Global Supply Chain Report

Summary

Electric Vehicle

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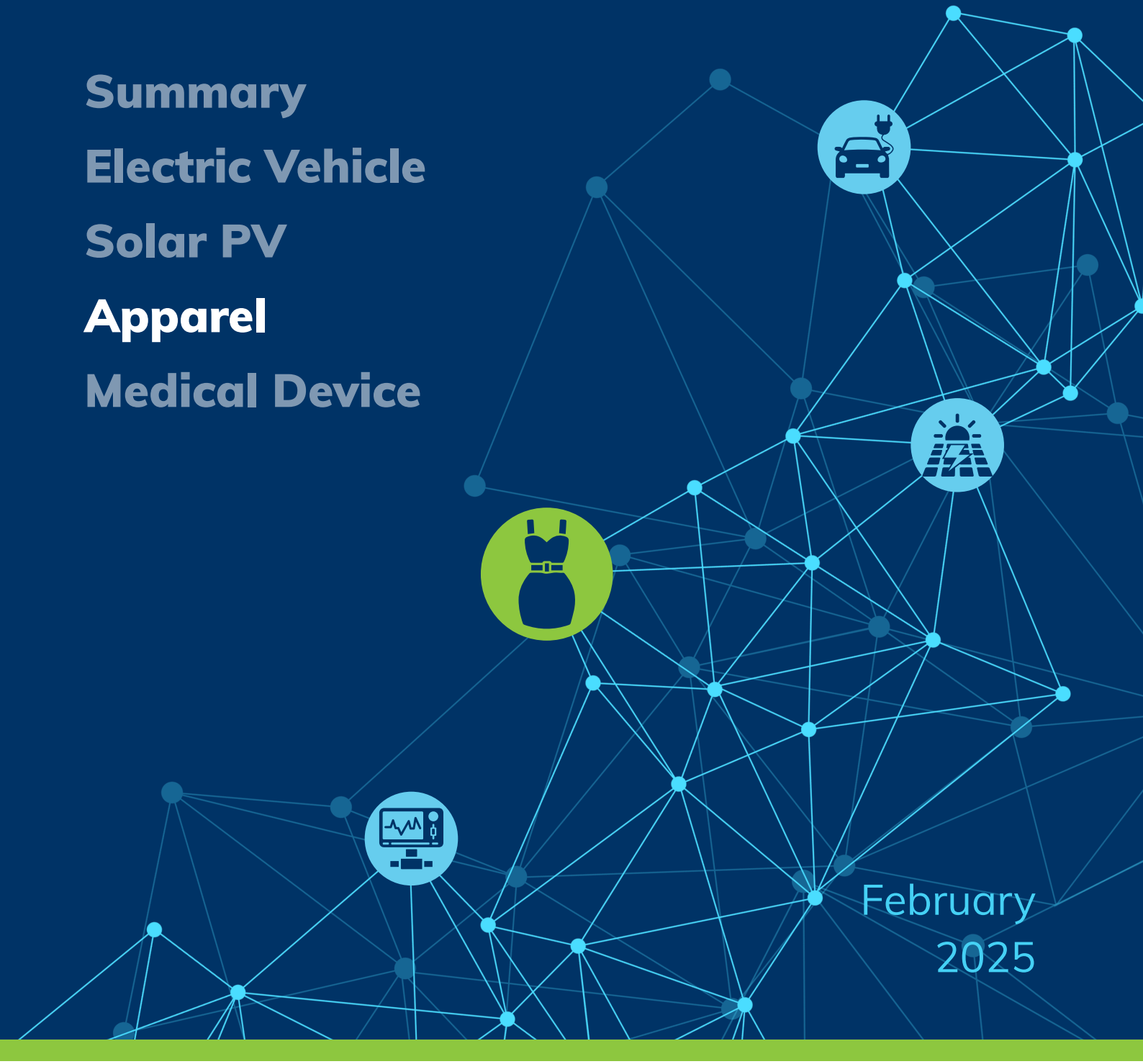

