thesis it’s really important to lay out that concept Just-in-Time and
494 how it changed global production but then I think when you come to the
495 conclusion is also totally fine to say that there won’t be any or few shifts at
496 all, because I think that’s actually what you see in the garment industry.

497 MB:

498 [00:47:48 - 00:48:51] To be honest, I have the same feeling probably and I want
499 to find out with my thesis, if it was just like a movement triggered by the
500 COVID pandemic that it was like in vogue to emphasize on risks and show that we
501 need changes in order to prepare for risks more often or more frequently. And
502 this is also why I’m also focusing a bit on climate change because climate
503 change could bring more risks in the future that are not accessible or you can’t
504 plan ahead really for them because you don’t know when the next flood or drought
505 happens. But that doesn’t mean that climate change and natural hazards will
506 impact Just-in-Time in the future a lot.

507 FM:

508 [00:48:52 - 00:51:01] I don’t think so because especially COVID was really like
509 a global all-encompassing crisis but when you look at climate change. I mean
510 these are effects are already there. For instance you maybe have a drought and
511 then you have less cotton production in Uzbekistan or you maybe have a flood.
512 There are these effects but then the other question is do people really perceive
513 it as that kind of risk that is linked to their causality. Then the second
514 question is really with climate change as an individual economic actor, what can
515 you really do about it. Because for sure you could say if for instance in that
516 shipping route there’s going be a hurricane, can I actually circumvent that but
517 then it’s very difficult to reduce risk exposure overall to climate change just
518 because you don’t know where it’s happening and what is happening. I think
519 probably we can get into a global crisis again like COVID due to climate change,
520 but I think people just don’t prepare for that. I think what could be
521 interesting is then also look at if that’s not the case then explain why is it

522 not the case that people don't shift. And I think then you already have your
523 answer to a why question, which I think is always much more interesting than
524 just the how or what question. It's totally fine to say that this was a debate
525 three or four years ago. As it often happens, it now completely changed and then
526 it's really this question like what are the forces that actually would prevent
527 any shift from Just-in-Time and that's also what I just laid out earlier. Just
528 how the industry works.

529 MB:
530 [00:51:02 - 00:51:55] I think that you already provided a lot of valuable
531 information for my thesis and you pretty much hit the nail on the head with your
532 statements, because I was also getting the sense that Just-in-Time is here to
533 stay and that there is not much of thought to change it and the only thing the
534 only factor that is changing in order to improve or to keep Just-in-Time as
535 effective as it is, is to diversify. Diversification is like the main key
536 ingredients to keep your value chain as resilient as possible and everything
537 else is not really attainable because it's not profitable.

538 FM:
539 [00:51:55 - 00:51:56] Yeah.

540 MB:
541 [00:51:58 - 00:53:40] And also in regards to climate change or political
542 conflicts, all these events like you said are rather regional or are only
543 happening in one place in the world and therefore it's not the global scale that
544 is affected, which was the case with Covid. So it's not something that will
545 occur probably in the near future and have far-reaching effect. Thank you so far.
546 One more thing that's maybe a bit off topic but since we talked about Africa
547 and I have one more question that popped up in my head, it was like one
548 disturbance to GVCs that had quite an effect for, I don't know, seven to
549 fourteen days. It was the blockage of the Suez channel. If you remember, this
550 ship Ever Given that blocked the whole channel and therefore this very important
551 global shipping route was blocked. How do you assess this? Is this still a
552 vulnerable spot for global trade in the future or do you think it's more that
553 there won't be any danger in this case in regards to local political conflict or
554 something else?

555 FM:
556 [00:53:41 - 00:55:42] Yeah I mean the Suez canal can become a bottleneck. What
557 you just saw in the past months with the Houthi attacks by Houthi but then you
558 also saw the response by the US and UK. Even China to a certain extent didn't
559 interfere but still tried to and also has an interest in that this kind of route
560 to keep on working smoothly. So I think it remains a geopolitical risk. I would
561 assume that especially shipping lines also have their risk assessment and you
562 saw that a lot of trade was redirected via the Cape of Good Hope in South Africa.
563 So yeah, if there are these blockades, you already have damage for instance
564 with the conflict with Huthi in the US, where I think Tesla just lost several
565 hundred millions because they couldn't get chips to their factories in Europe
566 and I think in Berlin it was. So you already had these effects but it doesn't
567 mean that you just then relocate your production. What you do is just redirect
568 the shipping routes. And there's such a big geopolitical interest. You always
569 had these aircraft carriers in the region but I don't see that there will be
570 like this long-term blockade of it just because it's of such vital interest for
571 key economic powers.

572 MB:
573 [00:55:43 - 00:55:58] So it's less of a risky spot on the world map of global
574 trade than like you mentioned Taiwan that could lead to geopolitical conflicts
575 that lead to extreme trade problems.

576 FM:
577 [00:56:02 - 00:56:53] You never know what's happening for instance in Egypt in
578 the region. I mean there's no big superpower. In the Taiwan and China issue we
579 have a superpower that could block that. It's also what you can actually
580 transport because that's really about okay you cannot transport these high-end
581 chips and that would also mean that all goods from China are blocked by the West.
582 So I think that's a whole other serious issue than one shorter route being
583 blocked. Obviously, what you would get if the Suez Canal is blocked, is that

584 shipping prices increase again, but it's also a blockade and I think that's a
585 very important distinction. There's also a really viable alternative like land
586 routes or other routes.

587 MB:
588 [00:56:59 - 00:57:25] I think it's less likely that it is instrumentalized like
589 Taiwan could be in this regard that it is used as a piece to really motivate a
590 political conflict or that triggers something like that.

591 FM:
592 [00:57:26 - 00:57:29] I mean the Houthis are trying to that

593 MB:
594 [00:57:30 - 00:57:34] Yes, but the Houthis are less powerful than China and the
595 US.

596 FM:
597 [00:57:34 - 00:59:10] Yes, totally. Let's put it this way. The big power all
598 have interest that this canal is working. I mean the region is very has a lot of
599 different conflicts. I mean also if you look at Somalia, if you look at...there
600 was this announcement by Ethiopia to also threaten its neighbors because it
601 wanted to have direct access. You have the conflict in Yemen, you have the
602 conflict in Gaza, but I just don't see any big power or really blocking it.
603 That's probably in realistic terms for it's ultimately decisive. I mean in terms
604 of canals, what you already seeing and what's interesting for you to look at is
605 this issue of droughts that really also for domestic canals, you have it a lot
606 in the U.S., also with the Panama Canal, that there is really a bit of a problem
607 in terms of like droughts really making it difficult for certain types of ships
608 to pass. I think that's really going to increase a lot, that you're going to
609 need that all over the place that shipping prices, there will be disruptions and
610 that shipping prices in general will increase because of that. So I think that's
611 probably it when it comes to shipping. Both, I mean globally, but then also you
612 have all these regional canals in Europe, but then also in the U.S. and I think
613 that's really also in China becoming like a key issue. Where you there actually
614 have this thing between climate change and also supply chain disruptions.

615 MB:
616 [00:59:11 - 00:59:15] Yeah, because the water level is lowering during these
617 droughts, that's the case, right?

618 FM:
619 [00:59:16 - 00:59:16] Yes.

620 MB:
621 [00:59:16 - 00:59:37] Okay. I have like two more points, but they probably will
622 be very briefly discussed. What's your opinion on the freshly passed European
623 Union's supply chain law?

624 FM:
625 [00:59:40 - 01:02:22] I mean, it was very difficult to get it through the
626 through the European Council. I think it's a good step. It's a 10-year process
627 that eventually, 12-year process that, eventually led to such a law. I think
628 it's a good starting point, but I think also to really transform the way global
629 value chains operate, you also need industry-specific standards. Because what
630 you now have is that companies need to prove that they did everything, that's
631 the heart of due diligence, to reduce the risk of human rights violations. But
632 you're still not judged against the outcome, but rather your intent and that's
633 already a big difference. And I think companies will respond to it, and I think
634 it will make a difference. A lot of would argue that it's a really big burden
635 for them, but you're not going to establish, for instance, a living wage with
636 that automatically. And I think it's really important, for instance, that you
637 have industry-specific standards of what is a living wage in that region, what
638 is a good sourcing practice in that industry. When obviously you cannot pass
639 such a law in the first place, but I think in the longer term, I think what is
640 really required to have these industry benchmarks on prices, on payment terms,
641 that would really make a big difference. But I mean it's already a big step, if
642 you see it as this broader concept of, in a way, extra territorial legal
643 mechanisms. But what you also saw in the debate is that there's always
644 resistance, obviously. So yeah, I don't see that what I just suggested will
645 happen soon, but I think that would be the way to go forward, because a lot of

646 NGOs and a lot of industries already said that these are the current minimum
647 wages that are paid, and these are the living wages would be required to improve
648 and enable decent work and I think we're far from that in many industries. But I
649 think it's a good start.

650 MB:
651 [01:02:23 - 01:02:26] Yeah, it's a step in the right direction, but it's still a
652 compromise, a big one.

653 FM:
654 [01:02:27 - 01:03:20] Yeah, I mean you need to start first to enable that kind
655 of framework and, these are also so different and complex processes, so it was
656 clear that you cannot come up with an all-encompassing policy, but just as an
657 example that sustainable textile and sustainable or circular textile strategy,
658 that really is an industry-specific regulation, and there you really see, okay
659 they also set big, big topics at the beginning, but they have these 16 building
660 blocks and that's really about, you need to, for instance, have a certain
661 recycling content in garments, and then you really see that, if it's really
662 tailored to an industry, you really can make a big difference. Obviously, if you
663 have these general laws, then it's always also a matter of interpretation and
664 how you actually implement it.

665 MB:
666 [01:03:21 - 01:03:34] Yeah, agree. My last question is, there is a Viennese
667 company called Prewave. Have you ever heard of them?

668 FM:
669 [01:03:35 - 01:03:36] Prewave?

670 MB:
671 [01:03:37 - 01:03:38] ReWave, yeah.

672 FM:
673 [01:03:38 - 01:03:39] No, what do they do?

674 MB:
675 [01:03:40 - 01:04:11] They do supply chain monitoring in real time in order to
676 evade risks. They do it for big companies and firms. I was just curious if you
677 know them because they totally fit probably my thesis, to have an economic
678 person as an interviewee to comment on that.

679 FM:
680 [01:04:12 - 01:04:49] I don't know them, but it depends. So, they seem to be one
681 of these big data provider that just try to provide some sort of analysis to see
682 what are the main shipping routes and so forth, where are the risks. Yeah I
683 think when interviewing them it could be quite interesting to not so much ask
684 them about how they see Just-in-Time, but just for instance how their business
685 model has changed in the past years.

686 MB:
687 [01:04:50 - 01:05:27] Yes, especially they also use AI now, which could be
688 interesting, but also as you say how their business model changed or was
689 affected due to these big crises during the last years, that really hit Europe
690 as well. I will try to get somebody from there to comment. Good, last but not
691 least, we touched on many points, thank you for that. Is there anything left
692 that you want to say, any additional insights you want to share?

693 FM:
694 [01:05:28 - 01:05:33] Well I think we covered most of it. I was just curious,
695 this was your first interview?

696 MB:
697 [01:05:33 - 01:05:46] No, my second, I had already one with somebody from
698 Südwind, that is also a person working with the Clean Clothes campaign.

699 FM:
700 [01:05:48 - 01:05:51] So they were more about human rights, or?

701 MB:
702 [01:05:52 - 01:06:18] Exactly, but I wanted to get also somebody from an NGO
703 standpoint that works with these campaigns to get further insight in order to
704 have a good mixture at the end of interviewees that are from the scientific side,
705 but also from the economic or NGO side. So I want to mix the backgrounds a bit.

706 FM:
707 [01:06:19 - 01:06:36] I mean, maybe you can even, is there any Austrian

708 retailer? Because I think that would be really interesting to talk, even if you
709 have this possibility in person, to talk to someone from the sourcing department.
710 How their work changed.

711 MB:
712 [01:06:36 - 01:06:41] Yeah, but that's really tricky to get somebody.

713 FM:
714 [01:06:42 - 01:06:45] Get somebody? Why is it so difficult?

715 MB:
716 [01:06:46 - 01:06:56] It's difficult to get a contact, especially if you like
717 contact somebody from Inditex. They...

718 FM:
719 [01:06:56 - 01:07:02] But in Austria, like a smaller one? I mean you don't have
720 to shoot at the big brands, at the beginning.

721 MB:
722 [01:07:03 - 01:07:09] To be honest, I tried at first big brands, to maybe have
723 some luck and get somebody from them.

724 FM:
725 [01:07:09 - 01:07:13] How did you approach them?

726 MB:
727 [01:07:15 - 01:07:23] Inditex? Basically, through their info mailbox.

728 FM:
729 [01:07:24 - 01:07:30] Okay that's not good. So you either approach them like any
730 person on LinkedIn.

731 MB:
732 [01:07:30 - 01:07:31] Yes.

733 FM:
734 [01:07:32 - 01:08:22] But I think rather maybe a smaller label or a smaller
735 retailer because with these big corporations you also have this compliance issue.
736 There's no point of going through all the compliance to speak to someone from
737 Academia. But maybe if it's like a smaller company that still has some sort of
738 global sourcing but then it doesn't have this big organizational set of layers
739 and it is also a target of maybe a lot of distrust, obviously, because most of
740 the reports are just negative. So that could be interesting, but it also depends
741 on what you want to see. But I think it would be good to have someone who is
742 actually in sourcing.

743 MB:
744 [01:08:23 - 01:08:24] Okay.

745 FM:
746 [01:08:25 - 01:08:38] So they either some merchandise or sourcing. I mean, it
747 can be apparel, but also another industry, food or something. I think it would
748 be just very interesting.

749 MB:
750 [01:08:38 - 01:08:56] Yeah. Right now, I'm still trying to focus on apparel to
751 have a more niche view. Otherwise, I was also told by my supervisor that my
752 topic, which is already pretty broad, would be even broader, if I don't focus on
753 one sector.

754 FM:
755 [01:08:56 - 01:08:58] You are writing with Etienne, no?

756 MB:
757 [01:08:58 - 01:08:59] Yes.

758 FM:
759 [01:09:01 - 01:09:02] Okay.

760 MB:
761 [01:09:02 - 01:09:15] Okay. We already exchanged each other about this, but do
762 you know anybody else I could ask for interview?

763 FM:
764 [01:09:18 - 01:09:23] For which kind of set of questions?

765 MB:
766 [01:09:24 - 01:09:30] Pretty much the same regarding Just-in-Time in garment
767 value chains.

768 FM:
769 [01:09:34 - 01:09:48] Because I think in garment the issue is also no one talks

770 about Just-in-Time. The question is really much more about logistics or like
771 inventory. But I think maybe you could even reach out to a logistics company.
772 MB:
773 [01:09:49 - 01:09:49] Okay.
774 FM:
775 [01:09:51 - 01:10:55] But yeah, I don't have any, there's not like in garment
776 someone that is really specialized on Just-in-Time, just because, it's not
777 really, I mean, so there are processes that you could be described as
778 Just-in-Time, but in the industry no one uses the term. I've really not come
779 across it. So I mean, that happens often that you want to talk about with
780 someone from the industry, but you cannot use the academic term because no one
781 will get what you want to say. No, I mean, I can just recommend you maybe some
782 literature, maybe you've come across like the work, but it puts it in a bit
783 historical frame like this from Frederick Abernathy, this book on lead retailing
784 in the library? So that's from 1999, but he basically describes how US retailers
785 shifted to lean retailing, which kind of then require Just-in-Time.
786 MB:
787 [01:10:57 - 01:10:57] Okay.
788 FM:
789 [01:11:00 - 01:14:31] Yeah, it's a book from 1999, I think. And then also Ian
790 Templin, he has some papers on fast fashion that also track the shift from lean
791 retailing, quick response, fast fashion. So I think that you already have some
792 insights, because doing these interviews is always nice as an experience. But
793 then you really need to get the right person to actually be able to answer your
794 research question. And I think in your case the interviews are nice to speak to
795 some people and get their views, but I don't think that you're going to find
796 someone that can really answer, like help you answer your. I also did like 30
797 interviews in Ghana and Côte d'Ivoire for my master thesis, but, and I could
798 have also written it without the interviews. But it was it was a good personal
799 experience. But to answer a research question, I think it's really important
800 just to know the literature well and to know the industry well and to know that
801 dynamic as well. And for that I mean, there is already a lot around like in both
802 in industry magazines and in academic research. So that just to say because when
803 I when I did my master thesis, you just need these one or two more interviews to
804 get a definite answer. But then people just might have you to add like a tiny
805 piece, but it's very difficult to get it because I'm also writing a journal
806 paper about that. But it's very difficult to get also an expert that really
807 knows about everything. So you just have someone that has like a tiny expertise
808 in one thing. But I think if you actually do, so what you what I'm trying to say,
809 what you would see in that, if you do this historical analysis of how the
810 industry evolves related to outsourcing and how it was linked to the sourcing
811 strategies of retailers, you really see that it had a commercial logic. And that
812 the business model and the consumer marketing was tried to create it in a way
813 that you have very low inventory because inventory means losing money. And if
814 you would speak to a lot of people from the industry, they would even say, we
815 need less Just-in-Time, but even much more Just-in-Time, because I conducted
816 some statistics and there you can actually see that the inventory efficiency for
817 many big retailers actually goes down since 2008. So that's also why you see all
818 these debates about we need like more nearshoring because the industry is still
819 very inefficient. You basically make money by pushing prices down to suppliers
820 and then you have a big cost mark up and that is then still okay if you don't
821 sell everything or if you sell a lot with discount. But if you had better
822 consumer forecasting, which would mean that you have like, less unsold or not
823 unsold inventory or mark down, then you could also reduce that inventory cost.
824 So I think that's really where the industry tries to work on. And I think if you
825 actually read the literature that's out there that also already becomes quite
826 clear.
827 MB:
828 [01:14:32 - 01:15:08] Yeah, I already read some of Ian Taplin, who you mentioned.
829 He's pretty good and I also have him in my master's thesis. I will also have an
830 interview with somebody from the WKO to get another point of view. Maybe I can
831 more indulge in this perspective regarding logistics and improving it and what

832	their way of thinking is in this regard.
833	FM:
834	[01:15:11 - 01:15:41] Yes, sure. And yeah, I think it's just important always to
835	see what is the, I mean how this turning point of the pandemic has changed, and
836	what's actually enduring. I think then that there could be also a really
837	interesting part, like what is really the enduring institution or legacy in the
838	companies. And what was just there, as you said earlier, what was just talked
839	for one or two years and then it's over. And I think it could be a really
840	interesting contribution also for your thesis.
841	MB:
842	[01:15:42 - 01:16:34] Yeah, especially with COVID, what were measures taken that
843	are still around and are effective, efficient, valuable for companies. And if
844	not, why not? Why this whole movement from moving away from Just-in-Time and
845	getting back to buffers and more inventory? Why was it just so short-lived? Okay,
846	thank you very much for your time and answering my questions. Is it okay if I
847	reach out to you, if some other questions pop up in the next few weeks?
848	FM:
849	[01:16:34 - 01:16:38] Sure yeah, I am always available.
850	MB:
851	[01:16:38 - 01:16:42] Okay, thank you very much. Okay, so that's mainly it.
852	FM:
853	[01:16:43 - 01:16:50] Great. I look forward to seeing what you're trying to
854	publish. When do you want to finish?
855	MB:
856	[01:16:50 - 01:17:12] In the summer. I'm not sure if I'm able to finish before
857	July, but latest in September because of the Defensio possibilities. But yeah,
858	working full time and writing the master's thesis is tough to plan.
859	FM:
860	[01:17:12 - 01:17:23] Yes. Okay, great. But then, all the best and enjoy the
861	rest of the interviews and let me know how it goes.
862	MB:
863	[01:17:24 - 01:17:29] Okay, then thank you and have a nice evening.
864	FM:
865	[01:17:29 - 01:17:30] You too, bye-bye.
866	MB:
867	[01:17:30 - 01:17:31] Bye-bye.

E2, 14.03.2024

1	MB:
2	[00:00:00 - 00:00:08] So, welcome and thank you for your time. Today our
3	interview will be mainly about the garment sector, global value chains and also
4	the Just-in-Time principle which is used in many of these global value chains.
5	And before we start, just to make sure that the data privacy and the protection
6	of the data can be assured and I hope it's okay that I use your name in my
7	master thesis to verify your expertise in this field.
8	GK:
9	[00:00:38 - 00:01:00] Yeah, for the moment as far as I can see, yes, let's
10	perhaps see what's at the end, which questions come up and just to be sure
11	because whatever information I give you it's very much based on our experience
12	working on cases with workers in the factories.
13	MB:
14	[00:01:00 - 00:01:01] Yes.
15	GK:
16	[00:01:01 - 00:01:11] And very often especially when it comes to situations
17	where I'm talking about then, I also have to make sure that workers or trade
18	unionists, worker rights activists are not endangered especially when it comes
19	to publications, yeah.
20	MB:

21 [00:01:19 - 00:01:55] Of course, of course. You don't have to name specific
22 names of people. We want to make sure that the GDPR settings are given so that
23 like Datenschutz is safe for everybody. Yes. At the beginning I would like you
24 to just briefly introduce yourself and provide a brief overview of your
25 expertise and your experience in the field of the garment sector and also the
26 Clean Clothes Campaign, if that's possible.

27 GK:

28 [00:01:55 - 00:03:10] Okay. Yeah. My name is Gertrude Klaffenböck. I work as the
29 National Coordinator of the Clean Clothes Campaign in Austria. But actually my
30 employer is Südwind. Südwind is an educational organization and campaigning
31 organization in Austria and is also working on other supply chains not only for
32 garments. But my specific focus is the Clean Clothes Campaign which is an
33 international organization based in more than 45 countries worldwide with more
34 than 250 partners I think at the moment we are. And we are campaigning and also
35 doing casework to improve the working conditions in the garment sector. And with
36 this we are very often confronted with labor rights violations that are or where
37 we are informed about situations where labor rights are violated and workers are
38 abused. But also we are doing lobby and advocacy work of course. So yeah, that's
39 more or less our specific scope that we are dealing with.

40 MB:

41 [00:03:11 - 00:03:29] Okay, thank you for that. And how do you perceive the role
42 of NGOs like Südwind and the Clean Clothes Campaign itself in influencing these
43 dynamics in these global value chains within the garment sector?

44 GK:

45 [00:03:29 - 00:03:32] You're talking about the role?

46 MB:

47 [00:03:33 - 00:03:34] Yes.

48 GK:

49 [00:03:35 - 00:05:54] Well, the point is, it has become rather successful and we
50 see this also in our communication but also in publications of major brands that
51 are taking up issues that we brought to the public. Above all, it's still about
52 wages. Nevertheless, I would say the Clean Clothes campaign exists now since the
53 1980s but I would say that the global garment industry is in a condition like we
54 find it now where living wages are paid whereas working conditions still are
55 really bad in some countries. I would say success could still be better, but of
56 course we are just a bunch of people who are trying to bring issues to the
57 public and raise awareness especially with consumers, but in the last let's say
58 10-15 years we increasingly also address governments to improve the framework,
59 the legal frameworks to have more kind of let's say more democratic frameworks
60 for workers also where they find themselves in so that's more or less the point
61 at the moment, but of course when it comes to specific situations in factories
62 but also to work together on a global scale, I think we are actually quite
63 strong and also like we have a really good reach in several in European
64 countries. Also I think the Clean Clothes Campaign meanwhile is very well known
65 to leading brands. So actually that's our role. I mean our first address always
66 are other brands and also then the consumers and of course the wider public as
67 citizens.

68 MB:

69 [00:05:55 - 00:06:08] From your perspective how would you categorize the role of
70 Just-in-Time and global value chains in the garment sector and in your work?