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HKUST LI & FUNG
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Apparel

Beyond Borders: The Global Landscape of Apparel Supply Chains and China's Evolving Role

Executive Summary

Apparel is an essential good and a key value-creating sector for the world's economy. The apparel market size is estimated at US$1.7 trillion in 2023 and is expected to reach US$2.3 trillion by 2030. Apparel supply chains are among the most globalized ones, starting with raw material producers, moving to ginners, spinners, weavers, dyers, designers, and garment manufacturers, before reaching customers through wholesalers, retailers, and e-commerce businesses. It is estimated that approximately 430 million workers are employed in fashion, clothing, and textile production.

This study examines the current status of the global apparel supply chain and projects its future trends. We identify the locations of major players, including apparel retailers, apparel suppliers, textile suppliers, raw textile material suppliers, and apparel machinery suppliers. We explore key factors affecting the future development of the chain and project the dominant trends in the coming years.

We found that the US and China are the world's two largest apparel consumers at present, while the US and the EU are the world's two largest apparel importers. Asia dominates clothing and textile exports, with China, Bangladesh, Vietnam, Turkey, and India among the top 10 global clothing exporters, collectively accounting for over half of the world's clothing exports. Seven Asian economies—the Chinese mainland, India, Turkey, Vietnam, Pakistan, Taiwan, and South Korea—are among the top ten textile exporters, contributing to over two-thirds of the world's textile exports. Raw textile material suppliers are widely distributed across North America, Oceania, Asia, South America, and Europe. The US is the largest raw textile material exporter, followed by Australia. Recently, South America has become more prominent, with Brazil emerging as a top ten raw textile material supplier. In the high-tech textile machinery segment, China is the leading supplier, accounting for over 30% of global exports. Other major suppliers include Germany, Japan, Italy, and South Korea.

The above analysis shows that China is the dominant force in the current global apparel supply chain, leading in three of its four key segments. It is the world's top exporter of clothing, textiles, and textile machinery, and ranks third in exporting raw textile materials, following the US and Australia. Additionally, China is a significant apparel consumer, although it is largely self-sufficient due to its extensive production capacity.

The apparel supply chain was traditionally cost-driven. While production costs remain a key factor in choosing manufacturing bases, recent years have seen mounting challenges to the global apparel supply chain due to regional conflicts, global trade frictions, material price volatility, rapidly shifting consumer values and preferences, fast technological advancements, and constant regulatory changes. Our report highlights several additional forces significantly impacting apparel supply chains: recurring pandemics prioritise "just in case" supply chain management, while geopolitical tensions drive diversification further away from China. Cheap, efficient labour keeps developing Asia as a manufacturing hub, but new technological breakthroughs in artificial intelligence, 3D printing, robotics, biomaterials, and digitalization are transforming the industry and its global supply chains. Amid the surge of global trade protectionism, regional free trade blocs like the Regional Comprehensive Economic Partnership (RCEP) are facilitating the integration and optimization of apparel supply chains in Asia, especially between China and the ASEAN countries. Domestic regulations and policies in sourcing countries will continue to boost the competitiveness and exports of their apparel industries. Lastly, sustainability as a global issue is increasingly gaining the attention of apparel consumers and legislators, pressing all apparel practitioners to put footprint reduction on their priority agenda.

In the coming year, we predict that an increasingly complex sourcing environment and a worsening global geopolitical landscape will compel more and more apparel companies and apparel retailers to adopt a sourcing diversification strategy. This strategy will balance factors such as cost, quality, product lead time and compliance, while also enabling quick adaptation to market uncertainties and achieving supply chain flexibility and resilience. However, our analysis also indicates that this diversification process will be long and gradual. In the near future, China will remain a pivotal player in the apparel supply chain, but it will transition from a direct apparel exporter to the US and EU markets to an intermediate component provider and a significant investor in other apparel manufacturing bases. Meanwhile, Southeast and South Asian economies are becoming more important apparel sourcing bases.

Our analysis also shows that, despite the media hype, reshoring and nearshoring in the apparel supply chain are progressing more slowly than anticipated. While nearshoring apparel production bases for the US market are advancing well, they face potential setbacks from erratic and indiscriminate tariff policies imposed by the current US administration. In

the European apparel market, Turkey remains an attractive nearshoring option due to its geographic proximity and regulatory alignment. However, Turkey's share in the EU's textile and clothing imports has stagnated in recent years, primarily because of its unstable domestic economy. Although some Eastern European countries are emerging as new nearshoring locations, they still have a considerable journey ahead to become mature and competitive production bases.

At the consumer end of the supply chain, there is a growing emphasis on sustainability, digital shopping experiences, and personalized products. Consumers are increasingly drawn to comfortable, functional, and athleisure apparel. This shift in preferences is set to drive a more sustainable, responsive, and technologically advanced global apparel supply chain. It will foster innovation in fabric technology and design, further automate manufacturing processes, and expand e-commerce brands to better meet the values and expectations of modern consumers.

With the growing involvement of legislators in the sustainability issue, sustainable practices are likely to become a standard requirement across the entire apparel chain. Supply chain players that offer sustainable products without compromising performance, quality, or price are well-positioned to gain a first-mover advantage in the market.

I. Introduction

Apparel is an essential good and a key value-creating sector for the world's economy. The global apparel market size is estimated at US$1.7 trillion in 2023 and expected to reach US$2.3 trillion by 2030, growing at an estimated compound annual growth rate of 4.1% during the period of 2024-2030.[2] The apparel industry encompasses the manufacturing, designing, wholesaling, marketing and retailing of various types of clothing and accessories.

An apparel supply chain is usually long and complex, spanning multiple countries, businesses, distributors, and suppliers. It starts with raw material producers, moving to ginners, traders, spinners, importers, garment manufacturers, dyers before reaching consumers through wholesalers, retailers, and e-commerce businesses. It is one of the most globalized supply chains travelling thousands of miles and supporting tens of millions of jobs[3]. It is estimated that approximately 430 million people work in fashion, clothing, and textile production.[4]

On the demand side, the US and China are the world's two largest apparel consumers. The US and the European Union (EU), on the other hand, are the key contributors to the global apparel supply chain as the world's two largest apparel importers.

On the supply side, Asia dominates apparel and textile exports. Five Asian exporters – China, Bangladesh, Vietnam, Turkey, and India–are among the world's top 10 apparel exporters, collectively accounting for over half of the world's apparel exports. Six Asian economies—the Chinese mainland, India, Turkey, Vietnam, Pakistan, and Chinese Taipei—are among the world's top 10 textile exporters, collectively accounting for two-thirds of the world's textile exports. Among them, The Chinese mainland alone accounts for over 40% of the world's textile exports.

Suppliers of raw textile materials are widely distributed across North America, Oceania, Asia, South America, and Europe, with the US being the largest raw textile material exporter, followed by Australia. South America has entered the apparel supply chain in this section, with Brazil becoming one of the top 10 raw textile material suppliers.

Apparel machinery encompasses a wide range of equipment used in the production of textiles and apparel. It supports the entire apparel supply chain and is vital for enhancing the efficiency, quality, and sustainability of apparel production. It also has high technology content. China is the largest textile equipment supplier, accounting for over 30% of the

[2] *Apparel Market Analysis Report.* 2024. www.grandviewresearch.com
[3] *Global Fashion Industry Statistics*. 2016. https://fashionunited.com
[4] Ariella, S. (2023, June 15). 28 Dazzling Fashion Industry Statistics. www.zippia.com

world's total textile machinery exports. Other suppliers in this section are primarily developed countries, including Germany, Japan, Italy, and South Korea.

Key traditional apparel retailers are concentrated in Europe and the US, while online apparel retailers, as rising stars, are emerging in multiple countries, most prominently in China.

The apparel supply chain is highly globalized with fierce price competition. It is also facing a more challenging environment due to mounting regional conflicts, global trade frictions, material price volatility, rapidly shifting consumer values and preference, fast technological advancements, and regulatory changes.