71 GK:

72 [00:06:09 - 00:06:12] What do you mean with categorize?

73 MB:

74 [00:06:16 - 00:06:33] For me it is interesting to know, if Just-in-Time and
75 global value chains or the combination of them have a significant role in your
76 daily work or how these factor in at the Clean Clothes campaign.

77 GK:

78 [00:06:33 - 00:11:53] Okay, I see. Now well, you know we are talking usually
79 about this kind of the one thing that the fast fashion production business model
80 let's say, and then, of course, we have this ultra fast fashion model that is
81 mainly based on online business, on doing business online, and that has still, I
82 would say, aggravated the situations that we have found in the fast fashion

83 models already. But of course, the fast fashion model is not that new. I mean,
84 we know it since more than 20 years now, and of course, it has aggravated the
85 already bad working conditions in production countries like we find them in Asia,
86 but also increasingly in eastern and southeastern European countries. And as we
87 see now, they spread. The fast fashion factories also are built in or
88 increasingly installed in African countries. And I think for the brands that are
89 selling in Europe, those kind of regions, of production regions are the most
90 important. I mean, I think there are similar conditions and business models
91 going on in Central and Southern America, but they are not that important for
92 the European market and the European citizens, I would say. That's one thing. Of
93 course, I mean the production of fast fashion is based on cheap production in
94 short time and at high quantities. So, that's the one thing. That's actually the
95 normal basis. But when we have now an increasing competition and the seasons are
96 changing clothes in the shops, but also in online offers, of course, the
97 pressure in the production chain becomes higher and then the last who's going to
98 pay for it is the worker. And in the factories, we realize that point one, the
99 regular working contracts are actually more or less... that there are no regular
100 working contracts, it's more or less very usual. So, there is not a written
101 contract or sometimes not even an oral contract, it's just a kind of like that
102 workers are hired on time, like I would say for a certain period until an order
103 is produced and then they are laid off again. So, that's one thing, so that
104 regular working contracts are decreasing, point one. Point two is that, of
105 course, the work hours and their increase. Working hours in the factories
106 increase and there is really also that, how should I say it's kind of forced
107 overtime that we see increasingly when it comes to this kind of pressure, yeah,
108 in the production chain. And the third point is that also when the pressure in
109 the factory ground increases, this also means, and especially for women very
110 often, they face increasingly, you know, psychological violence, but sometimes
111 even physical violence, and this kind of like intriguing and harassing
112 conditions. That is of course really a situation of abuse that we actually
113 wouldn't have expected, let's say 20 years ago. That this could really be
114 aggravated still. So that's what I think it's really this kind of Just-in-Time
115 production, that when a big quantity orders come, or a manufacturing owner is
116 just accepting it, and then the pressure in the factories is increasing, yeah.
117 And, of course, but this is really not new in the garment sector, that is the
118 wage issue. And this is really the basic reason why these conditions can prevail.
119 That point one wages are low, they do not, by far not, cover the minimum of
120 expenses a person would need for its basic needs. So this also means that many
121 workers have to take another job or have to take up other income earnings. So
122 it's, yeah, that's, I mean, there is a kind of like what we call it also a kind
123 of survival strategy they have to develop.

124 MB:

125 [00:11:53 - 00:12:22] Okay, that's totally understood. So would you say that due
126 to the development of fast fashion and ultra fast fashion, of course in
127 combination with functioning global value chains and the Just-in-Time principle,
128 which are used, the pressure is also heightening on the lower ends of the chains
129 where the workers are?

130 GK:

131 [00:12:24 - 00:12:33] With the lower end of the chain you mean the production
132 side or do you mean for example on selling?

133 MB:

134 [00:12:34 - 00:13:03] No, what I am talking about is that fast fashion and ultra
135 fast fashion use these mechanisms of GVCs and Just-in-Time and due to the
136 fastening of the process in these developments, the pressure heightens,
137 especially for people that are working, that are doing the work at the factories
138 and the manufactories.

139 GK:

140 [00:13:04 - 00:15:48] Yeah. Sure, sure. I mean, of course, the pressure is
141 increasing in the factories or in the workshops, like the production model of
142 SHEIN. I think that this documented by Public Eye another, I guess you've seen
143 their studies. So there is quite clear there is a kind of workforce that is
144 coming into the cities for a certain time or try to earn as much money as

possible and then and they are also accepting hard, really hard working conditions of course then. That's one thing. But the other thing is that, for example, what we have seen also that when the production or let's say there is a kind of like pressure that's in the production chain with high quantities within a short time that have to be delivered, we see also that the production chain becomes longer because then certain parts of the production can be outsourced or given to a subcontractor, which really then hire again short-time workforce for some weeks to produce something in a workshop, and then that's part of the order and this kind of like chain, this kind of subcontracting chains. And then also homework is increasing, and it always means that when working time or when the time to finish a certain task or a certain piece of garment or the work time is increasing, this also means that of course family time is decreasing. And this means that very often in households children have to take over family tasks and we are speaking of indirect child labor then because if the parents cannot cover this kind of task that has to be done in a family, in a household to run a family household then of course children have to take over and taking care of elderly sisters, taking care of elderly persons to clean the house, to do the cooking and so on. So it's not only the workers that come under pressure it's their whole family that comes under pressure.

MB:
[00:15:48 - 00:16:35] Yeah of course the whole surrounding system of their personal surroundings are affected. From your observation how was the garment sector, again that is using GVCs and the Just-in-Time principle, how did it perform during recent global crisis such as the global COVID-19 pandemic but also geopolitical conflicts like the Russian-Ukrainian war or natural hazards that are increasing due to climate change, for instance in Bangladesh where they have real struggles with floods and other hazards regarding nature.

GK:
[00:16:39 - 00:23:22] You have a point. You are really asking how the Just-in-Time model did perform? I mean, they did perform as always. Just take and run. That's actually the majority of them did not care at all, for example, during the COVID crisis. Some did not care at all what is happening to the workers. I mean, there were short-term layoffs. There were factories closed from one day to another. Then those who were still working, the workers in the factory were facing even higher pressure because they had to deal also with the tasks that the workers that had been laid off had to take over this. There were no hygiene measurements in place, there was no masks for the workers. In some factories they had not even the necessary hygiene facility like a place where they could wash their hands for example. There were some brands even just cancel their orders without paying what has been produced already. So that kind of financial risk had to be taken by the manufacturers. I think that was quite high in some countries actually. This in the second step meant that workers did not receive their wages. And I think this kind of wage theft, there is a report on this from the Clean Clothes Campaign that alone in the first six months of the pandemics in Asian countries, I think it was 12 Asian countries that had been investigated and then calculated, that was a sum of more than 10 billion US dollars in wages that were due to the workers but had not been paid. So this is kind of like the costs had to be borne by the workers of all this. And yeah, that's one thing. The other thing like when it comes to a crisis like in wartime in Ukraine, for example. I mean, as far as I know now, it's that many factories actually especially in the western part of the Ukraine was working even when the war began. And many of the workers of course were glad that they had still their income and it was not endangered. But of course, they were possibly working in or increasingly working also in fear in a war time situation when you see that in the eastern countries there is a war going on and actually the male Ukrainian workers are affected more or less. This also means that for the remaining persons in factories there is a kind of special nervousity around. But we also know from factories that for example tried to cover well, to take care of the workers, for example giving special aid or so, but what we saw, and that was actually a kind of really bad surprise, that there was after one year of wartime, at about I think it was 12, 14 months, the government themselves changed the labor law for example for overtime. They had a kind of labor law that fixed 40

207 hours per week as a normal work time and then it had been increased to I think
 208 60 or 80 hours per week. Then that for example the termination of a contract,
 209 you know, there had to be an announcement I think it was six or two months in
 210 advance, then when workers had been laid off. This was also cut, so there was
 211 this kind of like that the labor law was more, how to say this, die
 212 Arbeitsgesetz wurden ganz einfach aufgeschnürt. And this puts workers of course
 213 in a weaker situation. That's one thing and the other thing is that, for example
 214 that of course in the Ukraine wages are that low that workers normally are just
 215 glad to have some income to earn. And very often that's of course in situations
 216 where there is no alternative for having a better job under more decent
 217 conditions that these alternatives are not available. And I would call it, that
 218 there's a framework in place where actually poverty is constantly reorganized
 219 and I would even say that people are fenced into poverty and this is of course
 220 making this kind of like cheap labor available at any time and in special areas
 221 of course even cheaper than in others. Yeah and therefore I think it's really
 222 important to really have a closer look also on the legal framework that is
 223 enabling this kind of working conditions and it's legitimizing it also.
 224 MB:
 225 [00:23:23 - 00:23:49] Yeah. Very interesting. I didn't even know about these
 226 changes of working rights in Ukraine during the war. It's maybe something that
 227 gets, I don't know, most people that are not directly affected miss because it's
 228 not presented in the media as heavily as the war directly. But that's a very
 229 interesting point here.
 230 GK:
 231 [00:23:55 - 00:24:56] And perhaps because you know, this of course you say
 232 multiple crises, but the crises are affecting the workers in rather different
 233 ways. Like a war crisis or something rather different like when it comes to the
 234 COVID pandemic, but when it comes to climate crisis, it's again rather different
 235 factors that affect workers. For example, when their houses are taken by floods,
 236 for example, or when a factory is taken from a flood or especially in summer
 237 times when it becomes so hot in factories that you hardly can bear the
 238 temperature and workers are fainting. Then it's not that they would have a kind
 239 of medical support or something. No, they just try to recover and go back to the
 240 sewing machines again. So, I mean, this is really rather different. The
 241 consequences are rather different of course.
 242 MB:
 243 [00:24:56 - 00:26:03] Yeah, it depends on the crisis, how it affects the people
 244 in the end. That brings me straight to my next question. How does the Clean
 245 Clothes Campaign address these sustainability issues that affect so many people
 246 in the garment sector? Because the example I mentioned before, in Bangladesh we
 247 have a country that is often affected by floods, that also has many garment
 248 workers and factories, so they are often affected by these natural hazards. But
 249 it's also known due to the research in climate change that these natural hazards
 250 will appear more often in the future and in a higher intensity. So how does the
 251 Clean Clothes Campaign address these issues, because it's also affecting GVCs
 252 and the JIT at the core when the workers and factories are hit.
 253 GK:
 254 [00:26:04 - 00:29:36] Point one is that we have been, to be honest, we started
 255 just several years ago really to link the working conditions, also link it up to
 256 environmental factors. We had not been talking so much about climate change, I
 257 don't know, 10 years ago, but this was very often when it came to, for example,
 258 sewage of factories then was just dumped into the rivers, for example. But also
 259 like when surplus production was just dumped in landfills or something like that.
 260 But nowadays, now when it becomes quite clear that really workers are quite
 261 often affected, and the first issue was actually the increasing temperatures in
 262 the factories that you see that, for example, that is a big health issue for the
 263 workers themselves. And of course, that that kind of increased floodings, but
 264 also like other natural catastrophes are coming more frequently. That's a new
 265 issue and we have not yet really addressed it systematically, but more on a
 266 case-to-case basis. And first of all is, of course, it's not only the
 267 manufacturers that have to bear the risk, but also that we think that the brands
 268 and the buyers have to bear a certain responsibility that this kind of cost

269 should be shared that are coming. And what I think is one big issue actually is
270 that how safe are the factories. And especially in Bangladesh, there is an
271 agreement in place via court that is taking care of the factories are becoming
272 more safe. And first of all, we meant buyer and building safety after the Rana
273 Plaza accident. But nowadays, of course, the health conditions in a factory like
274 temperatures that fresh air is in and so on becomes an issue. That's one point
275 and the other is that this still doesn't mean that a worker could afford safe
276 housing with the wages that are earned in the garment sector. And therefore,
277 actually, I would say there is the government that has to really take care of
278 adequate infrastructure investment. But we have also seen a garment in
279 Bangladesh didn't care if the drinking water is safe in an area where the
280 workers are living. Yeah, I think it needs a kind of public awareness campaigns
281 first, that it needs public investment and not only going to really have big
282 businesses attracted into the country, but also to really have safe living
283 conditions for workers and not only workers, but for the population itself.
284 MB:
285 [00:29:36 - 00:29:49] Okay. Yeah, totally understood. But okay, so the Clean
286 Clothes Campaign rather focuses on specific cases that are affected with these
287 problems than having like a –
288 GK:
289 [00:29:49 - 00:30:13] At the moment. But we are starting now this specific
290 investigation track also on just transition and the climate change is of course
291 one of those aspects that is, let's say, investigated in a more systematic way.
292 MB:
293 [00:30:13 - 00:32:34] Okay, interesting. As I already mentioned, my thesis is
294 mainly about Just-in-Time in GVCs. My argument is, or the thing I want to
295 investigate is, that Just-in-Time is fragile, especially to this modern crises
296 we've seen in the last 10 to 15 years. That's the timeline I'm researching on.
297 We have seen that these mentioned crises really hit GVCs hard and unexpectedly.
298 And often, the Just-in-Time principle is the one very fragile factor that
299 collapses first and has a big effect or a big consequence for the whole chain,
300 of course. Because if one point stops, all the others. Still even though we have
301 seen during COVID that this is a big problem, the global economy tried to shift
302 around the problem of COVID during these times and got back to the way it was
303 before nowadays, in my estimation. Do you have an idea, or how do you envision
304 the future of Just-in-Time in the garment sector? Or do you see a way how this
305 way of working in the economy could be adjusted in order to improve the
306 situation, to make it less fragile? I see just a few alternatives to
307 Just-in-Time. They're not really total alternatives, but things that could
308 improve resilience, in order to make these GVCs working with Just-in-Time or
309 with another principle to keep the work up and keep them functional. For example,
310 there would be things like reshoring, diversification, shortening of GVCs. Do
311 you know these principles?
312 GK:
313 [00:32:34 - 00:32:38] Reshoring I know. What was the second?
314 MB:
315 [00:32:38 - 00:32:42] Reshoring is known to you, okay. Diversification is that...
316 GK:
317 [00:32:43 - 00:32:44] Diversification, yeah.
318 MB:
319 [00:32:44 - 00:33:35] Yeah, that enterprises have more suppliers, so they can
320 choose whichever one is working. Shortening of GVCs, which means we have less
321 steps in between, less linkages. And on the other hand, there's also a principle
322 by Brakman et al, they rather say that, that Just-in-Time should transform to
323 Just-in-Case. So, only if there is an order from a brand or somebody, that only
324 if this order is coming in, then the production starts. And now I would like to
325 know, how would how do you view these alternatives and their effect? And if
326 there is like a point of view from the Clean Close Campaign on how this could be
327 adjusted in a better way?
328 GK:
329 [00:33:37 - 00:35:05] Well, we know this phenomenon of reshoring quite well,
330 because I think that the increasing production volume, especially in Eastern and

331 Southeastern European countries, is actually the result of this reshoring
332 strategy by the global players, let's say. And what has for them from workers'
333 rights or from a labor rights perspective, we see that reshoring has become a
334 very successful strategy for the brands or for the industry, but not for the
335 workers because it came with the bad working conditions from somewhere else. So
336 the labor conditions are not better in Eastern European countries or
337 Southeastern European countries than in Asian countries. And in terms of wages
338 it's even worse in some places. And the same is one could say perhaps with other
339 European countries like Portugal. And the second point was that it's shortening?
340 MB:
341 [00:35:06 - 00:35:10] Yeah, shortening, diversification, which ever one you want
342 to pick up next.
343 GK:
344 [00:35:11 - 00:36:04] I mean from our perspective, actually we have seen that
345 some producers, actually they are retailers with their own brands. They have
346 these rather short supply chains and they were much more resilient. For example,
347 what we have learned, some of them just left their orders in place and gave them
348 more time to have them finished. They supported them with masks, for example. So,
349 there was a kind of like closer relationships to the manufacturers and the
350 manufactory owners. And this was actually the kind of balance that could be
351 activated also in a time of crisis to mutually support each other in these times.
352 Yeah.
353 MB:
354 [00:36:07 - 00:36:10] Do you have an example for that? Like a name?
355 GK:
356 [00:36:11 - 00:36:14] No, I can't give you. I mean. I mean.
357 MB:
358 [00:36:14 - 00:36:16] I have something in mind, somebody in mind. Okay.
359 GK:
360 [00:36:16 - 00:37:35] Yeah. But I guess there were some because, you know, this
361 is just how the textile sector is structured in Austria. It's small, medium
362 enterprises. They're not big players and they had to adjust to this kind of
363 global competition and some moved but also bought some factories in Asia, for
364 example. And of course there is that the relationship is closer, but this does
365 not mean that, for example, there is never homework involved or something. I
366 mean, I had in mind an example from a shoemaker, yeah. But nevertheless, in
367 these times of crisis, they really try to keep the relation and try to really
368 activate the cooperation, yeah. Anyway, that's one thing. And actually, I guess
369 you have followed the discussion about the CSDD file, the law that should be
370 approved by the European Union these weeks?
371 MB:
372 [00:37:35 - 00:37:40] Yeah, which was not passed through, in German the
373 Lieferkettenschutzgesetz.
374 GK:
375 [00:37:41 - 00:39:54] Yeah, the supply chain law, like it's called. Actually,
376 there was this kind of like – what we wanted to see, that there's a better risk
377 management from brands, from global buyers, to deal with this kind of risk that
378 might come up when it comes – not only in times of crisis, but I mean, workers,
379 you can say, are in a permanent crisis with this kind of survival strategy they
380 have to develop. So but really to have a kind of like closer look who is working
381 in that chain and how can conditions be improved or even risks be prevented. So
382 that actually would be a kind of approach to really not have this kind of
383 irresponsible behavior towards the producers, the manufacturers, the workers,
384 the home workers, and so on. Well, let's see, it's not accepted yet. The final
385 vote should take place I think tomorrow or another one perhaps next week, let's
386 see. But, yeah, I'm not too optimistic that it might happen. Nevertheless, that
387 would be this kind of approach that we want to see in the industry. To have more
388 takeover, more responsibility. But point one is, of course, that actually states
389 are the duty bearers. So the governments actually have to play a more active
390 role that the rights of the workers are protected. And this I think would also
391 mean, okay, we have the international trade policies, investment policies also
392 sooner or later should be changed. But this does not answer your Just-in-Time

393 question.
394 MB:
395 [00:39:55 - 00:39:55] Partially.
396 GK:
397 [00:39:57 - 00:40:25] No, but the enabling frameworks are really legitimized by
398 the governments, still one has to say this. And I mean the shortening of the
399 chain, the point is do they still, does it mean that buyers are behaving more
400 responsibly and I don't see it.
401 MB:
402 [00:40:27 - 00:40:45] The same thing with shortening is probably the same
403 problem with reshoring. You have like adjusted chain structure, but in the end
404 it doesn't really matter where the production takes place.
405 GK:
406 [00:40:47 - 00:42:03] Yeah, then we come to the purchasing practices because
407 this has also been an issue and a discussion that has come up in the
408 negotiations on the supply chain law and colleagues from Germany, perhaps you
409 have been seeing the report, it was published on the irresponsible purchasing
410 practices where actually this kind of Just-in-Time production was investigated
411 in three producer countries, I think in Eastern Europe and also in Italy and in
412 a Asian country, but I'm not sure. And there were specific recommendations
413 developed together with the labor rights organizations, the workers, and also
414 with the factory owners, recommendations to the brands, but also recommendations
415 to the government. They have really had a closer look on this, because this kind
416 of, like what we call irresponsible purchasing practices exactly addresses those
417 issues when it comes to short-term orders, big quantities, that really exceed
418 the capacities of a manufacturer. Then perhaps a second manufacturer is involved,
419 a subcontractor is involved and homework is involved and so on.
420 MB:
421 [00:42:05 - 00:42:08] Do you have a take on Just-in-Case?
422 GK:
423 [00:42:11 - 00:42:13] Sorry, I didn't get this.
424 MB:
425 [00:42:13 - 00:42:16] Do you have a take on Just-in-Case instead of Just-in-Time,
426 were...
427 GK:
428 [00:42:17 - 00:42:21] No, not really. I wouldn't have.
429 MB:
430 [00:42:20 - 00:42:21] Okay, it's an economic thing.
431 GK:
432 [00:42:21 - 00:43:03] No, not really. No, because I mean, the point is really,
433 what would make the difference is actually for example the example that I had in
434 mind when it comes to the SMEs is in fact, it's a kind of business model and
435 behavior that a buyer is practicing. So like either you go for cooperation or
436 you just cut and run. I don't see that the shortening of the supply chain would
437 automatically lead to a better purchasing practice, for example.
438 MB:
439 [00:43:04 - 00:43:07] So in the end it's a power struggle that persists.
440 GK:
441 [00:43:08 - 00:43:09] Yes, absolutely.
442 MB:
443 [00:43:09 - 00:43:10] Okay, understood.
444 GK:
445 [00:43:11 - 00:43:15] And there was a third one. There was the shortening and
446 diversification, the third one was?
447 MB:
448 [00:43:16 - 00:43:19] You already mentioned reshoring.
449 GK:
450 [00:43:19 - 00:43:24] Ah yeah, reshoring. Shortening and diversification.
451 MB:
452 [00:43:24 - 00:43:25] Exactly and Just-in-Case, so that's...
453 GK:
454 [00:43:26 - 00:43:35] Ah and this Just-in-Case.

455 MB:
456 [00:43:35 - 00:43:48] Okay, mainly that were all my questions. Thank you so far.
457 Is there any additional insight or perspective you would like to share regarding
458 Just-in-Time global value chains, the Clean Close Campaign based on your
459 practical experience?
460 GK:
461 [00:43:49 - 00:44:21] Well, yeah. No, what we have still not mentioned is, do
462 you also take into account, for example, the investment policies or the
463 ownership structures of these kinds of value chains and how they might be
464 organized differently?
465 MB:
466 [00:44:22 - 00:44:29] Concerning like the form of global value chains where
467 always there's a lead firm at top, you're talking about this?
468 GK:
469 [00:44:29 - 00:44:55] Yes, but if it makes a difference, if there are many
470 shareholders and the shareholders are, for example, coming from the finance
471 industry or if they are private shareholders or if they're family shareholders,
472 let's say. If there is a difference in this kind of light, the way the
473 production chain is organized.
474 MB:
475 [00:44:56 - 00:46:04] Actually, I don't really investigate this part because my
476 point of view or rather the starting point of my research rather tries to find
477 out the economic validity of Just-in-Time and, basically, if Just-in-Time is not
478 resilient enough, and it could be improved or switched up with another principle
479 that makes it more, let's say, profitable or let's make it more sustainable,
480 that would be interesting or would be favorable for the stakeholders, for
481 instance, or investors anyway. So it doesn't really matter for me who's giving
482 the money because they will, in the end, invest anyway if the change is in their
483 favor.
484 GK:
485 [00:46:05 - 00:46:11] And in the favor, you mean increased profitability?
486 MB:
487 [00:46:11 - 00:49:23] The favor is depending on who's at top, of course, who has
488 the power. But for my case, it's not about who's really favored by one change,
489 it's rather about the consistency of the structure itself, how it can improve.
490 And this improvement would, from my point of view, let's take the climate change
491 and the natural hazards as an example. If an improvement can be made in this
492 case, it would positively affect the whole chain and therefore, maybe workers or
493 even investors. So if a really economical change can take place, it could have
494 much more stability and that could favor everybody. And that's the point of view
495 I'm trying to argue because COVID-19, maybe something like this happens once in
496 a century. The Ukraine-Russian War or other political conflicts have happened
497 relatively frequently, like let's say every five years at a different spot in
498 the world. But let's take this example of climate change and natural hazards.
499 This will increase probably immensely and affect these economic structures a lot
500 in the future and very often. Therefore, I try to show how these modern crises,
501 which will probably increase in the future, especially in regards of climate
502 change, should adapt in order to keep them even relevant. Because if we have
503 floods in Bangladesh every week or every month, it's probably not sustainable to
504 produce there. Many people lose their work, but as we know, GVCs and the lead
505 firms at the top, they will just re-shore and go, for instance, like you said,
506 to Africa, Ethiopia, and produce there. But then we have another problem there.
507 Heat is rising. They have a lot of droughts, it's a dire situation as well. So,
508 in the end, there has to be an evolution, kind of, that evolutionizes
509 Just-in-Time to make it sustainable for the future. That's my guess. My very
510 bold guess. I don't know. It's a bit...I'm sitting on a high horse with this, but
511 I try to find out from different points of view. For instance, your expertise
512 from an NGO, but also from economic or from the scientific point of view, from
513 university members, how this really could develop itself, the principle of
514 Just-in-Time and make it better for everybody.
515 GK:
516 [00:49:23 - 00:50:22] Ah, okay. No, because I think there are some examples

517 which have developed a rather different model and that has of course proved in
518 times of crisis more resilient. I think, of course for most of them this
519 Just-in-Time is actually not the prioritized model of production. It's more to
520 have this kind of stable order, a rather different planning, a rather different
521 planning horizon of course, and also, and I think that's actually the point
522 that-

523 MB:
524 [00:50:24 - 00:50:26] It's a totally different approach-

525 GK:
526 [00:50:26 - 00:50:42] What kind of stability do you mean? Because when it comes
527 to stability, do you mean the stability of profit or do you mean the stability
528 of income for workers or what kind of resilience?

529 MB:
530 [00:50:43 - 00:51:54] Yeah, the stability point is, I'm focusing on the
531 stability of the chain. Because if the chain's not working, everything else can
532 be targeted. I know the different approach that you mentioned, that we have a
533 different approach of planning, where we're not everything has to be very fast,
534 very quick, very cheap and this is a totally different approach that is, as I'm
535 informed, is less used in the garment sector today. Especially when we see cheap
536 clothes, or most of the clothes that are produced and sold in Europe or in the
537 global north. And I try to shine a light on that, that there are different
538 approaches that could bring more stability, especially in the future, and also
539 be favorable or interesting for the big players that we have today that are not
540 using them.

541 GK:
542 [00:51:56 - 00:52:57] Okay. I think it's an interesting issue, because
543 especially this rather young entrepreneurs like Zalando – yeah? They have
544 started, I don't know, 10 years ago, 15 years ago, and with a rather
545 conventional business – online business model or so, and then just some years
546 later, I think they stumbled over this kind of really crucial issues, and for
547 some aspects, I really think they take care or try to take care. And therefore,
548 I think those are the more interesting dialogue partners, I would say. Because
549 they are young enough to say, okay, this is really an issue and we have to deal
550 with it.

551 MB:
552 [00:52:57 - 00:53:53] Yeah, but on the other hand, Zalando is also known already
553 or it is sad – I don't have proof for it – but that they also follow business
554 strategies like Amazon or high fashion brands like Louis Vuitton, that they take
555 garments that are sent back and they burn them or throw them away because they
556 can't use them or it's not profitable to repack them and sell them again. So
557 they probably take up the issue much more than others that just ignore it, but
558 they are on my radar as well maybe as a talking partner, because I also want to
559 try to get to people that are really in the economy and have a take on from the
560 field or the inside of the GVC.

561 GK:
562 [00:53:53 - 00:54:06] Yeah, but the point is then from where is your starting
563 point? Your starting point is then for example the brand or is your starting
564 point a retail or what is your starting point of perception?

565 MB:
566 [00:54:06 - 00:54:09] Regarding Zalando for a case?

567 GK:
568 [00:54:09 - 00:54:12] No, no, just for example, the garment sector.

569 MB:
570 [00:54:13 - 00:54:15] Sorry, I don't really get the question.

571 GK:
572 [00:54:15 - 00:55:20] We see the starting point actually from the brand
573 perspective. And of course then also like the retailing models that have like
574 online sale or so, like that's a rather new that has emerged rather in the last
575 few years or so. Of course they just jumped on the usual production model, but
576 had a different strategy for selling. Yeah. And therefore, but I had the
577 impression that, for example, the guys in Zalando just really then stumbled over
578 the problems in their production chain, yeah, and tried to find really tiny,

579 tiny, tiny solutions for some issues. But that was a kind of difference to other
580 leading global brands, let's say.

581 MB:

582 [00:55:20 - 00:55:326] Okay. So at least they try to improve and not like others
583 that stay with the old ways.

584 GK:

585 [00:55:26 - 00:55:48] Yeah, but their marketing model is quite conventional
586 still, of course. So therefore for me the question is what's the top from where
587 you regard the whole chain?

588 MB:

589 [00:55:49 - 00:55:53] Oh, I understand. The top actor is always the lead firm.

590 GK:

591 [00:55:53 - 00:56:00] And for me it would be the investor even and not so much
592 the brand marketing, managing structure.

593 MB:

594 [00:56:01 - 00:57:03] For me it's always the lead firm because the model of a
595 global value chain has at the top the lead firm. Because there are different
596 models like a global supply chain is different to a value chain is again
597 different to other models, but the lead firm is always at the top. And then it
598 depends how the lead firm is set up. Sometimes the lead firm is the brand itself,
599 sometimes it is a retailer. For example, Zara is the brand itself but is also
600 the retailer. Yeah, in the case of Zalando I would actually say that the top is
601 the brand, which is also a reseller in this case. So yeah, basically when I'm
602 focusing on interview partners from the economy, I try to first locate who is
603 the lead firm and start from there.

604 GK:

605 [00:57:03 - 00:58:02] Okay, I see. Okay, well I think from my side, I mean you
606 mentioned sustainability a few times for us, it's quite clear that there will be
607 no sustainability without human rights and labor rights. I mean very often
608 sustainability is narrowed down to the ecological, the environmental aspects or
609 this kind of material flows like recycling and so on, that's nice and it's good
610 that somebody is taking care but just taking on this kind of resource aspects,
611 actually we see it's rather risky, because then this means that this kind of
612 wealthy bunch of people would just take care of its own resources but never take
613 care of how other people are getting a living or how others get off.

614 MB:

615 [00:58:02 - 00:58:20] Yeah, they take advantage of the misconception that
616 sustainability is equal to ecological sustainability and not economic
617 sustainability or cases you mentioned like human sustainability if you can call
618 it like that.

619 GK:

620 [00:58:20 - 00:58:26] Yeah, social in a wider sense like Gesellschaft, also
621 nicht nur das Soziale sondern die Gesellschaft, das Ganze.

622 MB:

623 [00:58:27 - 00:58:41] Yeah, exactly. Totally understood and I noted a few things.
624 You talked about the German report regarding the purchaser's responsibility.

625 GK:

626 [00:58:40 - 00:58:42] Yeah, the purchasing practices. I can send it to you.

627 MB:

628 [00:58:43 - 00:58:44] That would be great. I don't know it yet.

629 GK:

630 [00:58:44- 00:58:46] Yeah, sure.

631 MB:

632 [00:58:46 - 00:58:47] Thank you very much.

633 GK:

634 [00:58:48 - 00:59:05] And also the investigations perhaps on the wage gap in the
635 crisis, during the pandemic. Did you see? Well, maybe. I don't know if that's
636 interesting for you.

637 MB:

638 [00:59:06 - 00:59:19] I think I know about it. But yeah, please send it to me as
639 well and I will have a look. And if I can find a spot where I can incorporate it
640 in my work, I will.

641 GK:
642 [00:59:19 - 00:59:25] Yeah, whatsoever. I can send you the link. It's just
643 published on the website anyway.
644 MB:
645 [00:59:25 - 00:59:41] Okay, perfect. Yeah, that's it. Thank you very much for
646 your valuable time and input. Is it okay if I have further questions in the
647 future regarding the development of my paper to reach out to you?
648 GK:
649 [00:59:41 - 00:59:43] Sure, sure. Just come back.
650 MB:
651 [00:59:43 - 01:00:11] Thank you very much. And last but not least, I'm right now
652 starting the process of interviewing and I'm still trying to find interviewees
653 that are willingly to take the interview and that can actually bring valuable
654 input to my thesis. Can you recommend anybody?
655 GK:
656 [01:00:13 - 01:00:49] I was just thinking because we have not mentioned this
657 kind of like, you mentioned the power structures and I don't know if that's
658 interesting for you, but you know, this kind of like gender bias that is going
659 through the whole sector, not only is this prevailing in the factories, but
660 really that you have this kind of gender and discrimination issues in the whole
661 sector. I think that there would be quite interesting partners for you in
662 Germany like FEMNET.
663 MB:
664 [01:00:50 - 01:00:56] But they are focusing on gender inequality in the garment
665 sector?
666 GK:
667 [01:00:56 - 01:01:23] Yes. FEMNET. That's also an NGO. And, of course, perhaps
668 some colleagues in the international office who have perhaps a better insight
669 also in the global value chains. And who might be interesting for you are the
670 colleagues in Serbia.
671 MB:
672 [01:01:23 - 01:01:25] Okay.
673 GK:
674 [01:01:25 - 01:01:33] Because they know the situation in South-Eastern, Eastern
675 European really quite well.
676 MB:
677 [01:01:35 - 01:01:39] And they are your boots on the ground for these countries.
678 GK:
679 [01:01:39 - 01:01:40] Pardon?
680 MB:
681 [01:01:40 - 01:01:45] They are the people right in the countries and they do the
682 research right there?
683 GK:
684 [01:01:45 - 01:02:05] Yes, but they are doing also real scientific research.
685 They are working closely together with academia and scientists and university
686 people, but also they have their own organization and I think they are really
687 doing great work.
688 MB:
689 [01:02:05 - 01:02:09] Can you send me names or like LinkedIn profiles?
690 GK:
691 [01:02:09 - 01:02:13] Yes, I just would prefer to ask them first, if they can
692 give you...
693 MB:
694 [01:02:13 - 01:02:14] Of course.
695 GK:
696 [01:02:14 - 01:02:20] Yes. If I can give you their contacts. And I think they
697 might be quite happy to talk to you.
698 MB:
699 [01:02:21 - 01:02:36] Yeah, that would be great, please ask them and let me know.
700 I can build up the contact for myself if you have an agreement with them or
701 they agree to take an interview. And yeah thank you very much. That's really
702 helpful.

703	GK:
704	[01:02:37 - 01:02:40] Yeah, of course. Well, sehr gerne.
705	MB:
706	[01:02:39 - 01:02:43] Okay, good then that's the interview.

E3, 02.02.2025

1	MJA:
2	[00:00:00 - 00:00:08] I request you for the recording.
3	MB:
4	[00:00:08 - 00:00:11] Yes, it should work.
5	MJA:
6	[00:00:11 - 00:00:13] Yes, It's working.
7	MB:
8	[00:00:13 - 00:00:49] Okay, so welcome. Thanks for taking your time. We're
9	going to talk today about global value chains in the garment sector and their
10	challenges, especially during modern crises. I can assure that your data will be
11	protected and also I can assure that your data privacy will be given. Is it okay
12	if I use your name in my master's thesis to verify your expertise?
13	MJA:
14	[00:00:49 - 00:00:51] Yeah, you can.
15	MB:
16	[00:00:52 - 00:01:06] Perfect, thanks. Before I start with my questions, I would
17	like you to introduce yourself a bit and especially give some insights on your
18	job in the garment sector regarding chain structures.
19	MJA:
20	[00:01:06 - 00:03:45] Basically, I have been in my career since around 2009,
21	mid-2009 with backward link in garment sector, of course, in supply chain. Then,
22	afterwards I moved to an Hong Kong-based organization, mostly in logistics.
23	During that period, I tried to add value on logistics in that organization. Then
24	I left my footprint in a French organization, namely <i>Auchan</i> . I don't know if you
25	know it or not, A-U-C-H-A-N. There I entered the retail industry, especially in
26	the garment sector. I have been there in the supply chain department in their
27	origin. So I was used to manage all their logistic activities including delivery,
28	equipment management, transportation, operation management, documents
29	management, vendor management, and of course, the 3PL management. My tenure
30	there was around seven years. Then I moved to <i>Primark</i> and this organization gave
31	me the global footprint. So I start my career there originated on a regional
32	base. Then I was lucky to start my career in a region based on Bangladesh, India,
33	Pakistan and Sri Lanka. Then I spent my time there, including logistic
34	operations backend and supply chain management. I spend almost 30% of my
35	responsibility in transit, packaging also, which added a significant value in
36	the garment sector. Then I moved to <i>TALLY WEiJL</i> , which is a Swiss organization.
37	Now of course I'm in a global position. I started my career here for whole Asia.
38	I am responsible for it, including Turkey and Morocco, also West Asia and West
39	Africa. This is the inside of my career. And during all my tenure I try to add a
40	value in logistics, transportation, delivery management, tenders, negotiations
41	with the CPL, including the vendor management, people management, resource
42	management and of course the cost-effective project management also.
43	MB:
44	[00:03:46 - 00:04:04] Okay, thank you for the insights. Let's start right away.
45	How would you characterize the current state of global value chains in the
46	garment sector regarding Just-in-Time practices?
47	MJA:
48	[00:04:04 - 00:04:58] Ah, it's been tough nowadays. It started during COVID. So
49	COVID impacted us a lot. It's disrupted the whole chain. The whole chain has
50	been affected. Further we have the war in Russia Ukraine and including the war
51	in Arab. So the value chain has been impacted a lot between East and West. If I
52	start with China to USA or North America, it's really difficult. Earlier the

53 transit time from East to West is around 40 days. Now it's been more than 50
54 days, 65 days. So people need to adopt to these extra 15 to 20 days in their
55 business. Sometimes which is really, really difficult, especially for the
56 fast-paced fashion.

57 MB:

58 [00:04:58 - 00:05:05] Mhm. OK, that's a pretty significant impact during the
59 last years.

60 MJA:

61 [00:05:05 - 00:05:08] Of course. Of course it is.

62 MB:

63 [00:05:10 - 00:05:16] Are there other primary benefits and challenges associated
64 with the implemented Just-in-Time method, especially the garment supply chain
65 right now?

66 MJA:

67 [00:05:24 - 00:08:19] Yeah. The other is the cost. The transportation cost
68 becomes higher and higher. So the last three months from Asia, the air delivery
69 is really struggling. It's become like up there. It's almost a 300% increase of
70 your costs of transportation. For the Ocean it's the same because of the Red Sea
71 issues, because of this Palestine and Israel war between Hamas and Israel. So,
72 the Red Sea has been impacted by Yemen, Iran, [incomprehensible], Egypt, also
73 the Israeli force and also Britain and the US. All parties are engaged there,
74 including China. It has been impacted a lot. The transit time has been
75 increasing. The transporters are using the different route through South African
76 channel. And they are not using the Mediterranean route because of this stress
77 in the Red Sea. Obviously they have to use extra fuel, extra resources, extra
78 materials to use this long transit. The cost becomes high, which has a greater
79 impact on the retail side or the final consumer. They have to pay more because
80 of this scenario. And on the other hand, there are some opportunities
81 cross-bordering. When the air transit gets highly requested countries like
82 Bangladesh, India, Cambodia, Vietnam, they are using the cross-bordering
83 in-between. For example, Vietnam and Cambodia is using cross-bordering with
84 Thailand. So from Bangkok you have a high level of connectivity, daily
85 connectivity, lots of options between Bangkok and Europe, where Cambodia's Phnom
86 Penh and Ho Chi Minh have less connectivity. So they are using this
87 cross-bordering, they are delivering their garment products or the shoes,
88 especially from Vietnam to Thailand and from Thailand to Europe by air. This
89 kind of opportunity has been growing. On the other side from Bangladesh to India,
90 by road then from India to Europe by air. This kind of opportunity has
91 increased, there is an impact. There is an impact on the global business. Also
92 there is some opportunity from Southeast Asia. They are using it too, because of
93 the Maldives. There is a high level of connectivity between Europe and the
94 Maldives, because of the tourists. So they are sending their goods to Maldives
95 by sea and from there to Europe by air. So this kind of opportunity has been
96 growing during this time. But on the other hand, the regular routes became
97 expensive.

98 MB:

99 [00:08:20 - 00:08:24] Okay, so a lot of changes regarding your everyday work, I
100 guess.

101 MJA:

102 [00:08:25 - 00:08:55] Yep, yep, lots of analysis, data analysis, lots of
103 opportunity discovering. So lots of things have been involved here. But yes, as
104 we are in the industry, we have to check all these things. We have to find the
105 best way to optimize the transportation cost. So that is what we are doing.

106 MB:

107 [00:08:56 - 00:09:16] Mhm, okay. You already mentioned a few indicators and
108 metrics you're using. Can you line out the most important metrics and indicators
109 you use during these turbulent times?

110 MJA:

111 [00:09:17 - 00:09:58] Yeah. The most interesting indicator was the land to air,
112 road to air development, which is not usual for us. The methods we discovered
113 during this time. And another method was between China and Europe by rail, but
114 because of the Russian war, we had to stop this method. Because Russia is no

115 more allowing any goods through Russia to Europe. So, these were the most
 116 effective methods or models we have been using during these challenging times.
 117 MB:
 118 [00:09:59 - 00:10:23] Mhm, and specific in your view, how has Just-in-Time
 119 production performed within the garment supply chain during the recent modern
 120 crises, like COVID pandemic, or the Ukrainian Russian conflict? How did you
 121 experience these phases?
 122 MJA:
 123 [00:10:24 - 00:12:35] It's a lot. We must say it's a lot. I have to start from
 124 Myanmar because the South, Southeast Asian industries are completely depending
 125 on China-sourced fabric for the garments. Mostly 70% of the fabric has been
 126 delivered from China to the East, East Asian countries like Cambodia, Vietnam,
 127 Myanmar, Bangladesh. Pakistan, they are dedicated to denim, India also. India,
 128 they are focusing on their local market because they have the 1,4 billion
 129 population. They have a domestic market. But apart from that, they can export to
 130 Europe and the USA as well. But apart from that, after the pandemic, there is a
 131 global impact, of course. The supply chain became expensive, because the
 132 transportation routes they are using, between East to West. If they start from
 133 East, with the fabric they will come to the Middle East, then they will drop,
 134 they will get the export from South Asia, then they will go to Western Europe.
 135 But during this time, the supply chain has been already impacted. The transit
 136 times are getting longer and longer. There is an obvious impact on the
 137 production delay, especially from countries like Bangladesh, Pakistan, Cambodia,
 138 Myanmar. And finally, due to the global ban from the European Union, China has
 139 to stop the production from Myanmar. The production has been moved to Vietnam
 140 and Cambodia. From this point of view, there is some opportunity for Cambodia,
 141 Vietnam and Bangladesh because the production has been moved to these free
 142 countries nearby, which are easy to deliver the fabric from China to. In a
 143 maximum of 15 days the fabrics arrive in these free producing countries. These
 144 are the impacts. You can say that these are the pros and cons and we have to go
 145 through these.
 146 MB:
 147 [00:12:40 - 00:12:55] When we compare the Just-in-Time performance in the
 148 garment sector during these times of crisis versus the stable periods, what
 149 observation or insights can you share with me?
 150 MJA:
 151 [00:12:56 - 00:13:27] I must give my observation with data then. It was around a
 152 20% of a gap between the stable time and the usual time. So 20% in terms of
 153 costs, 20% in terms of lead time, 20% in terms of production lead, 20% or 30% in
 154 terms of uncertainty between stable and unstable times. So these are the key
 155 things that happened during this time compared to the stable time.
 156 MB:
 157 [00:13:28 - 00:13:53] Okay, and in your opinion, what are the factors that
 158 hinder the resilience and the sustainable working of Just-in-Time production
 159 within the garment sector when confronted with these global turbulences such as
 160 mentioned?
 161 MJA:
 162 [00:13:54 - 00:16:22] It's a bit difficult to explain or a bit difficult to find
 163 a sustainable way because of the situation not being managed by the business
 164 community, by the land law and the politics well. And the geographic politics
 165 also been involved. It depends on the duty of countries and the local duty
 166 differs and also the diplomatic relationships between countries have also been
 167 involved. So, of course, the sustainable way is to find a better way to source
 168 the fabrics from one country to another. So, very stable transportation supply
 169 chains need to be implemented in this special area for the garments, from the
 170 raw material production to the final delivery to the consumer through the retail
 171 sale. So, all these things need to be binding in a good way, which will not be
 172 impacted by global politics or geographic instability or war between countries.
 173 We often say that this is the bull whip effect in supply chains, where something
 174 has been happening in Europe, but the Asian countries has been impacted after
 175 one or two months. This is what happened during this time. And I don't know when
 176 these things will going to be stable, because the USA has started something new

177 last week. They are implementing more and more taxes. They are not going to fund
178 any kind of thing to Europe or Asia or any other country, except Israel, Egypt
179 and [incomprehensible]. Countries like this really need to stay with the global
180 economy. But once these countries like the USA, Canada or Russia are moving
181 themselves away from the global economy, the global economy will obviously be
182 impacted.

183 MB:
184 [00:16:23 - 00:16:30] Yeah, they're big players. So the impact of their actions
185 will be felt all over the world, of course.

186 MJA:
187 [00:16:31 - 00:16:33] Exactly, exactly.

188 MB:
189 [00:16:35 - 00:16:57] We are talking here mainly about Just-in-Time. Are there
190 any alternative production strategies or methodologies that you believe could
191 improve the resilience or the sustainability of the garment supply chain during
192 these times so that Just-in-Time itself is more resilient?

193 MJA:
194 [00:16:58 - 00:18:40] Yeah, of course, it can be, especially like for a model
195 like fast fashion. They could import their product from Turkey maybe. The
196 moderate fashion they are used to export to Europe, maybe from Tunisia, Morocco.
197 I mean, the western part of Africa. Earlier they have been dedicated for this
198 garment sector. Maybe there is the time, after 30 or 40 years, to reduce the
199 transportation cost and deliver the goods by road to Europe, just crossing the
200 Gibraltar or that part of the Asia. I mean, from Turkey to Europe. This kind of
201 policy maybe can reduce 40 or 35% of the instability. But as we've seen in the
202 last 30 to 40 years, Southeast Asia has been growing more and more for the
203 garments and they become the first, second, third, fourth, fifth largest garment
204 supplier to Europe. It's better to invest more in this area, and to make a
205 stable supply chain between the raw materials import to the export to Europe.
206 And of course we need the power, we need the sustainable power also because
207 these countries are based on the fossil fuel and also based on the, how to say?

208 MB:
209 [00:18:40 - 00:18:43] You mean fossil energy like gas and oil?

210 MJA:
211 [00:18:43 - 00:18:55] Yes, they are using gas and oil but we need a sustainable
212 power source to stabilize production in this area. That is now the demand of the
213 time.

214 MB:
215 [00:18:56 - 00:19:07] Okay, so the energy resources have to be improved and got
216 to be sustainable.

217 MJA:
218 [00:19:08 - 00:19:09] Exactly.

219 MB:
220 [00:19:09 - 00:19:10] Okay. And you talked about Turkey as a supplier or as a
221 hub or Morocco. I'm referring to a concept like nearshoring where the production
222 sides move from South Asia to closer spots or countries closer to Europe or the
223 end market.

224 MJA:
225 [00:19:32 - 00:19:33] Exactly, exactly.

226 MB:
227 [00:19:35 - 00:19:45] Would you also say that nearshoring would be a concept
228 that was worked for example, for Northern America, where should plants move
229 other than South Asia?

230 MJA:
231 [00:19:46 - 00:20:10] Yeah, I don't know how the US, America will deploy their
232 duty policy with the nearby countries like Mexico, Brazil, Venezuela and others.
233 But in terms of population, they can use those countries' resources in order to
234 import their goods from these countries.