Amidst the increasingly complex sourcing landscape and the worsening global geopolitical environment, more and more apparel companies are adopting a sourcing diversification strategy to maintain the greatest flexibility and resilience, in an effort to cope with various market uncertainties and sourcing risks.

Centred around the sourcing diversification strategy, our analysis identifies three related trends in the global apparel supply chain: the continuous dominance of China and its shifting role (the continued theme of the 'China Plus' strategy), the rise of Southeast and South Asia as new apparel sourcing hubs, and the long road for nearshoring and onshoring to gain significance.

While consumer preferences are volatile, a clear direction is that consumers are showing a growing interest in comfortable, functional, and athleisure apparel. They are also increasingly prioritizing sustainability, digital shopping experiences, and personalized products. This shift will drive a more sustainable, responsive, and technologically advanced global apparel supply chain, fostering innovation in fabric technology and design, and promoting manufacturing automation and more localized and agile production to better align with the values and expectations of modern consumers. Meanwhile, the sustainability issue has engaged not only brand retailers and consumers but also legislators. This means apparel supply chains will be under increased scrutiny due to incoming regulations that demand higher environmental protection standards from textile production to waste disposal. In light of these factors, we identified two additional trends for the global apparel supply chain related to technology and sustainability, which are shaped not only by consumer preferences, but also by regional and country policies.

The remaining part of this chapter includes the following sections. Section II lists the key apparel markets in the world. Section III identifies the locations of major players in the global apparel supply chain, i.e., apparel retailers, apparel suppliers, textile suppliers, raw textile material suppliers, and apparel machinery suppliers. Section IV explains five trends that will dominate the global supply chain in the coming years, and Section V provides a conclusion.

II. Key Apparel Markets

1. Key apparel consumption markets

The US is the world's largest apparel market in terms of sales revenue, contributing about US$351.4 billion, or 20.6%[5] of the world's total apparel sales in 2023. It was closely followed by China with US$313.8 billion, or 18.4% of the world's total sales in the same year.[6]

Table 1 shows the world's leading apparel markets in 2023. It shows that, besides the US and China, important apparel consumption markets also include India, Japan, the UK, Germany, Italy, France, Canada, and South Korea. The 10 countries combined accounted for about 70% of the world's apparel consumption in 2023.

Table 1: World leading apparel markets, 2023

	Apparel sales revenue (US$ billion)	Share of world total
World	***1,709.8***	
US	351.4	20.5%
China	313.8	18.4%
India	101.4	5.9%
Japan	87.0	5.1%
UK	82.9	4.8%
Germany	72.6	4.2%
Italy	57.9	3.4%
France	40.0	2.3%
Canada	39.7	2.3%
South Korea	39.1	2.3%
Sum of ten countries	**1,185.7**	**69.3%**

Source: OBERLO; GRAND VIEW RESEARCH.

[5] The world total apparel sales revenue was estimated at US$1709.76 billion in 2023. www.grandviewresearch.com

[6] Apparel Industry Statistics (2018–2028). April 2024. www.oberlo.com

2. Key apparel import markets

Apparel importers are the driving force of the highly internationalized apparel supply chains. Developed economies in Europe and North America are the world's major import markets of apparel. Table 2 shows the world's top apparel importers in 2022. It shows that the US was the largest single country in terms of apparel imports (US$116.1 billion in 2022), accounting for 18.5% of the world's apparel imports in 2022. Seven out of the 10 largest apparel importing countries were located in Europe. The table also shows that, the EU collectively was the largest apparel import market in 2022 (US$216.4 billion), accounting for 34.4% of the world's apparel imports that year. Japan is the only Asian country that was among the top 10 largest apparel importers of 2022.