235 MB:
236 [00:20:11 - 00:20:14] So you would say that nearshoring would also there be an
237 idea?

238 MJA:

239 [00:20:14 - 00:20:25] Yeah, the mid-term solution, not the sustainable but the
240 mid-term, at least 20 to 30% of the production will be coming from there.
241 MB:
242 [00:20:26 - 00:20:51] Okay, understood. There are also other alternatives I read
243 about in papers, journals and articles. What do you think: Is shortening also an
244 option to improve the resilience of the garment global value chains using
245 Just-in-Time?
246 MJA:
247 [00:20:52 - 00:20:55] Yes, of course.
248 MB:
249 [00:20:55 - 00:21:02] Okay and have you also experienced diversification in your
250 work?
251 MJA:
252 [00:21:03 - 00:21:06] Yes, yes.
253 MB:
254 [00:21:06 - 00:21:07] Okay.
255 MJA:
256 [00:21:07 - 00:22:08] We have diversification, like as I explained you that we
257 have been working through that transit packaging process in my earlier
258 organization. So instead of carrying fresh air inside the carton, we are trying
259 to use more space inside the carton and the box in order to deliver the garments
260 to Europe. For example, earlier, it was 40 pieces in a carton, but we try to
261 import 44 or 46 pieces inside the carton in a sustainable way today. On the
262 other hand, earlier we have been using polybags inside the cartons to pack the
263 garment. We try to reduce the polybags inside the cartons. So that way we can
264 reduce the costs, and we can improve the sustainable environment in Europe, in
265 Asia, in the end to end supply chain.
266 MB:
267 [00:22:09 - 00:22:29] Okay. I want to move a bit away from the sustainability
268 factor and talk more about the resilience of Just-in-Time. Just-in-Time seems a
269 bit fragile to me because let's say one spot or one linkage in this chain of
270 struck, the whole chain is already impacted.
271 MJA:
272 [00:22:30 - 00:22:32] Exactly.
273 MB:
274 [00:22:32 - 00:22:51] That's also why I'm talking about things like nearshoring,
275 reshoring, shortening and also diversification. Did you experience any
276 implementation of these options in the supply chains that you work for?
277 MJA:
278 [00:22:52 - 00:22:34] Yeah, I can give you an example. Earlier, the denim has
279 been completely based on Pakistan and less from China and very little from
280 Cambodia and Myanmar. Nowadays, the denim has been moved to Bangladesh because
281 of the transit time, they are adopting the longer lead time, so they have moved
282 some production to Bangladesh and Pakistan. So they try to accommodate all the
283 goods together and bringing the goods to Europe just in time. In some cases,
284 maybe 12% or 14% of the volume will go like this way.
285 MB:
286 [00:23:35 - 00:24:29] I want to pick something up here. You just talked about
287 Bangladesh, for instance. Bangladesh is a country that's often hit by floods.
288 For example, now we're facing climate change and climate change will increase
289 the sea level, it will rise. On the other side, climate change also increases
290 the number or the frequency of natural hazards like floods. It is possible that
291 Bangladesh has to face more floods in the future than it did already. How do you
292 work with this future problem of climate change and natural hazards impacting
293 production spots?
294 MJA:
295 [00:24:30 - 00:25:46] Okay. We had a concrete example last year. I can tell you
296 about last year. In the last 50 years of history in Bangladesh, we had six
297 cyclones for the first time in the last year. Earlier years we had one, two,
298 maximum three cyclones in a year, but last year we had six cyclones. So because
299 of that we had to face closed ports, it impacted us automatically. So these
300 kinds of things will increase in future because of climate change. If the sea

level will rise and if the climate will change because of this global warming, we'll have this kind of issues often, not only in Bangladesh, even in other South Asian countries like India, Pakistan, Cambodia, China. But for another instance, last year in Shanghai we had more than eight typhoons. In the past, it was not like this, in the past it was four, five, not more than that. But we have to stop the delivery sometimes for 10 days, sometimes for six days, we had to move the delivery from there. So this kind of global warming definitely gives us an indication to deliver any goods just in time.

MB:
[00:25:47 - 00:26:04] And how do you improvise or what is your action if these harbors are closed? What are your solutions?

MJA:
[00:26:05 - 00:29:21] Oh, that is not in my hand. Even if I give some idea to the government, the final decision maker is the government. But if the shores are closed in the future, I don't know what the government will do because in Bangladesh, the government is planning to run a mother port from the south side of Bangladesh, which is namely Matarbari. They are going to start a mother port there, which will directly connect East and West. Japan, I mean the JICA, Japan International Corporation Association, is investing to develop this port to fix the automobile sector in Bangladesh and to bring their goods from Bangladesh to all over the world instead of producing in South India in Tamil Nadu. In the future, if the climate is going change more and more, at some point, some ports have to be closed. They have to be closed, there is no other option. I can give you some data. If you go through the UN data, you will see that they give us some results about this area. By 2050 some of the land will be under the sea level. By 2050, especially the largest mangrove forests in the southern part of Bangladesh and the east part of India, the Sundarban. So these forests are helping us a lot to protect from climate change, but if the sea level will rise, the mangroves will be unable to help us in the future. Also you can see in the northern part of the world, from Antarctica, from Northern Europe, the ice and glaciers are melting. It's from both parts of the world. It's not based on the East, also the action has to come from the West. And of course, from the East, they can increase their tree plantation. They can use the sustainable power source instead of burning the fossil fuel, which will reduce the carbon dioxide level and also make the household or the community household from our sustainable materials, not with the concrete. Lots of things are involved here to deliver the Just-in-Time daily delivery. Even if you apply too many methods, Six Sigma or lean management or the Kaizen method, but at the end of the day, something is beyond of human's control, which we are unable to solve.

MB:
[00:29:22 - 00:29:54] Yes and I'm interested in your example of Bangladesh, it was hit last year with many cyclones. What are short-term solutions when the border and the harbors are closed? For instance, the cyclone hits and you can't transport all the produce that is already ready to transport away, is stuck there. What are your workarounds?

MJA:
[00:29:54 - 00:30:59] Okay, there are some from the southern part of the coastal area in Bangladesh. The government is planning to do more plantation on that part, and they are making some dam in order to not to get the flood water inside the populated area or to the road, regular roads and highways. This kind of initiatives has been taken by the government in some cases last year, we have seen. It will be gradually improving in order to save the population, also the community, the highways. Also government is suggesting to the wire house authority that once you are preparing a wire house make it more elevated that the flood cannot get inside the wire house. In this way government is fine.

MB:
[00:31:00 - 00:31:04] Okay, these are rather infrastructure improvements as I would call them.

MJA:
[00:31:05 - 00:31:07] Yes, you can say that.

MB:
[00:31:07 - 00:31:33] Okay, and regarding Just-in-Time, I also read about an

363 alternative to Just-in-Time it's called Just-in-Case so that production sites
364 only produce once an offer is accepted. Do you think that's a viable option
365 just-in-case instead of Just-in-Time?

366 MJA:
367 [00:31:34 - 00:31:36] No, it's not a viable case because, if I give you the
368 example of Bangladesh, if we look for, the production area the production area
369 has never been impacted by the natural disaster or something else. It's always
370 been impacted by the human error or human disaster we may say. So it's all about
371 humans, humans need to plan well, humans need to organize well and humans need
372 to pay attention on the things that they need to do to make sure that the things
373 will be delivered just in time.

374 MB:
375 [00:32:11 - 00:32:14] Okay, so it's rather on the human side right now instead
376 of the natural.

377 MJA:
378 [00:32:16 - 00:32:19] Yeah, of course.

379 MB:
380 [00:32:20 - 00:32:40] What is your take regarding the combination of
381 Just-in-Time and fast fashion or even ultra-fast fashion which, established
382 themselves over the last few years?

383 MJA:
384 [00:32:41 - 00:32:43] Buyer. Yeah, nothing else. Buyer.

385 MB:
386 [00:32:44 - 00:32:48] It's a buyer-driven system or what do you mean?

387 MJA:
388 [00:32:51 - 00:33:33] We call this production a prior delivery. The production
389 itself, it's self-born as a prior delivery. The raw materials will be imported
390 from China or some other countries by air, and it will be delivered to the
391 production area as a priority basis transportation using the land transport of
392 course, and once the garments are ready, then it will be delivered to Europe by
393 air as well. So the whole supply chain shrinks by the air transportation, which
394 is not good for the nature as well.

395 MB:
396 [00:33:34 - 00:33:43] So they are changing the transport kind much more, much
397 more planes than ships.

398 MJA:
399 [00:33:44 - 00:33:45] Yes, not ships, much more planes.

400 MB:
401 [00:33:46 - 00:33:51] Yeah, mhm. So much more air transport to be faster.

402 MJA:
403 [00:33:52 - 00:34:08] Exactly. Especially I can tell you the retailers like *Zara*
404 from Europe, *Primark* from Europe, *H&M* from Europe, *Lidl* from Europe and
405 sometimes *Ralph Lauren* as well, they are doing it like this.

406 MB:
407 [00:34:09 - 00:34:10] Mhm. Okay, that was a very insightful, thank you.

408 MJA:
409 [00:34:16 - 00:34:17] You're welcome.

410 MB:
411 [00:34:17 - 00:34:33] To be honest these were actually all my questions. Last
412 but not least, is there anything, any additional insight or perspective you
413 would like to share regarding Just-in-Time practices, global value chains of the
414 garment sector during modern crises?

415 MJA:
416 [00:34:34 - 00:35:34] Of course, we need educated people throughout the supply
417 chain. We need efficient people, those who know about their responsibility. It
418 cannot be done alone, by a person or a country. It's a collaboration between
419 countries. And of course, for example, the production has been managed by
420 Bangladesh. The transportation has been managed by the Danish company. I can
421 give you an example, *MAX-Line*. They are the largest fleet in the world to
422 transport through the ocean. The airlines are the Turkish or Emirates airlines
423 from West Asia or Middle East Asia. This collaboration is really needed between
424 countries in order to deliver anything just in time. It could be a food, it

425 could be a medicine, it could be a garbage tomorrow.
 426 MB:
 427 [00:35:35 - 00:35:53] Okay, off topic, I have just two more questions. Would it
 428 be possible after transcribing the interview to reach out again to you if I have
 429 some follow up questions that would rather be in written form?
 430 MJA:
 431 [00:35:54 - 00:35:58] Yes, yes, it's possible. You're more than welcome. It's a
 432 good experience for me as well.
 433 MB:
 434 [00:35:59 - 00:36:22] Okay, I hope so. And one last thing. I'm working on this
 435 interview series and it's tough to find qualified interview partners. Could you
 436 recommend somebody that is also working in the garment supply chain world and if
 437 in your network that I can also interview?
 438 MJA:
 439 [00:36:23 - 00:36:41] Okay, let me check and I will recommend these persone
 440 because I need to talk with them first before recommending them. And which part
 441 of the supply chain would you prefer? From the production part or from the
 442 logistic part or transportation part, which or from the processing part?
 443 MB:
 444 [00:36:42 - 00:36:46] Rather the second one. Rather logistics and transportation.
 445 MJA:
 446 [00:36:47 - 00:36:49] Okay, okay, let me check.
 447 MB:
 448 [00:36:50 - 00:36:54] But if production anything will probably work.
 449 MJA:
 450 [00:36:54 - 00:36:55] Okay, okay.
 451 MB:
 452 [00:36:55 - 00:37:01] Okay, I'm very grateful, thank you for that. The help is
 453 appreciated.
 454 MJA:
 455 [00:37:02 - 00:37:03] Thank you.
 456 MB:
 457 [00:37:03 - 00:37:09] Thank you for taking your time and I will send you a copy
 458 once I'm done with analyzing, transcribing and finishing my thesis.
 459 MJA:
 460 [00:37:10 - 00:37:13] Great, great, thank you.
 461 MB:
 462 [00:37:13 - 00:37:15] Okay, then thank you and have a great day.
 463 MJA:
 464 [00:37:15 - 00:37:16] Have a good day, take care.
 465 MB:
 466 [00:37:16 - 00:37:17] Bye-bye.
 467 MJA:
 468 [00:37:17 - 00:37:20] Bye-bye.

E4, 11.04.2024

1 MB:
 2 [00:00:00 - 00:00:53] So, hello and welcome and thank you for taking your
 3 time and participating in this interview. As we already communicated, I am
 4 writing my master's thesis at the University of Vienna in international
 5 development and the topic we are talking about is Just-in-Time in global value
 6 chains and with the specification of the garment sector. As already mentioned in
 7 our written communication via e-mail, I can protect the data you are delivering
 8 and I hope it is okay to use your name in my thesis in order to verify your
 9 statements.
 10 DK:
 11 [00:00:54 - 00:00:56] Absolutely, no problem with that.
 12 MB:

13 [00:00:57 - 00:01:07] Perfect, thank you. First off, I would like you to
14 introduce yourself a bit and provide a brief overview of your expertise or your
15 field of work.

16 DK:

17 [00:01:08 - 00:02:20] Absolutely, more than happy to do so and thank you for the
18 invitation to the interview. My name is Daniel Kohlmann, I am a member of the
19 Transport and Logistics Management Institute together with Sebastian Kummer, who
20 is my supervisor. At the same time, I am leading also a supply chain technology
21 company and this is also basically my main work. We have a lot of clients in the
22 garment sector, so there should be some expertise from my side concerning the
23 clothing or the garment industry. Before, I was more than eight years at a
24 consulting company and before I started working I also completed the supply
25 chain master program at WU and the same is true for the bachelors with a focus
26 on finance and also transport and logistics management. So that's in a nutshell
27 about me.

28 MB:

29 [00:02:21 - 00:02:27] Okay, that sounds perfect and that definitely qualifies
30 you as an expert for this interview.

31 DK:

32 [00:02:28 - 00:02:47] But I think I cannot be compared with Sebastian Kummer
33 because he has by far more expert knowledge of course because of his vast
34 experiences but I think I can give you also some relevant insights into that.

35 MB:

36 [00:02:47 - 00:03:07] Yeah, I hope so too. Okay, let's start off pretty basic or
37 theoretic. I would like you to characterize the state of global value chains and
38 their usage of Just-in-Time as a principal method in today's economy.

39 DK:

40 [00:03:09 - 00:06:21] Absolutely, I would also then refer in particular to the
41 clothing industry. Just-in-Time itself, it's of course in the automotive
42 industry a very common concept, but overall also in the clothing industry. You
43 see some application areas and Just-in-Time itself refers to a manufacturing or
44 production concept where products are only produced when there is an order or
45 when there is a demand. Compared to the traditional production methods where
46 large quantities of goods are produced or stored in advance, Just-in-Time only
47 produces the things which are necessary basically. In the clothing industry this
48 means that garments are often manufactured only when there is an order or when
49 you predict a certain demand and that allows companies to minimize their
50 inventory levels. Also with the goal to reduce the costs because you have a
51 lower working capital and this gives you a higher liquidity at the end of the
52 day. Also to response to certain market trends or customer preferences. When you
53 look at the clothing industry itself you see that the preferences and trends are
54 changing very rapidly and that could be also a use case where Just-in-Time can
55 be applied. But, when you want to produce Just-in-Time, it requires a very close
56 collaboration among various stakeholders. That starts with the manufacturers or
57 even the steps before because you also need suppliers of raw material or
58 specific components. Just look at our clothes, you see here a button, you see
59 fabrics and so on and so forth. So even though we have only a jacket or a shirt
60 in front of our eyes, there is much more behind it. Also the chemicals which are
61 used and so on. I have read certain papers where they are talking about 8000
62 different chemicals. So just think about the various suppliers. So this means a
63 very close collaboration and efficient communication, also information exchange
64 since that is super important for the Just-in-Time production at the end of the
65 day. So I hope that addresses your question.

66 MB:

67 [00:06:21 - 00:06:39] It definitely does. Which actually brings me right to the
68 next question. What are, in your opinion, the key benefits and challenges for
69 Just-in-Time in the garment industry, within global value chains?

70 DK:

71 [00:06:40 - 00:11:28] Basically, it's a reduction of inventory at the end of the
72 day. So when you produce what is demanded, then you are closer to the quantities
73 of demand. So that means also that you can lower your inventory and this reduces
74 your costs and you also free up capital, working capital at the end of the day.

75 Then, cost reduction is an advantage or also flexibility. Just-in-Time also can
76 be applied when you have varying market trends, customer preferences. You can
77 basically switch to other clothes. Also it means improvements in the efficiency
78 because you streamline your processes. This is a requirement so that you can
79 really address that demand. But when I just think about this advantages or
80 benefits, you can also flip it on the challenges side because the demand in
81 particular in the clothing industry depends on seasonality, a lot of seasonality.
82 So planning is quite challenging because in one year you have the preferred
83 color of orange and then in the other year it is green. You have a lot of
84 dependencies and even these trends you see on a regional basis. It could be
85 valid in Europe, but it must not be valid in the German speaking countries. You
86 could even have other demand references than in the Scandinavian area or in the
87 southern part of Europe. You have such different preferences here which makes it
88 quite challenging for companies to plan and implement. At the end, it is
89 Just-in-Time production, you know the required quantity and when you need it. So
90 you have a very high complexity in this planning process and also it's a typical
91 saying "each forecast is wrong". So even though you try to somehow address the
92 needs and demands, sometimes you will have maybe overstock or out of stock
93 situations. You have also this risk. Another very very important point is, when
94 you look at the supply chain or the value chain itself, that the clothing
95 industry is very heterogeneous. You see a lot of small to medi-sized companies,
96 which are located all over the world and most of the production is even
97 happening in the developing countries. So this means the infrastructure there is
98 quite challenging because to implement Just-in-Time you need data, the
99 communication piece and close collaboration. That requires technology and
100 information systems to enable that production methodology. This is quite
101 challenging actually because I also read a lot of papers that the data quality
102 is sometimes pretty poor due to a lack of really efficient or required
103 infrastructure. That makes everything more complicated just to name a few
104 challenges here.

105 MB:
106 [00:11:29 - 00:11:33] Yeah, this is totally understood and that was also my
107 takeaway. Many factors have to be taken a look at and the developments over the
108 last 10 to 20 years regarding fast fashion and ultra fast fashion amplified the
109 significance of these factors. That brings me right to my next point, since you
110 pointed out the importance of data. What are key indicators or metrics that are
111 used to evaluate the effectiveness of Just-in-Time within these value chains?

112 DK:
113 [00:12:21 - 00:14:38] Well, there could be several key indicators, but of course
114 the stock itself. You apply Just-in-Time because you want to keep the stock
115 levels as low as possible. So you can also include here, basically, the
116 inventory level to other key performance indicators. For example, also the lead
117 times. The information when you placed an order, when you received it, and also
118 when it goes out to the customer. That means also the lead times are also a
119 suitable KPI, which allows you to measure the performance of the supply chain.
120 Then that leads me to the next point – supplier performance. You can use certain
121 metrics to evaluate the supplier performance. How reliable are they? How
122 responsive are they? What is their ability to meet your agreed service levels?
123 When changes happen, how agile are they to serve you? And of course, the costs.
124 You see that costs going up or down. So, which costs? Procurement costs,
125 production costs, logistics costs, you name it. And of course, what is also very
126 important is the quality. How many defects are there? In the production or when
127 you do some quality assessments before it goes out to the customer, that just
128 look okay. How is the quality of your garments, your clothes and the t-shirts,
129 you are selling?

130 MB:
131 [00:14:40 - 00:16:18] Yeah, that's understood. That brings me right up to my
132 next question, which is one of the bases of my research. I try to evaluate the
133 effectiveness of Just-in-Time during the times of modern crises. Modern crisis I
134 would say are defined during the last 15 years, which also includes known crises
135 like the global crisis of COVID-19 or the current crisis of the Ukraine-Russian
136 war. You can also take in consideration smaller crises like the situation in the

137 Red Sea with the Houthi rebels that try to impose power over this region, which
138 in the end also has consequences for any chain structure that uses these
139 transport ways. And therefore I wanted to know, how has the currently
140 implemented form of Just-in-Time in global value chains in the garment sector
141 performed during these modern crises, in your opinion. And how would you compare
142 it to more stable times. Or after the first impact of this crisis how they
143 bounced back and became stable again?

144 DK:
145 [00:16:21 - 00:17:29] Well, I think it differs. I would rather say, and let me
146 think about it, because for example, in stable periods you can basically say
147 Just-in-Time is a production concept or methodology, which works here because in
148 stable periods they have a stable period for planning. It's a key requirement
149 for Just-in-Time to have a good plan in place, that allows you to know, when the
150 supply will arrive for the production and so on. You have more of an environment
151 which is stable and more plannable. I hope it's an English word "plannable".

152 MB:
153 [00:17:29 - 00:17:38] Yeah, I would always use the word predicable or
154 sustainable but also reference that sustainable is not meant in an ecological
155 way but in an economical way.

156 DK:
157 [00:17:38 - 00:20:50] Absolutely, I think stable periods are better suitable for
158 Just-in-Time than crisis times, because in a crisis you never know what will
159 happen. As you brought up some examples, the COVID crisis, Ukraine, the Suez
160 Canal problematic here as well. These lead to a supply chain disruption, so lead
161 times can be much longer. Then you don't have this Just-in-Time anymore, when
162 you are waiting for delivery. Then you have these shortages of raw materials, of
163 required components and so on. When you have a shortage, then it leads to higher
164 costs, and because the clothing industry has relatively low margins, then you
165 have a problem. This is what we saw over the last couple of months, when you
166 read the newspapers. A lot of companies in this industry are struggling. Just go
167 outside, some shops had to close, because you don't have these big margins
168 compared to other industries. The problem is also that the power is more at the
169 customer side. You cannot just increase your selling prices because then the
170 customer goes somewhere else. The competition is quite high and that means that
171 the power is more at the client's or the customer's side, which even makes it
172 worse for the companies. Therefore, you see that a lot of companies are
173 struggling. Another sentiment for clients is the topic sustainability. You see
174 companies want to change their assortment, want to be more sustainable, but
175 everything is costly of course, and that is really what disrupts the clothing
176 industry right now. And I think we are in the middle of this disruption process,
177 and let's see where it will lead us.

178 MB:
179 [00:20:52 - 00:21:35] When you're saying it's a disruption process right now,
180 what does this include? I understand that the task is to compete in the global
181 market right now, and also to try to implement the longed-for factor of
182 sustainability in garments, which customers look for. But when you say a
183 disruption process, do you mean it in a way that the regression is that
184 effective or affecting that hard the sector, or is there something else in this
185 process that I'm not seeing right now?

186 DK:
187 [00:21:35 - 00:24:54] I think there are multiple factors which basically disrupt
188 right now the clothing industry. Of course, what you have mentioned. But I don't
189 know if you have heard about the European textile strategy 2030. And when you
190 read it, you see, that the clothing industry should change towards circular
191 economy. While keeping the competitiveness and the innovation capability of the
192 companies, but that is quite challenging. It's a lot of money, since the
193 infrastructure has to change. Right now, we have a linear infrastructure and not
194 the circular infrastructure. And the circular economy means also that you want
195 to keep your clothes, your t-shirts longer alive. And because you want to extend
196 the time span of the t-shirts, basically you use it longer, it's not that it is
197 in your closet and you just look at it. You also have to wear it and that is the
198 thing here. When you want to keep it longer, of course the quality needs to

199 change. But as we all know, better quality goes along with higher prices. And
200 here, we were used to pretty low prices. You can go to a *Primark* and you can buy
201 a t-shirt for five euros. Just think about it, when the same t-shirt, since it's
202 more circular, more sustainable, costs you 30 to 40 euros. Of course, then you
203 think twice if you should buy it or not. But what does it mean for the resellers
204 at the end of the day? You also have to establish the infrastructure for repairs,
205 for example. You don't throw your t-shirt away because it has a small hole in
206 it. You go there and let it repair or maybe you are even able by to repair it
207 yourself. That would be the best case. But you don't bring a t-shirt that costs
208 you five euros to a repair shop, where the repair itself costs you 30 euros.
209 It's crazy. It's six times more costly just to let it repair. And even this
210 infrastructure for repairs is not there. Just look at the numbers, how many
211 people were trained. I just don't know the name, "Schneider". Do you know that?
212 Tailor?
213 MB:
214 [00:24:55 - 00:24:56] Tailor, yes.
215 DK:
216 [00:24:56 - 00:26:33] Okay, tailor. How many people were trained as a tailor?
217 That is a very low number. How would you want to create a circular economy when
218 you don't have this infrastructure in place? That takes time. It's a process. I
219 think even that the textile strategy from the European Union is very sportive
220 and let's see if it's possible. But I think it takes much longer and it's a
221 process as always. You cannot change an industry within one year. That's
222 impossible and this is something that we have to bear in mind. That's why I'm
223 talking about a disruption process. The linear value chain or supply chain that
224 we have in this industry that goes back to 30-40 years with fast fashion and a
225 customer perspective. You have also to change your mind and say instead of
226 buying a t-shirt a year, I go to the repair shop and let it repair. It's not
227 only the supply side but also on the demand side where disruption takes place.
228 MB:
229 [00:26:35 - 00:27:01] Yeah, it's a big change of paradigms in the European Union.
230 The EU also presented many ambitious initiatives, especially as you mentioned
231 with the timing they should be reached by but we will see how that turns out.
232 DK:
233 [00:27:03 - 00:27:05] Hopefully it's a positive surprise.
234 MB:
235 [00:27:06 - 00:27:38] Yeah, I hope so as well. Getting back to Just-in-Time a
236 bit. What are the factors in your opinion that inhibit the resilience and
237 sustainability of Just-in-Time production, which are always getting to the
238 forefront, when they are facing global crisis or like the poly crisis we
239 described with regression, political crisis, health crisis and so on?
240 DK:
241 [00:27:29 - 00:29:25] Well I think some points have to be mentioned. For example,
242 you have to find reliable suppliers, reliable partners, where you have trust
243 and where they are willing to have a close collaboration to pursue transparency
244 in your relationship. That goes hand in hand. Trust, transparency and so on.
245 These two factors go hand in hand and the suppliers. Your partners, your
246 ecosystem, it's super important that you have this in place. A good
247 collaboration in place makes it possible that you have production processes that
248 enable the Just-in-Time and also the flexibility. I think that also the factors
249 of technology and data are key. When you don't have the data in place,
250 everything is much more challenging because without the right data you could
251 make some wrong decisions. I think these are the most important ones.
252 MB:
253 [00:29:26 - 00:29:34] Just since I get the feeling: Is your company into data
254 sourcing for supply chains or anything similar?
255 DK:
256 [00:29:35 - 00:32:48] Well it's more that our key clients are corporate clients.
257 Just go in a supermarket, go into public transport, buses or trains: you see
258 everywhere people with uniforms. For example, we provide technology for these
259 kinds of companies that helps them to equip their employees. You know it sounds
260 easier than it actually is because I would assess that you have another size

261 than me or maybe we have the same but multiply it to 30.000 employees. Then
 262 planning is quite difficult. When you just think about getting the demand right,
 263 placing the order, pay it, look if you know everybody is happy or manage the
 264 returns, get it to out to the repair shops or to the washing facilities. These
 265 processes are very complex to manage and this is where we have a very unique
 266 technology and software in place which allows to manage all these kind of
 267 processes in one platform. You can customize basically your shopping purposes
 268 for your employees. For example, you are a stewardess and this guy is a pilot.
 269 Of course the clothing is different and they don't need to see all the different
 270 t-shirts or clothes what you listed you really tailored it to the specific job
 271 profile. Even to tailor it to the person itself due to the size differences.
 272 Also the different grades for an airline. So this is very specific and
 273 individual. Without the right technology in place, it's quite difficult to
 274 manage it. Or think about protection clothes. When I think about the voestalpine.
 275 When you stand next to the oven, you need also protection in place and some
 276 clothes are only allowed to be worn 10 times. Otherwise, it will lose its
 277 protection. You have also to track it and you need a platform to tell you that
 278 these clothes were used 10 times now and you have to replace it with new ones.
 279 We create this infrastructure for our clients and make it available.
 280 MB:
 281 [00:32:49 - 00:33:05] Okay that's a very interesting idea to digitalize these
 282 processes as far as possible and to make data much more reachable for people
 283 that are responsible.
 284 DK:
 285 [00:33:06 - 00:33:08] Absolutely yeah.
 286 MB:
 287 [00:33:12 - 00:33:52] Thank you for these insights. Getting back to Just-in-Time.
 288 During the time of these crisis named, especially during COVID-19, there are
 289 always these ideas floating around in the economic and also the scientific
 290 community about alternatives. Do you think that there are alternative production
 291 strategies or methodologies to Just-in-Time that could potentially enhance the
 292 resilience or the sustainability of supply chains in the garment sector during
 293 these times of crises or when the stability comes back?
 294 DK:
 295 [00:33:53 - 00:36:50] So I will address the strategies as well as methodologies,
 296 but I think the diversification is key here. You have basically redundancies in
 297 your supply chain and those redundancies make it more costly at the end of the
 298 day but from a risk management perspective it's always good to have a
 299 diversified supply chain and suppliers in place because you reduce the
 300 dependencies in your supply chain. We talked so much before about the crises,
 301 about the disruption. Even when you have a very stable period, at one point in
 302 time everything can get destroyed. So it's always good to diversify. That's one
 303 strategy that you can apply. Also you read very often over the last couple of
 304 months or even years is this reshoring, nearshoring topic, to have your partners
 305 closer to you. You are more responsive, you have less ways, lower distances and
 306 that makes it possible to be more responsive. But it goes hand in hand with
 307 higher production costs when you are sitting in Europe for example. Then dual
 308 sourcing is also like diversification. When you want to prepare or when you have
 309 a risk management in place of course you also need inventory levels. You have to
 310 maintain stock but this is against Just-in-Time as well and these strategies or
 311 methodologies. But digitalization is also key here so having a good technology
 312 in place will help you at the end of the day and this is key. I mean that when
 313 you look out there it's not that expensive any more than 10, 20 years ago to
 314 have a good platform in your company because it saves you so much time, so much
 315 effort and it reduces your repetitive processes which you can optimize, automate
 316 here. So these are just some strategies or methodologies which you can apply
 317 here.
 318 MB:
 319 [00:36:51 - 00:36:59] Yeah okay the main point is always profitability in
 320 economics.
 321 DK:
 322 [00:37:00 - 00:37:01] Of course.

323 MB:
324 [00:37:01 - 00:37:50] And during these times of crises Just-in-Time is not that
325 efficient since a disruption that really brings change even that far that they
326 halt. You now named strategies like dual sourcing, diversification, investments
327 into technology, probably also data. All that would favor or improve the
328 resilience of Just-in-Time. Do you think it is always better to improve
329 Just-in-Time than to go into a different direction like I mentioned it in my
330 e-mail like Just-in-Case?
331 DK:
332 [00:37:50 - 00:37:51] Yes.
333 MB:
334 [00:37:51 - 00:37:56] Especially in the garment sector. That's the main point
335 I'm interested about.
336 DK:
337 [00:37:10 - 00:41:04] Well I would think it depends on the company, on the
338 philosophy, on your business model itself. It depends on that mostly when you
339 are let's say a *Primark* you have another philosophy and business model than a
340 very specific tailor. Look at the Wiener Innenstadt where you have very
341 traditional stores. It's not really comparable. It depends really on your
342 business model and on your strategy and you have to evaluate and find the right
343 ways to where you can stay profitable. But also that you are able to address
344 future demands and we really don't know what the world will look like in five to
345 ten years. Maybe in the next years there will be a methodology in place which
346 really completely disrupts everything and also how for example clothes can be
347 reused or refabricated. Or technology and how fast technology changes, your
348 supply chain could change. I mean there is also a lot of research done when you
349 look at *Lenzing*. It's a private company from Austria. They reevaluate how to
350 make your garments or to reuse it. Maybe they get a breakthrough to make it
351 really profitable also to reduce the cost and that could change a lot of things.
352 We are just talking here about the status quo but what is more relevant is to be
353 open-minded to look at the technologies and based on that you make the decisions
354 how to change your supply chains. It's also important that you have a good
355 ecosystem as a company, that you have good partners in place and also innovate
356 on new things. Then you can stay competitive and you stay relevant on the market
357 and that's the most important thing. Maybe people like it even though it's more
358 costly. It's just that you really find the thing that really people want. Maybe
359 they don't want this five euro t-shirt anymore, they rather like it what you are
360 offering because of your new ideas and that's how people should change or
361 companies should change demand.
362 MB:
363 [00:41:05 - 00:41:32] Okay just to summarize a bit here and for me to understand
364 you properly. There is no universal solution for that since it's always
365 depending on the individual business model and strategy therefore you always
366 have to update your own strategy or business model in regards to the
367 circumstances.
368 DK:
369 [00:41:32 - 00:41:35] Yeah absolutely you summarize it pretty well.
370 MB:
371 [00:41:35 - 00:41:36] Okay perfect.
372 DK:
373 [00:41:37 - 00:41:48] I mean when you don't re-evaluate, you're stuck and you
374 are losing competitiveness and that's the worst thing what you can do as a
375 company.
376 MB:
377 [00:41:49 - 00:43:24] Understood and do you see that reshoring is here to stay
378 because there are some strategies or even business models that also disrupt the
379 garment industry quite a bit. I did some research and I read a lot about the new
380 ultra fast fashion companies that are based on online shopping like Temu or
381 Shein. They went so far that they even did some onshoring for small stock. Then
382 they produce some kind of product and afterwards they immediately have a look
383 how these small stock numbers of one product perform. If it performs well then
384 they offshore the production to some other country and therefore I think

385 reshoring, nearshoring, friendshoring, all these processes are probably on the
386 rise in the garment sector, but I guess it's still an individual case which
387 process you will implement. I also read in an article in the *Presse* that
388 reshoring to Portugal is somehow favored since it's more stable to have it
389 already in Europe than in the southeast of Asia. What is your takeaway on these
390 different moves?

391 DK:

392 [00:43:25 - 00:44:54] I mean what you are outlining is quite interesting and I
393 think they are just testing out how it works and if they can also be profitable
394 with that approach. I think they are just figuring it out. I mean let's look at
395 this in two years, if they are still working like that. For example, two weeks
396 or three weeks ago, I also talked to a local retail store focused on corporate
397 fashion and they said that even in Bulgaria, which is I would say near-shore
398 somehow, it's too costly right now to produce. They are going to the Asian
399 markets. So what you are explaining is quite the opposite. That's why I think we
400 are in this process where we have to figure out what works best and I think a
401 lot of companies are trying to test that to see, to find the right use case for
402 certain products or maybe for more collections. I think advancements in the
403 technology will play a major role. Maybe 3D-printing clothes will be the next
404 big thing, who knows.

405 MB:

406 [00:44:56 - 00:44:57] That would be some kind of innovation.

407 DK:

408 [00:44:58 - 00:45:07] Yeah I mean, who knows. It's a manageable cost I think
409 that's the best thing what you can do.

410 MB:

411 [00:45:08 - 00:45:17] Okay so we live in volatile times in the garment sector
412 and it will be very interesting to see where it takes us in the next few years.

413 DK:

414 [00:45:18 - 00:45:56] Yes, if you call it a paradigm shift anyway, it is also
415 there from a customer side. Maybe people are willing to pay more for a t-shirt,
416 more for their clothes, but less often. That could become also a point at some
417 time. At the end of the day the market will tell you and we as customers are
418 together in the market with the companies who are offering the products. And
419 without the demands there won't be supply.

420 MB:

421 [00:45:57 - 00:46:00] That's the principle of course.

422 DK:

423 [00:46:00 - 00:46:02] We decide it.

424 MB:

425 [00:46:03 - 00:48:47] I have one last main point for this interview. Like I
426 mentioned in my last question there is some reshoring or relocating of
427 manufacturing in place already. I heard of companies that re-strategized, they
428 are not producing anymore in southeast Asia they're going to African countries
429 like Ethiopia, which is working out sometimes well sometimes not so well. I also
430 heard about some companies strategy called China and 1 (China+1) since they are
431 facing some backlash from customers due to the location of the production sites
432 in China, especially in the Xingjiang province, where a religious minority, I
433 think the Uyghurs, are discriminated against and customers don't like that. They
434 want to buy clothes that are not produced in this region so there are many
435 movements going on. Also one big hub in the garment industry is Bangladesh as a
436 country that really provides a lot of products and is known for its production
437 sites. A big future crisis I think will be climate change. Climate change is
438 enhancing or increasing the number of natural hazards which means natural
439 hazards are appearing more often and even in a more intense manner. The example
440 of Bangladesh is that Bangladesh is hit by floods frequently. These floods
441 happen more often and in a more intense way due to climate change and this also
442 disrupts production in the garment sector due to the factories that are hit. How
443 do you envision the future of Just-in-Time within global value chains in the
444 garment sector considering the ongoing global challenges of climate change and
445 the natural hazards that are intensified by it?

446 DK:

447 [00:48:49 - 00:49:55] I think it's not relatively new. You always have some
448 natural disasters. This is not new. If it's more frequent, but it isn't really
449 unexpected because at some point in time you have to expect flaws. It can happen
450 everywhere at the end of the day and it should not be a surprise. I think what
451 should be more worrisome are the things that we don't have now on our radar
452 because just thinking about the bell curve. We are talking only about the middle
453 piece, where the frequency is more higher, but the real disruption happens at
454 the tails, not that often but when it happens it disrupts everything. So this is
455 more what should be a company's worry.
456 MB:
457 [00:49:55 - 00:49:57] Like COVID-19?
458 DK:
459 [00:49:57 - 00:52:15] For example or look at the world trade center. Who has
460 ever expects it? This has nothing to do with textiles directly, but as we are
461 even thinking about it, it's more on your radar and you plan for that. You plan
462 for such scenarios in the future. It's part of risk management and you change
463 your supply chain accordingly or you look at least for some alternatives at
464 least. I would do it when I would be an owner of such a company, but you should
465 have the capacities and capabilities in your company that you are able to deal
466 with things which are not on your radar. We don't know what will happen in the
467 next five to ten years, twenty years. Is climate change the big thing or is it
468 something else. It also comes in waves. Of course we have to worry about the
469 climate and environment since it is our essence to live, but it was also 30
470 years ago where people talked about it. I think people should be rather prepared
471 or be agile to have the capacities and capabilities to change very quickly, to
472 change in your environment in your ecosystem. I don't have a better answer than
473 that on your question because this is something that we don't know now. We will
474 know more about it when it actually happens but then it's there.
475 MB:
476 [00:52:15 - 00:52:37] Okay, can you give us some insight from your company on
477 this process because I now understand your statement is that you have to set up
478 your risk assessments in order to expect the unexpected.
479 DK:
480 [00:52:37 - 00:52:38] Exactly.
481 MB:
482 [00:52:39 - 00:52:46] And how do you manage or implement this into your
483 assessment?
484 DK:
485 [00:52:47 - 00:55:16] This is a multi-faceted approach. On the one hand, your
486 people have to be very capable and need the right capacities to deal with
487 uncertainty to changes. It starts with education, training and so on and also
488 dealing with new technology. AI is right now on vogue for example and it will be
489 a big topic. Also that people are open to such thing. So training is key here
490 and always improve. When you look at your company itself besides your people,
491 make sure that if your supply, your key resources decide to leave the company
492 you have the right replacements. So to have redundancies is key for risk
493 management. So that you have such strategies in place when you look beyond your
494 company. Let's assume a key supplier right now, which is a strategic partner to
495 you and important for your production, goes bankrupt. How would you plan for
496 that for example? Could it be due to climate change, or could it be because of a
497 fire, or could it be because of his financials? It can be various reasons, but
498 you just need to know, if this supplier would go bankrupt and won't be able to
499 deliver anymore, what does it mean for your company. These are the questions
500 that you should ask yourself and think about these implications to your company.
501 Be very honest and don't lie to yourself. Sometimes the truth can be quite harsh,
502 but it also prepares you for the future.
503 MB:
504 [00:55:17 - 00:55:42] That's definitely a way of looking at things. So far these
505 are all my questions. Are there any additional insights or a perspective you
506 would like to share regarding Just-in-Time practices, global value chains, the
507 garment sector or anything else during modern crisis?
508 DK:

509	[00:55:42 - 00:56:23] I think we covered a lot and I think the only thing what
510	we can do is having an eye on the development. Look what the future will bring
511	and I think we should be rather excited than worrisome. So there will be a lot
512	of opportunities, great opportunities, but you have to discover them and have be
513	open-minded to change. Then we will be successful in this industry.
514	MB:
515	[00:56:23 - 00:56:49] I have one last question: There is a Viennese company and
516	I would like to know if you know the company. It's called Prewave. They're using
517	data collection and I think already also AI to predict the development or the
518	stability of supply chains. Have you heard of them?
519	DK:
520	[00:56:49 - 00:56:52] No I haven't heard about them.
521	MB:
522	[00:56:52 - 00:56:58] Okay that's unfortunate. I'm just trying to convince
523	somebody from their company to partake in an interview, but they are a bit of a
524	black box.
525	DK:
526	[00:56:57 - 00:56:59] I have to have a look at it.
527	MB:
528	[00:57:00 - 00:57:15] Yes please do so. I think they have a very interesting
529	business model and it's a very interesting idea to improve supply chains
530	especially regarding the developments of AI in the future.
531	DK:
532	[00:57:15 - 00:57:16] Okay cool.
533	MB:
534	[00:57:16 - 00:57:44] And also to the point of data collection, it could be
535	something interesting for you as well. Good then, thank you very much for your
536	valuable time. It was great to speak to you and have this discussion and
537	interview. Is it okay if I contact you after transcribing the interview in case
538	some further questions pop up? Just via e-mail to clarify things.
539	DK:
540	[00:57:44 - 00:57:46] Absolutely yeah, please feel free to reach out to me.
541	MB:
542	[00:57:47 - 00:58:10] Okay perfect and last but not least: Do you have somebody
543	else you can recommend for another interview? I think it wouldn't be that
544	fruitful or provide that much more insights by interviewing or annoying
545	Sebastian Kummer again with an interview request, but do you know somebody from
546	the industry or somebody else I could interview?
547	DK:
548	[00:58:10 - 00:58:21] I mean from the industry itself I don't know, but maybe
549	you find someone at <i>Lenzing</i> , because I think that would be super interesting for
550	you.
551	MB:
552	[00:58:21 - 00:58:26] Okay, noted that. Okay maybe I will find somebody there.
553	DK:
554	[00:58:26 - 00:58:32] Yeah absolutely fingers crossed and thank you for having
555	me. I also really enjoyed this conversation.
556	MB:
557	[00:58:32 - 00:58:35] Perfect then, thank you very much and have a nice day.
558	DK:
559	[00:58:36 - 00:58:39] Thank you, you too. Bye bye.
560	MB:
561	[00:58:39 - 00:58:40] Bye.

E5, 31.03.2024

1	Topic: Understanding Just-in-Time (JIT):
2	1. <u>How would you characterize the current state of global value chains in the</u>
3	<u>garment sector regarding Just-in-Time practices?</u>

4 PLT: It depends upon which segment of the value chain you are looking at.
5 Just-in-time practices are very widespread when it comes to low-cost, fast
6 fashion items. Particular countries, Bangladesh in particular, are specialized
7 in this segment, which sometimes puts the country in a difficult spot, as many
8 buyers seem to expect paying a lower price in Bangladesh, the so-called
9 Bangladesh price, than in some of its competitor countries. In other segments, e.
10 g., sports wear, the dynamics are somewhat different, as demand tends to come in
11 cycles that are related to major sports events, such as the world cup in
12 footballs. Here it is easier to plan long-term and adjust production cycles in
13 relation to expected demand over a longer time period.

14 2. What are the primary benefits and challenges associated with implementing JIT
15 specifically within garment supply chains?

16 PLT: The primary benefits is that it is possible to produce more garments in a
17 shorter space of time, while retaining greater flexibility in the value chain
18 from the perspective of brands. The downside is mainly for manufacturers that
19 have shorter lead times for producing various items. They have to run faster,
20 without really being awarded having to increase intensity in production. As
21 production intensity increases, exploitation of workers on the production time
22 also tends to increase, as workers often have to work overtime or increase the
23 speed of work in order to meet particular production deadlines. More has to be
24 done with less time being available for completing the work.

25 3. From your experience, what are some key indicators or metrics used to assess
26 the effectiveness of JIT implementation, particularly during turbulent times?

27 PLT: This is not something that I have studied in particular, but usually lead
28 time is used as an indicator for this.

29 Topic: Resilience and Sustainability of JIT in Modern Crises:

30 1. In your view, how has Just-in-Time production performed within garment supply
31 chains during recent modern crises like the COVID-19 pandemic and the
32 Ukraine-Russia conflict?

33 PLT: Again, this is not something that I have studied in particular. However, it
34 is generally acknowledged that disruptions of global value chains in response to
35 these crises have made JIT production difficult, with many brands and retailers
36 considering diversifying their supplier source and countries. In particular,
37 having back-up options, either through new warehousing strategies or by having
38 more production alternatives, particularly supplier countries that are located
39 more closely to brand/retailer headquarters in Europe and North America.

40 2. When comparing JIT performance in the garment sector during times of crisis
41 versus more stable periods, what observations or insights can you share?

42 PLT: I think that it is possible to speak of a time before COVID-19/the Ukraine
43 crisis and a new moment in global garment production after these crises. It
44 seems that most brands/retailers now are in calculating a more permanent state of
45 instability in global sourcing relationships, which requires than to find
46 alternatives to just-in-time production. Kohlmann as well

47 3. What factors, in your opinion, hinder the resilience and sustainability of
48 JIT production within the garment industry when confronted with global
49 turbulences such as those mentioned?

50 PLT: Obviously, the crises that you just mentioned require brands/retailers to
51 adjust the production and sourcing relationships in such a way that JIT is no
52 longer the only approach that they used in the global garment industry.

53 Topic: Alternatives to JIT:

54 1. Are there alternative production strategies or methodologies that you believe
55 could improve the resilience and sustainability of garment supply chains during
56 times of crises?

57 PLT: Yes, improved warehousing strategies, for instance, with suppliers opening
58 more warehouses in Europe and North America along with nearshoring are good
59 alternatives to mitigating the sudden eruptions to global value chains.

60 2. Do you think there's a need for JIT to evolve, adapt, change, or be replaced
61 by alternative approaches to better navigate modern crises and ensure
62 sustainable operations? What are your reasons for this viewpoint? (e.g.,
63 Just-in-Case, Just-in-Worst-Case, GVC shortening, diversification, reshoring,
64 etc.)

65 PLT: I think that JIT will continue to exist well into the future. But it has

66 become imperative to find alternative strategies, such as the ones mentioned,
67 including having more supplier countries “near to home”, increasing the use of
68 warehouses that are also located geographically close to end markets, and
69 becoming less dependent on suppliers that are located on the other side of the
70 world.
71 3. _____ Brakman et al. suggest that Just-In-Time could be transformed into
72 just-in-case management and advocate for increasing buffers and borders to
73 enhance economic resilience. Do you agree with this perspective? Why or why not?
74 PLT: I think that what Brakman et al. are suggesting is already happening for
75 many bigger brands. However, continued reliance on some of the major producer
76 countries in Asia is likely to continue well into the future, as this is where
77 the manufacturing knowledge, the production set-up, and the cost-structure
78 allows for manufacturing at the scale which is required to meet world consumer
79 demand.