Table 2: Top 10 apparel importers in 2022

	Apparel import value (US$ mn)	Share of world total
World	***628,472***	
European Union	*216,374*	*34.4%*
US	116,058	18.5%
Germany	47,173	7.5%
France	29,095	4.6%
Japan	27,068	4.3%
UK	25,670	4.1%
Spain	23,442	3.7%
Netherlands	21,848	3.5%
Italy	20,778	3.3%
Poland	14,742	2.3%
Canada	13,646	2.2%

Note: Apparel refers to the commodity group of apparel and clothing accessories under SITC category 84.

Source: WTO STATS; HKUST Li & Fung Supply Chain Institute analysis.

III. Global Apparel Supply Chain: Current Status

1. Apparel retailers

Apparel retailers connect directly with the consumers and could be considered as the last but crucial part of the apparel supply chain. Apparel retailers, many of whom directly own multiple brands, engage in product design, conduct R&D, strengthen online and offline marketing, and conduct mergers and acquisitions.

Key traditional apparel retailers are concentrated in Europe and the US. The world's top apparel companies include LVMH, Nike, Inditex, Adidas, H&M, Uniqlo, Kering SA, VF, Prada, and Under Armour, to name a few.[7]

It is noteworthy that the rapid development of the internet and e-commerce has led to the rise of online apparel retailers. E-commerce-based apparel retailers like ASOS, Boohoo, and Sheinare staying ahead of fashion trends and leveraging technology to enhance the customer shopping experience. They offer a wide range of affordable clothing, footwear, and accessories, featuring both their own labels and third-party brands and catering to young and fashion-conscious consumers worldwide. It is reported that the value of global online apparel sales reached US$872 billion in 2023 and is expected to reach 40% of total apparel sales by 2025.

Shein, the world's largest online apparel retailer, is based in China. In 2023, Shein's revenue (US$32.5 billion) surpassed Adidas's (US$22.5 billion), ranking it fourth among all apparel retailers, only behind LVMH (US$93.7 billion), Nike (US$51.2 billion), and Inditex (US$38.9 billion).

2. Location of key apparel suppliers

Clothing manufacturers transform fabrics into finished garments, usually commissioned by retailers, fashion brands or their agents. Clothing manufacturing is a key part of the global apparel supply chain.

While the leading apparel brands are often based in Europe or North America, the majority of manufacturing occurs in Asia, where production costs are lower and efficiency is relatively high. Table 3 shows the world's 10 largest apparel exporters in 2022. It shows that China was the leading apparel exporter in 2022, accounting for over one-third of the world's apparel exports. Four remaining Asian exporters in the top 10 apparel exporters—Bangladesh, Vietnam, Turkey, and India—combined accounted for one-fifth of the world's apparel exports in 2022. EU as a whole accounted for 27.2% of the world's apparel exports in 2022, while Italy, Germany, the Netherlands, Spain, and France were the EU's top exporters.

[7] Top 100 Companies. FashionUnited International. 2024 https://fashionunited.com/i/top100.

Table 3: Top 10 apparel exporters, 2022

	Apparel export value (US$ mn)	Share of world total
World	***577,700***	***100.0%***
China	182,416	31.6%
European Union	*157,111*	*27.2%*
Bangladesh	45,709	7.9%
Vietnam	35,298	6.1%
Italy	28,777	5.0%
Germany	26,771	4.6%
Turkey	19,907	3.4%
India	17,641	3.1%
Netherlands	17,414	3.0%
Spain	16,660	2.9%
France	15,251	2.6%

Note: Apparel refers to the commodity group of apparel and clothing accessories under SITC category 84.

Source: WTO STATS; HKUST Li & Fung Supply Chain Institute analysis.

3. Location of key textile suppliers

Textile manufacturing is an important basis for apparel making. Textile companies create yarn from raw materials and turn yarn into fabrics for apparel manufacturing companies.[8] The Chinese mainland is the largest textile supplier in the world, accounting for over 40% of the world's textile exports, as shown by Table 4. In terms of region, Asia is the largest textile supplier in the world. Seven Asian economies, i.e. the Chinese mainland, India, Turkey, Vietnam, Pakistan, Taiwan, and South Korea combined accounted for over two-thirds of the world's textile exports in 2022, as shown by Table 4. The EU is the second-largest region for textile exports, accounting for 20.6% of the global total in 2022. Germany and Italy are the two largest EU exporters of textile. The US is also a key textile exporter ranking sixth in textile exports in 2022.