E6, 18.04.2024

1 During this online interview session the screen of the interviewer was shared
2 with the interviewee to display the questions and written answers of the
3 interviewee, which he provided beforehand. The display of information helped the
4 interviewee to remember his already given input and elaborate on it.
5 MB:
6 [00:00:00 - 00:00:43] So Tanmoy, welcome and thank you for joining the interview.
7 We already had contact with each other, where you already answered some core
8 questions of my research regarding the Just-in-Time principle in garment global
9 value chains. Your data can be assured to be safe and at the beginning I would
10 like you to just give a brief introduction of yourself to give us a bit of a
11 glimpse of your everyday life and your work in the sector.
12 TD:
13 [00:00:44 - 00:01:56] At first, thank you so much, Moritz, for giving me this
14 opportunity for the interview session. To be very honest regarding my work
15 career, currently I’m working in *Pentland Brands* as a sourcing officer, where
16 actually I’m sourcing vendors for particular products. I hope that you know
17 about the brand *Speedo*. For *Speedo*, we are doing swim shorts and there is one
18 brand that I’m working for, *Vargas*, it’s one of the most influential products in
19 the UK, an influential brand. And I’m working for *Canterbury* and regarding
20 *Canterbury* if I want to say it, that if you see any New Zealand cricket match,
21 you will see three Cs in their jersey and in their cap. So that’s actually, we
22 are sponsoring that. And there is one more brand that I’m currently working with,
23 that is *Endura* which is a giant cycling brand in the UK market. So before that
24 I have worked for nine years in the manufacturing end and currently it is three
25 and a half years where I’m working in my buying end. Regarding my family, I’m a
26 loving father of two daughters, one is six and one is one. So passing the busy
27 day almost every day. So yeah, I think this is me.
28 MB:
29 [00:01:57 - 00:01:59] Perfect, thank you. Let’s jump right in. I will share the
30 screen so you can see the follow up questions I’ve already prepared to your
31 first statements. Let’s go. Can you see my screen?
32 TD:
33 [00:02:16 - 00:02:21] Yeah, will you please make it a little more bigger?
34 MB:
35 [00:02:21 - 00:02:22] Does this work?
36 TD:
37 [00:02:22 - 00:02:24] Yeah, this is perfect.
38 MB:
39 [00:02:27 - 00:02:58] Okay. My first follow up questions regarding your first
40 answer would be you stated that some companies have fully embraced Just-in-Time
41 principles while others are still in process to transitioning and or maybe face
42 barriers due to complex supply chain structures. Can you provide some examples

43 of these complex chain structures that face barriers or still transition to JIT?
44 TD:
45 [00:03:03 - 00:04:26] Yes, so actually in my view you know that Just-in-Time
46 also requires some softwares sometime because while I was in my manufacturing
47 [incomprehensible] on that time to maintain everything we were using SAP
48 software. That software will give you the highlight that you need to do that
49 work now and this work is pending, this payment is not done yet. So those
50 Just-in-Time work easily happened on that factory because those SAP softwares
51 are there but some factories I have also known who doesn't have these kinds of
52 software automation in their factory. So let's say that how many I mean it is
53 quite it seems to me very it seems very difficult to me to just maintain a
54 simple diary other than using some softwares or any calendars it's not it's
55 actually sometime is not working properly because we are human being and we are
56 completely forgetting things each and every day. So to maintain those actually
57 the complex thing I suggested in my in my answer that people should learn to use
58 the softwares to make the things Just-in-Time because those software we follow
59 up with you. So you cannot forget. So sometimes actually we should depend on the
60 system to make our work efficient.
61 MB:
62 [00:04:27 - 00:04:36] So you see as a barrier that many managing tools are not
63 yet as implemented as they should be.
64 TD:
65 [00:04:37 - 00:04:38] Right.
66 MB:
67 [00:04:39 - 00:05:07] Okay. This is understood. Regarding the second your second
68 answer I have follow up questions you mentioned supply chains, disruptions
69 during COVID-19 pandemic impacting the Just-in-Time implementation. How do
70 companies typically address or mitigate these disruptions within their
71 Just-in-Time frameworks?
72 TD:
73 [00:05:07 - 00:06:57] During COVID-19 actually all the whole world was stuck
74 completely. I'm actually trying to give you for every answer an example so that
75 you can understand the full matter, not from the bookish way. So let's say my
76 production plan is from today is April 17th and May 17th is my production start
77 date. So that means before you start the product at least before one week of the
78 production all materials should be in the factory. But due to the pandemic issue
79 many of the fabric mills and other material suppliers could not deliver our
80 fabric or our material Just-in-Time. As a result my production line was hampered.
81 Sometimes actually there are lots of time when we need to give at least one
82 month salary to the workers just because my materials are not in the factory in
83 the right time. So on that time there were many people were sacked from their
84 job and you know that many factories in our country have closed. So in the
85 overall scenario during that pandemic time garment manufactures actually
86 properly understood the importance of the Just-in-Time case because during that
87 time they actually completely understand the framework because everything is
88 related with everything. If your materials are not coming in the right time then
89 you cannot start the production at the right time. So there could be shipment
90 delays and customers could ask for [incomprehensible] sometimes and sometimes
91 factories need to ask for extensions. So during the pandemic situation the
92 factory's owners and the factory's management teams understood the importance of
93 JIT.
94 MB:
95 [00:06:58 - 00:07:19] Okay, the COVID-19 pandemic could be seen as a pretty good
96 example to demonstrate the Just-in-Time workings but also its challenges or the
97 negative aspects of it that comes with it.
98 TD:
99 [00:07:20 - 00:07:45] Yeah, because you know that sometimes, an office is an
100 office. So during the pandemic time we were not allowed to go to the office.
101 Lots of paperwork has to be done in the manufacturing industry in our country.
102 So those all were stopped because there are lots of approvals needed by sign
103 till date because there was no proper system again.
104 MB:

105 [00:07:46 - 00:08:08] Okay, this also brings back the first point you brought up
106 that managing tools are not implemented as efficient as they should be. Would
107 you say that these managing tools are not implemented enough in the whole
108 garment sector or is it rather a specific case?
109 TD:
110 [00:08:09 - 00:08:49] Actually, if I'm talking in the perspective of our country,
111 you can find that people are using Outlook in every office right now, but you
112 don't find ten persons, who know how to utilize properly the Outlook calendar,
113 where you can do everything. So sometimes you have the system but people don't
114 know how to use it or the management team didn't show them how to use it or they
115 don't have the system. There could only be two options in that case.
116 MB:
117 [00:08:49 - 00:09:21] Okay, understood. Thank you for that. My next question
118 would be in regards to the indicators or metrics you use to assess the situation
119 with the Just-in-Time chains. You mentioned a few in your answer like inventory
120 turnover rates, supply performance metrics. Do you use these in your daily work?
121 TD:
122 [00:09:22 - 00:10:32] Yeah, actually in my current company, *Pentland Brands*,
123 they have such systems like I'm working with the people from China from Vietnam,
124 from UK, from Thailand, from Hong Kong and from New Zealand, from Australia. I'm
125 working with all of them. So, I'm in a global chain you can say. There are lots
126 of systems, actually there are lots of softwares we are using right now. Like
127 the PLM, there is one software is PLM, from where you can easily see that what
128 are the styles you need to do for this year, what are those styles you need to
129 do for that year, what has already been done and which factory has done this.
130 All this information can be gathered from our company system. And to monitor the
131 factory performance, sometimes we are using various kinds of metrics, various
132 kinds of mathematical algorithms to check which factory's performance is how
133 much. We are implementing some software in my current organization.
134 MB:
135 [00:10:31 - 00:11:29] The next topic would be resilience and sustainability of
136 Just-in-Time. Here in my second question of this specific topic, you highlighted
137 the importance of alternative sourcing strategies and maintaining buffer stocks
138 to improve Just-in-Time resilience during crisis. Can you elaborate a bit on how
139 companies decide for or against buffer stocks, or is there an optimal level of
140 buffer stocks without compromising Just-in-Time efficiency? This question is
141 based on the perfect version of Just-in-Time, since this perfect implementation
142 doesn't favor the existence of buffer stocks.
143 TD:
144 [00:11:30 - 00:11:47] [interruption due to technical issue: connection issue]
145 [00:11:48 - 00:13:12] Let me read your question once again. Actually, there is
146 no optimal level for the buffer stock without compromising JIT efficiency.
147 Because as you know that, while we are in a global supply chain issue, during
148 that time everything is related with everything. Like, this has to be a complete
149 cycle, which needs to be filled up. To avoid the buffer stock sometime and not
150 to compromise the JIT, we can add some middle points. Like for my company I am
151 the sourcing officer. People are sitting around the world. They are sending me,
152 they are couriering me some of the garments to check, whether which factory can
153 do these kinds of products. But, so it doesn't mean that this product is
154 [incomprehensible] for my brand, no. That is actually working in another
155 factories. But to minimize the production lead time and to minimize the stocks
156 without compromising the JIT efficiency, they are actually creating an option B.
157 So, that if there is any problem in the earlier factories, we can move to new
158 one. So, this is how I think we can do that.
159 MB:
160 [00:13:13 - 00:13:20] So basically it is all about diversification rather than
161 buffer stocks.
162 TD:
163 [00:13:20 - 00:13:21] Yeah, yeah.
164 MB:
165 [00:13:22 - 00:13:37] Okay. I was just a bit thrown off because in my
166 understanding, the buffer stocks have to be reduced as much as possible to reach

167 the lean nature of Just-in-Time.
168 TD:
169 [00:13:37 - 00:13:40] Okay, okay.
170 MB:
171 [00:13:40 - 00:14:05] In the next one, you mentioned that companies need to
172 diversify. They need to diversify the supplier base, maintain strategic buffer
173 stocks, probably to a minimal level, and develop robust risk management
174 strategies to enhance resilience of their chain structures in the face of
175 unforeseen events, which would be in this case crises.
176 TD:
177 [00:14:06 - 00:14:07] Yeah.
178 MB:
179 [00:14:07 - 00:14:19] Can you share specific insights or best practices from
180 your company or other examples you know, that successfully enhanced Just-in-Time
181 resilience?
182 TD:
183 [00:14:19 - 00:16:01] Yeah, for sure. That's a nice question, by the way,
184 because this is actually very important for any company. These kinds of JIT best
185 practices should be existing in every company in my eye. As an example, to
186 implement Just-in-Time, I'm giving you my example. My company's example, they
187 are shipping with one shipping company named *Maersk*. I hope you know that. This
188 company *Maersk* is working through the Nexus system. So, Nexus system has to be
189 installed on the vendor side and also on the shipping side. If anybody missed to
190 book any vessel, right away, those *Nexus* systems will give the notification to
191 both parties so that they do not forget what they have missed. So, this example
192 has been shared from one of my bosses of this company how they follow this
193 Just-in-Time process. So this is the answer, this is the example that he shared
194 with me to create a bridge, to show how much our company is trying to minimize
195 mistakes as much as they can. So that's why they are implementing these kinds of
196 best practices, which automatically follow up with the vendor and the shipping
197 person, both.
198 MB:
199 [00:16:02 - 00:16:17] Does it mean that the systems of both parties, in your
200 example, the vendor and the shipping company, they align their systems?
201 TD:
202 [00:16:17 - 00:16:19] Align their systems. Yeah.
203 MB:
204 [00:16:19 - 00:16:32] So everybody is up to date and can see on screen somewhere,
205 which numbers are in there or are not in there, and if everything is on point.
206 TD:
207 [00:16:32 - 00:16:33] On point, yeah
208 MB:
209 [00:16:34 - 00:16:45] Oh, okay. That's interesting. Thank you. And regarding the
210 point of...
211 TD:
212 [00:16:45 - 00:16:54] Moritz, there is one more thing, if you are not clear
213 about anything, you can ask me and you can send me an email later so that I also
214 can briefly write in the email if necessary.
215 MB:
216 [00:16:54 - 00:17:05] Okay. Thank you for the offer. I will maybe reach out to
217 you after I transcribed everything and started the analysis. And if something is
218 unclear or I have some more questions, I will reach out. Thank you.
219 TD:
220 [00:17:06 - 00:17:13] Yeah. So but next week, I'll be on a business trip. So I
221 think next month, from the next month, first week, I will be available.
222 MB:
223 [00:17:13 - 00:17:20] No worries. I won't start with the analysis before May.
224 TD:
225 [00:17:20 - 00:17:21] Okay. Fine.
226 MB:
227 [00:17:22 - 00:17:23] Thank you.
228 TD:

229 [00:17:24 - 00:17:24] Yeah.
 230 MB:
 231 [00:17:25 - 00:17:32] Regarding the point of robust risk management strategies,
 232 can you share some experience from your side regarding this?
 233 TD:
 234 [00:17:33 - 00:18:33] Risk management, risk assessment strategy could be
 235 different types. From my previous experience in the factories, every time there
 236 is some problem in the production line, it is the nature of the garment industry.
 237 So nowadays, people are using 5S. Nowadays people are using Kanban strategy.
 238 Nowadays people are doing the Gemba walks. Then people are using one more
 239 Japanese term that's Kanbo. Those are the strategies actually they are
 240 implementing right now to minimize the risk on the product. So that's why
 241 actually I wrote this for developed robust risk management strategies for
 242 downforce and events. You can easily say that lean management, the importance of
 243 the lean management.
 244 MB:
 245 [00:18:33 - 00:19:24] Okay, to be honest, I only know Kanban and Kaizen, I think.
 246 These are the two names I know, but this is understood. Let's move on to the
 247 next topic regarding the alternatives to Just-in-Time. You mentioned that you
 248 prefer exploring alternative production strategies, such as Just-in-Case
 249 management, diversification of suppliers, maybe also reshoring, all to improve
 250 the resilience and sustainability of the garment supply chains, especially
 251 during the times of crisis. Can you share your experiences of the implementation
 252 of these alternative production strategies in the garment sector during these
 253 times of crisis?
 254 TD:
 255 [00:19:24 - 00:20:12] This is actually quite easy, because if we are developing
 256 one garment and there is one care label, I hope you know that care label. So
 257 let's say that care label we are planning to bring from Hong Kong. But I will
 258 definitely ask from my local suppliers whether they can make the same care label
 259 by maintaining the same quality, which the abroad supplier is doing. So I will
 260 create one alternative, basically. So if there is any problem or if there is any
 261 supply chain problem, or if there is an Just-in-Time production problem, which
 262 will be happening by that foreign supplier, I will definitely go for the local
 263 one. That will be my strategy for this.
 264 MB:
 265 [00:20:13 - 00:20:17] So you prefer local opportunities?
 266 TD:
 267 [00:20:18 - 00:20:35] I mean, definitely. At first, I need to obey the system of
 268 my company for the foreign suppliers. And I will create my option just to keep
 269 myself on the safer side so that there is no hampering in the production line.
 270 MB:
 271 [00:20:37 - 00:20:49] Okay. And regarding Just-in-Case management. How do you
 272 implement this and when do you implement this?
 273 TD:
 274 [00:20:51 - 00:20:56] Should I share this with my practical experience?
 275 MB:
 276 [00:20:56 - 00:21:21] Of course, please, because my question comes from the
 277 point of view that it is very minimal, The use of Just-in-Case in the garment
 278 sector, especially big brands or big retailers that produce very fast and have
 279 very fast turnover times. And that's where my question regarding Just-in-Case
 280 stems from.
 281 TD:
 282 [00:21:23 - 00:21:32] I didn't understand your question properly maybe.
 283 MB:
 284 [00:21:35 - 00:21:43] Just-in-Case is that you only produce when it is ordered
 285 from your company, for example.
 286 TD:
 287 [00:21:44 - 00:21:45] Right. Very true.
 288 MB:
 289 [00:21:47 - 00:22:18] Most people I talked to yet, and also most articles I read
 290 and papers, state that in the garment industry, especially when we focus on fast

291 fashion for example, that Just-in-Case is not profitable and Just-in-Time is the
292 only option. So I'm not sure how you use Just-in-Case in combination or as an
293 adaptation to Just-in-Time.

294 TD:
295 [00:22:19 - 00:22:55] This is due to the various kind of policy. Our country
296 couldn't produce the garments before receiving the purchase order from the
297 customer. I mean, they have to give the proper documents, what is the quantity,
298 what will be the size breakdowns and all. So through this, I try to write about
299 Just-in-Case management, because if this is the nature of a country's factory,
300 which you cannot change with Just-in-Time. So that's why actually I said to you
301 this example.

302 MB:
303 [00:22:55 - 00:23:03] Okay. So it's a different step where Just-in-Case and
304 Just-in-Time are used.

305 TD:
306 [00:23:03 - 00:23:10] Yeah. It's actually completely depending on the situation,
307 depending on the brands and most important, depending on the factory, with the
308 financial strength.

309 MB:
310 [00:23:11 - 00:23:28] So it's again a very unique case, because I experienced
311 the inputs or the insights that often it's based on the unique case of a
312 specific garment, a specific brand, a specific company.

313 TD:
314 [00:23:28 - 00:23:29] Yeah.

315 MB:
316 [00:23:29 - 00:23:40] If they choose the principle of Just-in-Time or
317 Just-in-Case or anything else. Would you agree on that? That it's rather unique
318 or individual?

319 TD:
320 [00:23:40 - 00:23:43] No, that is actually a quite unique one.

321 MB:
322 [00:23:44 - 00:24:04] Okay. Now that we have a better understanding about the
323 thing we're talking about, I think my other follow-up questions won't be
324 necessary.

325 TD:
326 [00:24:04 - 00:24:06] We can skip that.

327 MB:
328 [00:24:09 - 00:24:40] In your next statement regarding one of my questions, you
329 stated that in your view, there is a need for Just-in-Time to evolve and
330 incorporate elements of Just-in-Case and Just-in-Worst-Case approaches to better
331 navigate modern crises and ensure sustainable operations, considering the
332 inherent risk and uncertainties in global value chains. What kind of adaptations
333 would you advocate for or are you already using in your work?

334 TD:
335 [00:24:42 - 00:24:47] During my regular thing again, I'm actually taking the
336 importance of our daily life with outlook calendars and other software stuff
337 like that. Those things make your life easy. So definitely, if you want to do
338 something in time, one very pretty good example would be I have a nature to
339 forget things. So that's why when I have a meeting with you. I put the one
340 reminder in my mobile last night so that I don't forget. Honestly, for this
341 morning, I was super busy with my current work and I completely forgot that I
342 have one meeting with you. And I couldn't go through the last pages before
343 starting the meeting. When the alarm ringed in my mobile, then only I jumped to
344 your questions, and I studied all the things I have written and I came for the
345 interview because I just didn't want to have any delay. So these are the
346 practical work experiences. You can count from my side, I guess.

347 MB:
348 [00:25:52 - 00:26:05] Yes, this is understood. Regarding this statement of yours,
349 do you think there are no elements that Just-in-Time can take from Just-in-Case
350 or Just-in-Word-Case?

351 TD:
352 [00:26:04 - 00:26:08] No, no, it cannot.

353	MB:
354	[00:26:08 - 00:26:10] It's not practical, though.
355	TD:
356	[00:26:08 - 00:26:11] It's not practical. It's not practical.
357	MB:
358	[00:26:16 - 00:26:34] As I mentioned, I have already conducted a few interviews
359	and other interviewees often state that only diversification can improve
360	resilience without reducing profitability. What is your opinion on this
361	statement regarding the garment sector?
362	TD:
363	[00:26:35 - 00:28:13] Diversification especially is needed in Bangladesh right
364	now, to be very honest. Because currently Bangladesh is known only for some
365	specific products, not any special products, not any critical products
366	Bangladesh can do. People are thinking like that, but right now, it was today's
367	news that we have hundreds of LEED (Leadership in Energy and Environmental
368	Design) platinum factories. So being a LEED platinum factory, there are lots of
369	stages, there are lots of certifications needed. You need to follow the proper
370	maintenance, completely. You can make different types of garments nowadays. So
371	if we can have the product diversification, then definitely it will be an
372	improvement for us. And this will definitely generate the profits, in my view.
373	Because while you have the difficult product to maintain, on that case you SMV,
374	the standard minute value, it means the minutes you require to produce one piece
375	of garments, that thing will go high. And you know that in the economics there
376	is opportunity cost. That if we have those kinds of diversified products in our
377	country or in anywhere, the opportunity cost will be so much higher and people
378	will be benefited. So diversification is actually necessary and it will not
379	hamper the profitability.
380	MB:
381	[00:28:13 - 00:28:49] Okay. But diversification is pretty much the only measure
382	that can be taken to improve resilience of Just-in-Time. Other measures like
383	reshoring will be taken if it's improving other metrics like resilience or
384	profitability or sustainability, but just if it's necessary and really has a
385	benefit for the company. Right?
386	TD:
387	[00:28:49 - 00:28:52] Yeah, 100%, 100%.
388	MB:
389	[00:28:57 - 00:29:10] Another statement from other interviewees is that
390	companies prepare much more for times of uncertainty, instability, and crisis
391	like the examples we mentioned before. What is your opinion of this statement?
392	TD:
393	[00:29:10 - 00:29:24] So, from the COVID-19 and you know that there was one
394	incident happened in 2011 that there is one factory of ours named Rana Plaza. I
395	hope that you heard the story.
396	MB:
397	[00:29:24 - 00:29:25] I know the case, yes.
398	TD:
399	[00:29:27 - 00:30:53] So, after that the trust from the brands became less on
400	Bangladeshi factories, to be very honest. And in my company, it is also very
401	necessary to have the Higg Index. It's a must. Then, there is one certification,
402	which is RSC (RMG Sustainability Council). That is a must. Then, there are
403	Acutex. Those certifications is also a must nowadays. So, from the garment's
404	industry, we are already always feel uncertain because you see that nowadays for
405	the rare crisis issue, shipment is taking 21 more days to reach the garments to
406	the desired destination from Bangladesh. Now, customers are asking to advance
407	their products, to ship the goods early. So, if some factories cannot make the
408	shipments early, some goods may cancel. So, that is one uncertainty the
409	factories are currently having. And also, due to these kinds of issues, some
410	materials are also not coming to the factory on time. So, the production
411	efficiency is hampering. So, yes, in this way, the garment factories of our
412	country are in the uncertainty, instability and enterprises, it's very true.
413	MB:
414	[00:30:54 - 00:31:12] Okay. I have another follow-up for this. During my

415 research, I also stumbled upon some data about Bangladesh, and especially that
 416 Bangladesh in regards of crises is also prone to be hit by floods.

417 TD:
 418 [00:31:13 - 00:31:14] Yeah.

419 MB:
 420 [00:31:14 - 00:31:41] And also the papers I read stated that the factories or
 421 many industrial hubs are close to areas that are flooded when these big floods
 422 occur. How do you estimate the problem that floods will probably happen more
 423 frequently in the future due to climate change?

424 TD:
 425 [00:31:44 - 00:33:42] To be very honest, I cannot depend on my countries weather
 426 report properly because nowadays due to the ice which is melting from the
 427 Everest, our water level, I mean, every country's water level is going high, I
 428 guess. So nowadays currently in my country, if I can give you the example, in
 429 the daytime, start from 8 a.m. in the morning till 5 p.m., the temperature is
 430 sometimes 40 degrees and suddenly there is a rain. For the evening, the
 431 temperature suddenly came down to let's say 27, 28. So you can see the
 432 difference. And regarding the flood, sometimes that people can assume, and
 433 moreover, most importantly, if there is any climate types of issues are
 434 happening, or if we find that we can foresee that these kinds of issues can
 435 happen by seeing the condition of the weather and can see the condition of the
 436 sea level, we are actually writing to the customer quite upfront. We are raising
 437 the issues early, that there is news that from this day to this day, there could
 438 be heavy rain. Some workers couldn't be able to come to the factory. So might be
 439 there will be a delay for one week or two weeks or whatever depending on the
 440 situation. Those kinds of things we are doing, but to be honest, everything is
 441 depending on the nature. And it's quite difficult for me to give you a pure
 442 quotation that this will happen, this will not, that actually will be difficult
 443 for me to be very honest

444 MB:
 445 [00:33:43 - 00:33:59] Okay, so actually we are back to the statement we
 446 discussed before, it's again getting back to more preparation, more management
 447 regarding uncertainties, instabilities that can't be foreseen.

448 TD:
 449 [00:33:59- 00:33:59] Yeah.

450 MB:
 451 [00:34:00- 00:34:40] Okay. Thank you for that local input. Last but not least,
 452 you mentioned in your written answers that it's essential to strike a balance
 453 between lean practices and building resilience considering the unique
 454 characteristics and challenges of the garment industry. Do you think that the
 455 garment or that every garment value chain is unique and therefore needs to find
 456 its unique or individual balance between lean practices and building resilience
 457 or can some adaptations be implemented sector-wide to improve this balance?

458 TD:
 459 [00:34:41 - 00:36:08] I will prefer the second one, because lean production
 460 methods let's say the Kaizen or the Gemba or anything, which are already
 461 implemented and patented by the people, which you cannot change suddenly. So, I
 462 will look for the continuous improvement in this scenario, because some
 463 adaptations will definitely be there like this and we can slowly improve the
 464 balance. Like from one factory we cannot expect everything, but we can work on
 465 the continuous improvement, like from my company if it is like our requirement
 466 is we need to have Gemba walk in the production floor, to see that everything is
 467 on track, to see if there is any problem, because sometimes the people couldn't
 468 say the actual problem, especially it is happening in the manufacturing industry.
 469 There are many problems which cannot be directly stated to their bosses, but
 470 during one whole forum, they can actually state that. So, in my view, the lean
 471 manufacturing processes can be adapted in a separate way and balance will
 472 improve with the same way about those lean management things.

473 MB:
 474 [00:36:11 - 00:36:43] Do I understand correctly when I say that it's rather a
 475 combination? In some points, every company or every factory has its own unique
 476 system but also points to improve. There are also sector wide adaptations that

477 can improve the workings of everybody.
478 TD:
479 [00:36:43 - 00:36:44] Yeah, true.
480 MB:
481 [00:36:44 - 00:36:50] For example, the management tools you mentioned in the
482 beginning.
483 TD:
484 [00:36:50 - 00:37:41] Let me give you one example, let's say that from this
485 company. I am lucky that I visited almost 37 factories in our country of
486 different product variations. So after visiting a factory, we are giving them a
487 report that after visiting a factory we have found this and for my company I am
488 preparing a [incomprehensible] analysis that from this factory, what are their
489 strengths what is their weakness, what are their opportunities and what are the
490 threats. I am giving all the points to my boss and he is checking actually which
491 factory will be better suitable for us. So I think you can use this as an
492 example.
493 MB:
494 [00:37:42 - 00:38:03] Yeah, that's good insight to have. Okay, so far that were
495 my follow-up questions to your written answers. Thank you. Is there anything
496 additional you want to state or anything we left out you still want to mention?
497 TD:
498 [00:38:13 - 00:39:26] Actually, you know that people, not every people are
499 actually willing to follow the Just-in-Time strategy. There will be always some
500 people who will disrupt, who will try to create problems, but at the end of the
501 day we need to manage everything and as an example my company appointed me for
502 some particular brands, I am working as their eye. The thing I am saying to them
503 they are completely trusting just because they are not here. In another case,
504 now if I need to do complete a work within 90 days, if my bosses are there, I
505 could finish that work within 20 days because they will see the same thing,
506 which I am seeing and as they are not here they are asking me so many questions.
507 So, Just-in-Time strategy I am following in my whole life and I will follow
508 because at the end of the day this is the future to grow for any industry, not
509 only the government sector.
510 MB:
511 [00:39:27 - 00:40:02] Okay, that's a powerful ending statement. Thank you for
512 that. That's really helpful. Yeah, finally, thank you again for your inputs and
513 for taking your time. Thank you also for offering that I can reach out again to
514 you if some further questions come up in the next few weeks or months. One last
515 question. Can you recommend anybody else I could contact that would be
516 interested or that could be insightful for my research?
517 TD:
518 [00:40:04 - 00:40:37] I have actually one guy but his wife is actually having
519 the admission from Finland. So actually he is taking the preparation for that
520 but I just need to check with him. He is the same fellow mates of my company.
521 Okay so let me check with him and you please just give me a simple "Hi" to my
522 LinkedIn because as I told you that I have a nature to forget things. So it
523 would be helpful and I will understand that why you knocked me and I'll act
524 accordingly.
525 MB:
526 [00:40:37 - 00:40:58] Yeah, thank you for offering that and I will contact you
527 maybe in a week or two if you already had the chance to talk to your colleague.
528 It would be really great and helpful to have further people from the sector,
529 from the industry to talk to, to have a more diverse source of input.
530 TD:
531 [00:40:59 - 00:41:13] Yeah and hopefully there will be lots of differences
532 between the reply from others because I have said to you everything from my
533 practical experience not from anywhere else. I didn't borrow any story to share
534 with you.
535 MB:
536 [00:41:13 - 00:41:42] That's perfectly fine that's actually what I'm looking for
537 so that's the way it should be and thank you for being totally honest and giving
538 me all your insights especially regarding the examples. This really helps me to

539	show the difference between your side and the academic one I mentioned before to
540	show that there is a difference after all.
541	TD:
542	[00:41:42 - 00:41:50] Yeah okay so just after you stopped the recording then I
543	can share with some of my things if it is okay.
544	MB:
545	[00:41:49 - 00:41:58] Yeah, I will stop now give me a second please.

E7, 03.07.2024

1	MB:
2	[00:00:00 - 00:00:15] Thank you for taking your time and having this
3	interview with me and giving me the possibility to interview you. A brief
4	outline of the topic would be that I'm taking a closer look on global value of
5	chains. I'm not sure if you're familiar with that. It's probably supply chains
6	in an international development way. We look at global value chains as chains
7	that produce value in every step, which is actually a global supply chain, if
8	you put into a context of economy. My specific focus of my thesis is that I look
9	at global value chains and how the principle of just-in-time prevails during
10	times of modern crisis in the garment sector. We will come to the specifics
11	later. Before we start, I can assure you that data privacy is guaranteed and
12	that the data is safe on my end. First of, can you allow me that I use your name
13	within my thesis to verify your expertise?
14	GD:
15	[00:01:27 - 00:01:31] Only when you rank me on the number 1 position.
16	MB:
17	[00:01:31 - 00:01:39] I think I can do that, no worries. As part of the
18	introduction, I would ask you to introduce yourself, your position in the
19	garment sector or in your company and also your experience so far.
20	GD:
21	[00:01:54 - 00:08:42] Good, so my name is Gerhard Digruber, I'm coming from
22	Amstetten. I started at the University of Applied Science in Steyr,
23	International Logistics Management and after my studies I started to work for
24	Adidas in Herzogenaurach at headquarters. I started in the global operations
25	function, which by the way stayed my home for by now nearly 20 years. I'm right
26	now in Switzerland, we are having a trading company set up here and I'm heading
27	up global product supply. So I'm responsible for planning and buying roughly 1
28	billion products for Adidas a year. I have teams across the globe who are close
29	to the markets and who actually help translating a demand plan into a feasible
30	supply plan. So as I said in my area of responsibility I'm converting demand
31	into supply. My responsibility is the entire event management. So getting the
32	products to the markets when needed at the right volume, at the right time.
33	Quality would also matter. I'm responsible for inventory management globally. So
34	of course I'm also making sure that we are doing netting but we are also a very
35	seasonal business. So we have every season around 30,000 new articles. So you
36	can imagine that our forecast [incomprehensible] is pretty high. The good thing
37	is we also have not just key accounts, but we also have an e-comm business. We
38	have concept stores and we have factory outlets. So in the end it's about I
39	would say more the bigger planning topics when it comes to integrated business
40	planning or sales and operations planning that we need to consider demand,
41	supply, and inventory. The anti-availability management is also under me
42	including deployment meaning which deployment strategies or nodes we are using
43	in our network. We have roughly, I don't know, 60-70 DCs (distribution centers)
44	across the globe, a mix of own and partner DCs. And this is in the end I would
45	say where my responsibility stops. So as I said, the market is giving me input.
46	I'm then converting it into supply. I'm dealing with our sourcing organization
47	with the headquarter in Hong Kong and with the Asian offices in every country of
48	origin. And then I need to get the product together with all my logistics
49	partners here into the markets and when the goods are received in the DC, that's

50 more or less where my scope is ending. Our supply chain is a very traditional
 51 one. So it was always a very much wholesale driven one where, you know, you
 52 create a new range, you show it to the accounts, you collect pre-orders, then
 53 you have enough time to produce. In 60 days, in 90 days, however technical the
 54 product is. Then you transport it from Asia mainly. Again, can range from a week
 55 when it's China for China to 120 days when you need to get it to the US, and in
 56 the US to a key account and on the shelf of the key account's store. So that's a
 57 bit, you know, the lead times we're dealing with, and that's already giving you
 58 a bit of a feeling. The traditional wholesale supply chain in the garment
 59 industry is everything else than just in time.
 60 So, also it comes from original behaviors where we confirmed our sales orders on
 61 a monthly base. So, if you're a customer Intersport Winner in Vienna, you
 62 more or less, you have, you are not a super high key account. So, you have a
 63 software where you can access our range and you get a retail intro date provided
 64 and you can then say, okay, for winter 24 just now started in June or July, you
 65 can ask, you know, what you want and then we confirm you the month. So, yes, you
 66 get your product in June or yes you get your product in July. Behind the scenes,
 67 of course, we are date specific, but very much of our demand is really, you know,
 68 I would say, placed on the first of the month. It is a sales order or when it
 69 comes from a demand plan which is also normally dated for the first of the month
 70 and we are doing then, you know, an offset if you need to sell it on the first
 71 of the month but we do not know the customer yet, we get it 10 to 15 days
 72 earlier into our DCs and then, you know, you can go to your local sports dealer
 73 and order something then you get it 10 days later on time. So, that is a bit the
 74 wholesale, the traditional wholesale supply chain. In times of crisis, and it is
 75 going a bit into your direction, first of all, you know, we had with COVID many
 76 lockdowns and we were particularly impacted by the lockdown in Vietnam, where
 77 suddenly a big production network was more or less completely blocked and we
 78 did not get enough product. We were then overwhelmed, so we had to make choices,
 79 so we cut supply, we had to allocate available products, you know, according to
 80 our priorities. In the COVID times it was definitely the direct-to-consumer
 81 business because that is where we did the highest margin. So e-comm sales were
 82 starting to, you know, boost as well as everything that we could control in our
 83 own store network. And then the wholesalers, of course, they were also starting
 84 to ask for more products. And then we suddenly moved from not having enough
 85 product to everyone wants more product and we started to overbuy because
 86 everyone believed that, you know, I don't know if you try to get a mountain bike
 87 in Corona times, you didn't get something, correct?
 88 MB
 89 [00:08:43 - 00:08:44] Exactly.
 90 GD:
 91 [00:08:44 - 00:18:33] And everyone believed that suddenly Moritz will buy a
 92 mountain bike every year. No, that's not the case. You buy one and then you are
 93 done for the next five years. Same with running shoes. Everyone bought running
 94 shoes or outdoor equipment, but all the dealers, the accounts, believed that
 95 okay, suddenly, you know, the growth rates will continue like this. And also
 96 internally, we prepared from, but we just had, you know, depleted all of our
 97 inventories. So we went from no sales to no inventory to extremely high sales.
 98 What we then chased to buy. And then suddenly, you know, in 2022, everyone
 99 realized there is no more demand out there. You know, people had less money in
 100 their pockets. They had enough product, and we were suddenly sitting in the
 101 retailers on inventory. We were sitting in our own DCs on inventory. And we had
 102 to start cutting our buys again, meaning, if we had a demand of 100, we only
 103 bought 80, because we said we first need to clean our inventories. Why am I
 104 telling you all of this? Coming from this traditional wholesale supply chain
 105 with very long lead times, 150 days, 160 days in total from, I would say, order
 106 entry to product available in the DC, we moved to the need of being more
 107 responsive. So whenever, you know, we now had again the Red Sea crisis, where we
 108 relatively on a short notice realized, okay, we can't go through the Suez Canal
 109 anymore, we need to add 21 days to our transit lead times because we need to go
 110 through the Cape of Good Hope. So we did this quickly, but we also realized how
 111 volatile the environment right now is, and we started to become more creative.

112 Can we take a train from China or Vietnam to Germany? So we were looking for
 113 alternatives. And we were also pushing for more nearshoring. So taking a bit of
 114 a more risk-averse approach, and we really said, okay, we are not getting
 115 everything from Asia anymore, but we have apparel from Turkey, Jordan, Egypt for
 116 the markets, emerging markets, as well as Europe. Or we do North and Central
 117 America sourcing for the region there. Argentina is another good example
 118 Argentina was so protective that we did a lot of local sourcing. Now the reverse
 119 effect happened. Industry is opening up, we can get more product from across
 120 while Brazil is producing in Brazil for Brazil. So we have mixed situations, but
 121 in general we are trying to massively reduce our end-to-end lead times from
 122 demand to delivery to the consumer. And the best example is China, where we said
 123 okay, we have a naturally a very big sourcing network there. We have a franchise
 124 business, yes, with franchise partners, but we are more or less, I would say
 125 running to a certain extent the stores for them, and we are doing all of the
 126 planning, buying, and replenishment for them. And we have taken a very extreme
 127 approach to say okay, we will give you only 60 to 70 percent of your seasonal
 128 demand into the franchise stores, then we see, and we are still doing this in
 129 long lead time, then we see how successful a t-shirt is. We have material staged,
 130 we have advanced analytics reading the sales data, and then it gives us a
 131 decision, re-buy, yes or no, and from this point of re-buy, which normally takes
 132 two weeks of reading into consideration, until we have it replenished to the
 133 shelf, we are doing this in 35 days. So taking the 150, 160, 170 day example, on
 134 average, traditional wholesale supply chain worth we confirm a month. Going to
 135 China where we know, okay a product is successful, and we will run out of stock
 136 in the next three weeks, that's where we then can start replenishing quickly,
 137 and we are making sure that we have product always available that is selling
 138 without any discounts. So I would say, long story short, just-in-time, if you
 139 compare it with an automotive industry, I think this is different here. It's
 140 really about managing availability, ideally on-shelf availability. If we should
 141 no longer pump product into the market, also from a sustainability aspect by the
 142 way, which in the end is not needed. Yes, we do have a factory outlet business
 143 where we can still get rid of it, still at a good margin, but I think it's more
 144 important to really read sales, understand the demand overall. Have the supply
 145 chain ready to produce more of what it's selling, and don't produce the stuff
 146 that it's not selling. And whenever you're starting to run out of stock, that's
 147 where you need to be "just-in-time" to have more fresh product available. And
 148 then, as I said, you guarantee a continued sales. You don't need to discount
 149 things. That's what you find normally in every brand when you shop around. It's
 150 a very high discount strategy. Right now, at Adidas is hot again, we're not
 151 discounting. And that's where you, in the end, are profitable as a company. And
 152 as I said, you need to be equipped from a supply chain or in your explanation
 153 value chain perspective, that you have a materials led approach. So, you need to
 154 make sure that you have your cotton ready, that you have now your leather ready
 155 for all the *Sambas* that are currently hot out there. That you have this there,
 156 that you can design into these materials, that you have a production ideally
 157 nearshore. Not for everything. Because, you know, we are not doing, for example,
 158 footwear in Europe. Yes, we do some *Sambas* in Italy. We do some stuff in- even
 159 in Germany, some *Copa Mundial*, etc. But, you know, really the scale of footwear
 160 is coming from Asia. But you know, you ask for garments and garments can be
 161 produced everywhere. And that's where we also now have, I would say, 25% I would
 162 roughly guess, nearshored for Europe. And that's where we can then really start
 163 to, you know, use the shortened end-to-end lead time to our advantage. We really
 164 see what is hot in the market, what is required. We prepare ourselves for that
 165 with, you know, reserving capacities, stitching materials, having everything
 166 ready that when we see that there is a trend coming, or you know, a product is
 167 hot, we can do more of it. If it's not hot, we sit on the liabilities for the
 168 material, but ideally we can design it to the materials again or use it for a
 169 different purpose. And then I think the only last piece to your value chain, so
 170 that was everything around planning and production, I did come up with the train
 171 sample before, now as a solution to the Suez Canal challenge. We are now also
 172 starting because we always, you know, I think, like every other company, when we
 173 looked at transport, it was always about, you know, getting the best container

174 rates, but we never looked at how much days it requires to ship products from A
 175 to B. And you know, it always went through many consolidation routes, ect. It's
 176 like, if you take an intercity versus a local train. So same here, we are now
 177 going into our logistics approach much different. We say, okay, we still have
 178 our traditional sea freight, slow, very cost-competitive. This is what we
 179 normally need for the product, where we know six months in advance that an
 180 Intersport Winning in general needs a *Predator*, and we can produce it on a long
 181 lead time and we can ship it for the season start. No risk, everything, you know,
 182 fine. But then we do the same, maybe different, when we say, okay, if the
 183 *Predator* is selling well, we have more production secured and we can maybe
 184 switch to an expedited ship mode, which could be sea-air, which could be air or
 185 in the apparel or garment sector. If it comes from Turkey, I can take a truck.
 186 If it comes from Jordan, I can go through Italy and then truck it to Germany and,
 187 you know, it takes me 20 to 30 days versus maybe 75 days on a vessel from Asia.
 188 But now the challenge comes that you also need to plan these different ship
 189 modes. And then you need to nicely tie it together with your production plans,
 190 with your demand plans. And you know, when all of this is coming together, then
 191 you will make sure that there is not a moment where you are out of stock and
 192 there is also not a moment where you are overstocked. And that's what I would
 193 say is "just-in-time" for our needs from a pure product availability and sales
 194 perspective.
 195 MB:
 196 [00:18:34 - 00:18:50] Okay. Thank you for the very detailed first insights. Just
 197 to make a few things sure, I'm not sure if we understand each other. DCs are
 198 distribution centers?
 199 GD:
 200 [00:18:50 - 00:18:51] Yeah.
 201 MB:
 202 [00:18:51 - 00:19 :06] Okay. Perfect. And in the beginning when you talked about
 203 your responsibilities, you said you were responsible for some kind of management,
 204 inventory management and the other one, I didn't get it. What was it?
 205 GD:
 206 [00:19:07 - 00:19:10] So my team is called global product supply.
 207 MB:
 208 [00:19:10 - 00:19:11] Yes.
 209 GD:
 210 [00:19:11 - 00:19:35] So I turn a demand into a supply signal. So I do the
 211 entire planning and buying. And with that, I'm also owning, not just you know,
 212 someone tells me I need to produce a billion products, but they will also tell
 213 me by when they need it. So my responsibility is also to get the products into
 214 the markets on time. So availability management.
 215 MB:
 216 [00:19:34 - 00:19:38] Okay. That was the word the audio cut out for a second.
 217 GD:
 218 [00:19:39 - 00:19:45] So it's availability management. And you know, I can have
 219 the highest availability if I have twice as much stock as I need.
 220 MB:
 221 [00:19:45 - 00:19:46] Yes.
 222 GD:
 223 [00:19:46 - 00:20:57] And I think that's where availability and inventory
 224 management are coming together. If you find the equilibrium between, you know,
 225 the right amount of product to support your sales, that's where availability and
 226 inventory management are coming together. We also have products, you know,
 227 multi-seasonal products where we can take a bit of more risk and we buffer some
 228 stock in our DCs. So whenever you need, you know, normally the football teams
 229 are waking up a week before the season starts and they need a new training suit
 230 or whatever. So some of these products we always have available. So here we are
 231 taking a different inventory management approach to it. So that's a bit the
 232 explanation behind. And I think that I hope that you were not asking for
 233 just-in-time from a production management perspective because for me, as I said,
 234 it's really about how I bring the product into the market where we sell them,
 235 where there is either an e-commerce customer or you go to another store or you

236 go to Intersport Winner who preorders products from Adidas and you get it
 237 through them. So my responsibility is that the demand is satisfied
 238 “just-in-time”.

239 MB:

240 [00:20:56 - 00:21:46] Yes, I understand. To be honest, my point of view or my
 241 starting point is a bit of both regarding just-in-time because you are also
 242 affected by just-in-time if it’s not working. Because also getting the product
 243 to the shelves can be hindered when just-in-time is not possible. For instance,
 244 when you said like the Suez Canal or the channel is blocked or whatever. One
 245 question, how would you characterize the current state of global value chains in
 246 my case in the garment sector right now which use the just-in-time?

247 GD:

248 [00:21:46 - 00:30:03] That’s a bit of definition topic. And sorry, my university
 249 times are 20 years ago, when we talked about just-in-time, it was just-in-time,
 250 for example, in Steyr for BMW engine production. So yes, you had to have the
 251 components just-in-time to finish the final product, the engine, to then put it
 252 in a car and make sure that the car runs off the production line. Just-in-time
 253 in the garment industry, and that’s where I’m struggling maybe a bit with your
 254 request, for me it’s about – you know, it’s not different components that you
 255 need to put together. It’s about an entire value chain and the value chain
 256 starts with a forecast, which can then potentially be used to stage materials,
 257 which will be used to agree on production capacities, which will be used to
 258 agree on transport capacities, because it’s great that I have a produce, but I
 259 can’t ship it because I have no vessel. So, all of these things are coming
 260 together, including do I have a distribution centre that has enough storage
 261 capacity to get the products, then in the end, through the DC to their final
 262 channel or customer. So, all of these things are coming together. And for me,
 263 that’s what I said in the beginning, the concept of trust in time in the garment
 264 industry, I don’t know if this is now theoretically correct or not, but for me
 265 it’s, you know, do we have product available on shelf, the final product. If
 266 it’s this T-shirt with different trims or what, you know, that’s the
 267 responsibility because we have outsourced production. So we, you know, we create
 268 the product, we hand it over to a manufacturer and they are doing it against the
 269 dates that we give them. So we are tracking in order to have a product sold on
 270 July 1st at Intersport Winner, I maybe need to achieve what we call an
 271 ex-factory date end of March from China. Then it goes on a vessel, it reaches
 272 the DC in the north of Germany and then it gets shipped through the DC to the
 273 Intersport hub or the DC or maybe directly. And you know for me, just-in-time is
 274 that when you then go to Intersport Winner and you want to get your Predator,
 275 that it’s on the shelf and you get it. So I think from this perspective we are
 276 definitely much better than we have been in the past. You got the example where
 277 we promised their account a month when they get the product, now we are
 278 date-specific, but we also just now have upgraded our availability KPI, so on
 279 time availability, because we were always, in our industry it is allowed that a
 280 customer calls and says I want the product tomorrow. It’s impossible, but it’s
 281 impossible. We have also very often unrealistic demand, as we call it, and we
 282 have now sharpened – and due to the fact that we had a lot of this unrealistic
 283 demand we always said, okay, it’s enough if we have the product at the customer
 284 within 15 days. That was the old thinking. By now it’s very much sharpened, so
 285 when I now look at our own retail stores, having the product a day or two too
 286 late, before the weekend sales are starting it can be a disaster. So if you need
 287 the product on Friday to refresh your shelf, and you only get it down on Monday,
 288 then you miss the weekend sale. So from this perspective it’s very crucial that
 289 you be on time. But it’s also not good if you get the product there three days
 290 too early because you don’t have that much storage space in a small other store
 291 in Vienna. So I think the concept of trust in time from a store perspective is
 292 the same as from an e-com customer. So when you order something online and you
 293 get a promise that you get it delivered in three days, after five days you get
 294 nervous. So I would say also here, specifically for this direct-to-consumer
 295 business, it very much goes into, I would say, a delivery promise in a
 296 day-specific manner. For wholesale accounts, we still have a bit of more buffer
 297 because they also then need to put the product and put it in their stores in

298 order to sell it. And normally, I would say, with bigger key accounts, you know,
 299 some of the trade terms are saying, you know, after eight or eleven days delay,
 300 they are allowed to cancel orders. So, I would say that's where we maybe have a
 301 week grace period. But also differently, if we have an agreement, you know, we
 302 are doing a Predator collaboration with Intersport and we have a big, you know,
 303 advertisement planed, you know, you get your flyer at home, etc., and then we
 304 wouldn't be there. It's a disaster. So, we also have, you know, certain
 305 campaigns or launches where we also have to be day-specific. And as I said,
 306 while the final delivery is then very much just-in-time, the entire value chain
 307 to get the product at this date into the consumer's or customer's hands takes
 308 quite a lot of effort and also some time. As I said, we are producing, I think,
 309 the fastest is maybe two weeks or 21 days, up until 180 days, if it's an outdoor
 310 product with Gore-Tex or whatever. So, we have pretty different, you know, lead
 311 times for production. I did tell you that also from a transport perspective, we
 312 have multiple options available. But also, you know, when you look at Germany,
 313 it makes a difference if you need to ship it to the north of Germany or
 314 somewhere in the South, which is, you know, ten times further away from the D.C.
 315 So, all of this, I would say, planning component and to end lead time is very
 316 challenging and to your thesis in times of crisis moments, very hard to manage.
 317 And I think what we need overall, and that's what I said is we need to decide
 318 what is our long lead time, you know, we have sales orders early enough, we have
 319 enough buffer in our value chain to get the product initially into the market
 320 versus a more responsive supply chain, where we then say, okay, good, if
 321 something goes well, or we have now maybe another trend that we don't want to
 322 miss, how quickly can we get product into the market again. And then it's not
 323 just-in- time, but it's as quick as possible. And as profitable as possible, we
 324 are not flying everything. If I can take a train and it takes me 30 days from
 325 Vietnam, versus I fly something, yes, the flight itself just takes a couple of
 326 hours, but getting product to the to the airport of origin and then again
 327 picking it up from the airport or destination and getting it to the DC can in
 328 total also take up to 15 days, so I think that's where you then need to make
 329 certain trade-offs when it comes to profitability, but I would say just-in-time
 330 for initial fills, for launches. Now, another good example is Eurocup'24, that's
 331 where you can't come two months late because then the tournament is over and
 332 you're not selling anything anymore. So, that's just-in-time, to as quick as
 333 possible replenishment where you have successful articles. And in order to
 334 achieve that, a much more stronger push for nearshoring, for better demand
 335 accuracy, as well as then more I would say responsive transport and logistics
 336 solutions.
 337 MB:
 338 [00:30:04 - 00:31:03] Okay, do I understand correct that you are already trying
 339 to risk-proof your chains in order to make it more resilient and be as fast as
 340 possible if a crisis occurs and you still have to be productive? For instance,
 341 when the Suez channel is once again not available, you switch production for
 342 Europe to Turkey instead. You also mentioned that the lead times are getting
 343 shorter and shorter also for you guys, not for all products but for products
 344 where you want to be pretty fast. Where does this pressure come from to be
 345 faster, is it mainly the consumer is it also other competitors like Ultra Fast
 346 Fashion or is there even another factor I'm missing?
 347 GD:
 348 [00:31:03 - 00:36:32]
 349 You know Fast Fashion was always a topic but we can't compare ourselves with a
 350 vertical company like Zara or what is it, Shein and whatever, yeah so I think
 351 they have a completely different model you know we have very high social and
 352 environmental affairs standards. We take care of sustainability to a certain
 353 extent so I think we can't we can't just you know fly everything to Europe and
 354 you know we burn the returns so we are not doing this so there is definitely but
 355 still you can always learn from everyone. So the way how that's what I said
 356 initially how products are being created, how they are sharing the same
 357 materials for different products, how they also empower the suppliers to do
 358 product creation for us so you know right now all the products or majority of it
 359 are designed in the headquarters in Germany. Also here the trend goes more and

360 more okay again we get the specifications to the manufacturer and they tell us
 361 how to make it in the most simple way that we can produce it also faster that we
 362 can automate more so I would say general you competitors or you know brands that
 363 are completely doing it differently, the consumer trends because you know when
 364 you want something you're no longer waiting for a six month you want it tomorrow.
 365 So the question is you know how can we really read trends so a best example is
 366 you know everything was that around *Samba, Terry, Gazelle* or *Handball Spezial*
 367 that's where we are reading you know where we're using Google Trends, where we
 368 read analytics you know, how are things popping up in social media then
 369 translated into a demand signal we are staging materials as I said materials, we
 370 are taking risk to really you know get supply pumping and then we are fast you
 371 know even before you know that there is a trend or you know that you want
 372 something that we already more or less predicted and be ready when you can come
 373 to the store you want something. There is always a bit of scarcity of product so
 374 it must not be that we have everything available all the time it can also be
 375 good if you know people are lining up and they are really desperate to get some
 376 product. So that's maybe also something important you don't need to always have
 377 everything but generally speaking when a product is hot ideally you want to sell
 378 more of it and that's what I said the consumer is demanding it and if we manage
 379 to get now this pink DFB jersey back into store we also know that we will sell
 380 it at full price so I would say it's also a matter of a profitable value chain
 381 that we make money by getting product quickly back on shelf when it's hot and as
 382 I said from more from a crisis management perspective yes the more we diverse
 383 our production the more we also look at things above market you know you can
 384 have a crisis moment in the production area what I said before Vietnam lockdown
 385 but if you remember when COVID broke out in 2020 first market was China where
 386 from one day to another we didn't sell anything anymore because all the stores
 387 were locked so what we did then is of course you know in other markets COVID was
 388 not there so we more or less redirected the supply to other markets so that's
 389 you know these are some of the tactics where if you put things about market you
 390 can also better supply you know there's always one market who sells more than
 391 another market was maybe struggling. If it comes more to the supply chain if you
 392 have as I said no production Vietnam from one day to another that's where you
 393 need to reallocate products to other sources and that's the good thing when you
 394 have multiple sources set up. You can also use them but of course it comes at a
 395 price. If you can also have a network available when it comes to transport and
 396 logistics in this example, okay we are not doing through Suez canal but we
 397 reroute immediately through Cape of Good Hope yes it takes two weeks longer or
 398 three but we immediately you know consider this in our total lead time in our
 399 planning. Yes we can add us you know a train option to it and with that we made
 400 sure that we have you know a Euro cup made feasible. I would say it's a mix of
 401 competitor consumer expectations these days I'm more diverse supply chains in
 402 general and then you have multiple options and the thing is also as a supply
 403 chain then more of these situations you have the more resilient you become
 404 because you learn so much that you always have something available when the next
 405 surprise kicks in. I would I would never be that we are set up for everything
 406 that is yet to come but we are by now pretty good in managing a crisis moments
 407 because we had enough.
 408 MB:
 409 [00:36:34 - 00:37:03] Do I understand correctly that you learn from the last I
 410 call it modern crisis because they happen during the last 15 years like you
 411 mentioned COVID. I also count in a bit the Russian Ukraine war, I'm not sure how
 412 much you're affected by that, but did these events showed you that you have to
 413 invest much more into risk management?
 414 GD:
 415 [00:37:03 - 00:37:12] I mean in in Adidas we have a corporate risk management. I
 416 think
 417 what you are more referring to is I would call it scenario planning.
 418 MB:
 419 [00:37:13 - 00:37:13] Yes.
 420 GD:
 421 [00:37:13 - 00:38:36] What if and also as I said having enough flexibility in

422 your supply chain to respond to a crisis moment. Still if I don't know the next
423 virus is coming and you know all of our Asian sourcing countries are stopped
424 from one day to another you know that's not what we have prepared for, but I
425 would say to a certain extent that's what it says you know from an eastern
426 perspective if you have 20 to 30 percent you know close to your market and
427 that's what I mean apparel is always the easier or the garment division is
428 always the easier one to produce you can definitely you know take certain risk
429 away from Asia as an example or when you know you have to go through the Suez
430 Canal maybe it's wise what I said to produce in Turkey and truck it up. Right
431 now Turkey is also not a good idea because the inflation is so high so these are
432 other crisis moments, where we are by now as I said becoming more flexible and
433 we are not we are not linked to one setup in our supply chain anymore but we
434 have I would see different pillars which we can put together again to get to the
435 optimal outcome, given you know the disruptions.

436 MB:
437 [00:38:40 - 00:38:47] Okay can you put the Ukrainian-Russian conflict for me
438 into a perspective of your company how it affects you or it doesn't?

439 GD:
440 [00:38:48 - 00:40:39] We had in Russia I think in peak times up to a thousand
441 stores so it was a big business for us but more I would say on the commercial or
442 sale side but we had no production there or whatever so purely from a supply
443 chain perspective for us the message was okay we will stop supplying products to
444 Russia. And then the question was: okay who is taking it because we already
445 bought it. So this is what I meant before you know if you don't have a market
446 like Europe we have to redirect the product to Europe or worst-case, we need to
447 write it off. So but generally speaking that's what I meant when you have if you
448 would be you know operating or selling in one market only and then you have you
449 know something like this then you have a problem but that's what I said when we
450 look and you can check all of our annual reports we always have you know we are
451 very globally present on the sales side and I can tell you most of the time you
452 have you know the majority of markets are doing well and then you have one
453 problem child and this is where you then need to help together and say, okay
454 what are we doing with it. Best example what I mentioned before in China. When
455 they had the lockdown, they had too much inventory because nothing was sold
456 anymore, all the stores were shut down. We then made sure that instead of buying
457 more for North America. We took the stock from China and shifted it to the US.
458 It comes at the cost but it's the right thing to do from perspective. Ideally we
459 can already reroute it when the stuff is still in production or even before that
460 but you know worst case is it's in the market and we need to get it out.

461 MB:
462 [00:40:41 - 00:40:41] Okay.

463 GD:
464 [00:40:41 - 00:41:18] The same has happened for Russia, where then other markets
465 got you know again Russia I don't know what maybe from a volume perspective a
466 low single-digit number so it was not too much to absorb. If Europe would stop
467 from one day to another to sell Adidas products, which is I don't know 40% of
468 the global share, then it would be a massive problem because then not you know
469 many markets or all of them together can absorb a volume like this.

470 MB:
471 [00:41:19 - 00:42:16] Yeah, this is totally understood. For me I'm researching
472 about just-in-time to find out if the resilience of just-in-time is stable
473 enough or in a state that is predictable enough for companies or for but a
474 change itself to keep it as a principle. You already mentioned that you try to
475 help out the resilience of just-in-time or to boost it by implementing more
476 diversification and also by nearshoring, which... Is this also combined with
477 shortening of chains?

478 GD:
479 [00:42:16 - 00:42:24] Yeah that's what I said before. So ideally you get it
480 closer to where you're selling the product.

481 MB:
482 [00:42:24 - 00:42:24] Exactly.

483 GD:

484 [00:42:25 - 00:42:47] Your entire value chain. You shorten your transport. You
485 ship it directly to consumer. So yes you take out days wherever you can and I
486 think to be honest whenever I listen to you I have a problem understanding what
487 you mean with just-in-time in the garment sector. What is for you just-in-time?
488 Give me the definition.

489 MB:
490 [00:42:54 - 00:43:25] Just-in-time is for me that the product arrives right in
491 the
492 moment where it is supposed to arrive. I think you already give a great example
493 a great example with your wholesalers or your stores that it has to be there on
494 date. Also when you gave insights to your store system where they can really
495 pre-order per date that was really insightful and that's mostly what I'm talking
496 about. I'm also having a production sides in mind but it's not your expertise as
497 I understood yes.

498 GD:
499 [00:43:29 - 00:44:10] So for me just-in-time is more production our concepts to
500 be honest. Again maybe it has changed in the last 20 years what you are talking
501 about is what we call or in the entire industry is on time in full. So if you as
502 a e-comm consumer order something or we need to you know have an initial feel
503 for our concept source or we need to deliver I don't know 50,000 Predictors to
504 Intersports main distribution center and we get a date and the volume for an
505 article including a size curve and we deliver it at the day we confirmed it.
506 That's for us on time in full.

507 MB:
508 [00:44:10 - 00:44:49] Okay understood. Do you have... You were talking about
509 specific products that are a trend right now and they're hot and they and you
510 have to produce faster because you want I don't want to miss the trend and other
511 products that are like classic products that are always on shelf. Do you also
512 have products that you produce just in case so when they're just ordered except
513 like individualization things where like order a jersey and you put your name
514 your own name on it.

515 GD:
516 [00:44:52 - 00:45:13] So we have what we call SMU's or Special Make-Ups. So if
517 you know our standard Samba right now we maybe have a collaboration with Zalando,
518 who you know is choosing the you know different colors and whatever type of
519 thing and we have an agreed volume and then we just produce it for them.

520 MB:
521 [00:45:14 - 00:45:15] Okay.

522 GD:
523 [00:45:16 - 00:45:49] If you want a DFB jersey with Toni Kross and number 8 at
524 the back, you can go online. You can order it, you can put the name a number on
525 and you get a delivery promise in three days and hopefully you have it at your
526 doorstep in three days. So yes we do both, we do customization for individual
527 items but also as a scale for example for key accounts. So both is existing and
528 the concept of delivering on time is valid for both.

529 MB:
530 [00:45:50 - 00:46:02] Since you are also or we are talking about inventories
531 quite a lot. The goal is always to keep inventory as low as possible since it
532 costs a lot of money.

533 GD:
534 [00:46:03 - 00:46:04] Not true.

535 MB:
536 [00:46:05 - 00:46:06] for you not?

537 GD:
538 [00:46:06 - 00:46:07] No.

539 MB:
540 [00:46:08 - 00:46:09] Why not?

541 GD:
542 [00:46:09 - 00:46:11] You have good and bad inventory.

543 MB:
544 [00:46:12 - 00:46:15] The one that you're not selling is bad inventory probably,
545 right?

546 GD:
547 [00:46:015 - 00:47:23] And that's what we can want to keep as low as possible,
548 but you know... Do you know what do you buy at Interspot tomorrow? No, you
549 normally walk in, maybe you know to go for a running shoe that's why you go to
550 Interspot because you get all of the brands and you get a bit of a service there
551 to tell you which ones is the best for you. So how would others know that you
552 exactly buy our running shoe? So the forecast accuracy or the demand plan
553 accuracy is so low that for some of the items either the classics,
554 multi-seasonal or the ones where you, okay yes football we are leading people
555 will come and get it and we don't want to be out of stock and we know that we
556 have a collaboration with a Jude Bellingham and with the Euro Cup, it will give
557 it another boost I don't know. So this is where we want to have more stock
558 because we want to allow and sales upside. Exactly for the cases where you don't
559 even know that you need it maybe.

560 MB:
561 [00:47:24 - 00:47:27] Yes. This is...

562 GD:
563 [00:47:27 - 00:48:12] Sorry, either you or the accounts. You know every summer
564 we realize we need more socks. Yeah okay good, because you know Decathlon is
565 waking up, they need more stocks, but you know we also have a program in place
566 where we plan the socks and we put the buffer in. You can imagine when Decathlon
567 comes and says okay I haven't planned it but I need 20.000 more. Yeah okay we
568 have it in our D.C. you get it the day after tomorrow. That's in the end you
569 know can positively impact the business through good inventory. For the stock
570 you know now all the Yeezy products, which we are not selling anymore. This is
571 bad stock because we don't know what to do with it and it cost us money and we
572 need to write it off.

573 MB:
574 [00:48:13 - 00:48:19] Okay, so it is really a lot of products specific?

575 GD:
576 [00:48:19 - 00:48:25] Yeah. And you know the topic of supply chain segmentation?

577 MB:
578 [00:48:26 - 00:48:27] Partially.

579 GD:
580 [00:48:27 - 00:49:52] Yeah so we are not running one supply chain for all of our
581 products but we have very trendy products, very seasonal products, on the other
582 side we have our basics and evergreen products. We can have it once a season.
583 When you go to Deichmann you get you know all the take-down versions, which we
584 you know they are not having a high profit margin, so we need to keep them very
585 low cost in production in transport in whatever but on the flip side we get the
586 stable demand signal uh you know six months ahead. Okay good, that is one very
587 stable traditional supply chain segment where we don't need to have a lot of due
588 diligence. And then you have the other extreme way where you say, okay we don't
589 know how this article is performing but we believe in it we prepare everything
590 for an upside. And when we see that there's a trend that's undegenerated, we can
591 quickly replenish our products and with that also sell more. So I would say
592 maybe look up the topic of supply chain segmentation. I think that's very much
593 uh common practice in the industry that we have different let's say value chains
594 for different uh channels, products. It's very much product driven let's be
595 honest about this, where we deliver a different set of service for each
596 combination.

597 MB:
598 [00:49:53 - 00:50:38] Yeah that makes sense. I have one more question or I
599 wanted to come back to something you mentioned before. You mentioned google
600 analytics so the experience as I got from the interviews I had before, everybody
601 says okay data is key nowadays and it will become more important every day since
602 everything is based on knowing the next trends first. First off how do you
603 experience this new data-driven everyday work and are you also
604 considering or already using AI for this?

605 GD:
606 [00:50:34 - 00:51:53] So I think the times are over that we are doing demand
607 planning based on gut feel. So yes when you look at what I had the example

608 before with our football team products. You know 20 years ago we had one person
609 who was planning this every season and he knew exactly, okay we will sell again
610 what we had last year plus 10 or whatever. So there was not a lot of diligence
611 in there but more history and experience based. By now you know with the
612 multitude of as I said consumers, our own stores, key accounts, field accounts
613 and all of you know the social media on top, we are using advanced analytics to
614 read sales data, to read social media, to translate it into a demand signal in
615 the end. So maybe we had planned 100 but through additional insights we realized,
616 no it's not 100, it's 150 or it's nothing. So we use advanced analytics to
617 improve our forecast accuracy.

618 MB:
619 [00:51:54 - 00:51:57] Pretty interesting actually.

620 GD:
621 [00:52:02 - 00:54:41] Yeah, we yeah we are using it also, we are using advanced
622 analytics also in different sectors of the value chain. So for example when I do
623 planning and purchasing, I'm not interested in, you know, what I said the social
624 media read, but I'm interested in you know how are all my markets planning to
625 sell an article. I then use advanced analytics to say okay, what did we do in the
626 previous season? What is the product type? How many cancellations did we have
627 for this type of product before? Which color is it? So many different
628 combinations which a human could not put together anymore and the algorithm now
629 tells us, okay this is a safe product to pre-produce. So we're using this for
630 maybe, I don't know, up to 10 percent of our production, where we have not even
631 talked to a customer yet and we're already producing it. So we're doing some
632 stuff like this. I am applying personally advanced sorry AI in other areas. For
633 example just the recent one, we have so-called, you know from a training
634 perspective, desktop procedures. So how is a person executing their job. You
635 normally get a training manual 80 pages, but we're also using process
636 documentation in Signavio and I only recently tried it myself. I said okay take
637 the PDF of 88 pages, which explains how you do a process in your day job and
638 I've used AI to translate it into a process description ARIS level 5 ready to be
639 uploaded in in Signavio. So stuff like this we're using more and more for
640 project management, for as I said in this case process documentation, for
641 creating Power Points, stuff like internal processes. What we have not explored
642 yet is directly in the planning system. So I think also in the future we are now
643 implementing SAP IBP and as for S/4HANA and I'm pretty sure that other companies
644 are maybe you know already ahead and they let the system you know not just plan
645 but also learn and plan again. So this is something we have not explored yet. We
646 are not at this level yet.

647 MB:
648 [00:54:42 - 00:55:15] Yeah I'm just asking, because I also have a company, I
649 really want to interview somebody from them. They're not from the garment sector
650 but they have a company that analyzes supply chains and does the calculations on
651 how probable it is that there will be a risk coming up, for instance a political
652 conflict or whatever, but I was just curious if you already have something like
653 this in-house but I don't think so.

654 GD:
655 [00:55:16 - 00:55:52] I think we that's what I said, we have a corporate risk
656 management, but as I said it's more board level conversation as well. You know
657 we are doing, we are doing currency hatching, we are preparing for political
658 situations what I said with you in Argentina. You know we have we have plans
659 ready for all of this what we can somehow predict. If something really comes as
660 a surprise, like a Houthi attack in the red sea, this is something where yeah
661 we were not prepared for it, but we knew how to deal with it from previous
662 crisis.

663 MB:
664 [00:55:53 - 00:56:09] Yeah and nobody knows it in advance so we have the
665 experiences we already made and we can learn from that at least. Okay good,
666 thank you so far actually that were all my questions uh it was really insightful.

667 GD:
668 [00:56:10 - 00:56:12] I think it was the best interview you had so far.

669 MB:

670 [00:56:13 - 00:56:15] That's the reason why I have to put your number one,
671 right?
672 GD:
673 [00:56:15 - 00:56:17] Exactly, exactly, that's all I hope.
674 MB:
675 [00:56:17 - 00:56:18] Of course I will.
676 GD:
677 [00:56:18 - 00:56:22] Good and it was one hour, not just half an hour. Moritz
678 you are a bad planner.
679 MB:
680 [00:56:22 - 00:56:33] Sorry, I got a bit too much drawn in into your insights.
681 Last but not least anything additional you want to share with me?
682 GD:
683 [00:56:33 - 00:56:35] No, I want to call it a day.
684 MB:
685 [00:56:35 - 00:56:48] Okay perfect. Thank you again for your time. I have just
686 one more question. Can you recommend somebody? Somebody else I could interview
687 for my thesis?
688 GD:
689 [00:56:53 - 00:58:10] I think for Adidas you are covered. Uh I don't want like,
690 nothing that is coming to my mind right now. I think you said it yourself that
691 you have sent out hundreds of requests. I'm pretty sure you know the
692 *Rücklaufquote* will go up. Just be, I don't know uh you know think about the
693 storytelling, think about how you approach them, maybe you can come up you know,
694 if no one is coming back to you can either *explicit* and moan about it or you
695 can change your approach. Sell them something. You know give them something.
696 Make it more interesting you know how you approach them. As I said I wasn't
697 absolutely clear on what you want with just-in-time in the garment sector and
698 I'm like okay, I don't know what but you know just because you got somehow to my
699 colleague he then said if you're Austrian I should maybe talk to you. That's why
700 I signed up for this. But I would say think about how you can make your thesis
701 more interesting for companies to participate and what they get in return. One
702 hint: you can now say okay, I have you know some of the big players in the
703 industry, like Adidas for example. So maybe this helps you a bit.
704 MB:
705 [00:58:11 - 00:58:17] Okay thank you for the feedback. I will incorporate it and
706 try to make my request a bit more engaging.
707 GD:
708 [00:58:17 - 00:58:20] Yeah use AI to write a pitch for you.
709 MB:
710 [00:58:20 - 00:58:32] Yeah. Okay perfect, just in case anybody comes to your
711 head I could interview please contact me on LinkedIn and I would be very
712 grateful.
713 GD:
714 [00:58:33 - 00:58:37] Good. So when I hear from you again?
715 MB:
716 [00:58:38 - 00:58:46] Thank you very much. I'm not sure. I hope in September
717 when my thesis is finished and I can send you the final paper.
718 GD:
719 [00:58:47 - 00:58:51] Super, you have my email address.
720 MB:
721 [00:58:52 - 00:58:54] I have email address of Martina.
722 GD:
723 [00:58:54 - 00:58:57] Okay good then I'll send you mine.
724 MB:
725 [00:58:57 - 00:58:58] Okay perfect.
726 GD:
727 [00:58:58 - 00:59:01] Super Moritz, alles Gute.
728 MB:
729 [00:59:01 - 00:59:04] Danke. Danke für die Zeit und schönen Tag noch.
730 GD:
731 [00:59:04 - 00:59:05] Wünsch ich dir auch. Tschau.

732	MB:
733	[00:59:06 - 00:59:07] Servus.