[8] Everything about the (traditional) supply chain and the core players of fashion industry. FashionUnited International. 20 October 2022. https://fashionunited.com

Table 4: World top 10 textile exporters in 2022

	Textile export value (US$ mn)	Share of world total
World	***350,959***	***100.0%***
Chinese mainland	148,132	42.2%
European Union	*72,305*	*20.6%*
India	19,330	5.5%
Turkey	14,593	4.2%
Germany	14,076	4.0%
US	13,775	3.9%
Italy	12,523	3.6%
Vietnam	11,024	3.1%
Pakistan	9,273	2.6%
Taiwan, China	8,329	2.4%
South Korea	8,299	2.4%

Note: Textile refers to the commodity group of textile yarn and related products under SITC category 65 .

Source: WTO STATS; HKUST Li & Fung Supply Chain Institute.

4. Location of key suppliers of raw textile materials

Raw textile materials include both natural fibres like silk, cotton, jute, and wool, and synthetic fibres like polyester, nylon, and acrylic. Raw material producers, wholesalers, and retailers are the upstream players in the apparel supply chain.[9] Table 5 shows the top 10 raw textile material exporters during 2020-2023 (2023 with incomplete data). It shows that suppliers of raw textile materials are widely distributed across North America, Oceania, Asia, South America, and Europe. The US is the largest raw textile material exporter, generally accounting for over 20% of the world's total. Australia is the second-largest raw material exporter after 2020, and its share in world raw textile material exports steadily increased from 5.4% in 2020 to 13.5% in 2023.

China ranked third in 2022, accounting for 10% of the world's exports in 2022 and 12.2% in 2023. It should be noted that China used to be the second-largest textile material exporter in the world. The Xinjiang cotton event in 2021 affected the sourcing of cotton from China in the apparel sector, and therefore, since 2021, it has been replaced by Australia as the second-largest textile material supplier.

[9] Everything about the (traditional) supply chain and the core players of fashion industry. FashionUnited International. 20 October 2022. https://fashionunited.com

In this segment of the supply chain, a new location, South America, has enters the apparel supply chain, with Brazil becoming one of the top 10 raw textile material suppliers.

Table 5: Top 10 exporters of raw textile materials, 2020-2023

	2020		2021		2022		2023	
	Export value (US$ mn)	Share of world total	Export value (US$ mn)	Share of world total	Export value (US$ mn)	Share of world total	Export value (US$ mn)	Share of world total
World	***34,763***	***100.0%***	***44,822***	***100.0%***	***48,741***	***100.0%***	***36,794***	***100.0%***
US	7,689	22.1%	7,708	17.2%	11,235	23.1%	8,253	22.4%
Australia	1,893	5.4%	3,844	8.6%	5,345	11.0%	4,951	13.5%
China	2,682	7.7%	3,796	8.5%	4,872	10.0%	4,506	12.2%
Brazil	3,343	9.6%	3,533	7.9%	3,794	7.8%	3,202	8.7%
India	2,398	6.9%	4,105	9.2%	2,353	4.8%	1,774	4.8%
South Korea	1,419	4.1%	1,676	3.7%	1,569	3.2%	-	-
Germany	786	2.3%	952	2.1%	1,239	2.5%	1,052	2.9%
Belgium	856	2.5%	1,081	2.4%	1,095	2.2%	1,346	3.7%
Indonesia	690	2.0%	1,064	2.4%	1,053	2.2%	-	-
Thailand	747	2.1%	961	2.1%	1,031	2.1%	-	-

Note:

1. Raw textile materials refer to the commodity group of textile fibres under the SITC category 26.

2. Ranked in 2022 value as not all economies' statistics are available in 2023.

Source: UN Comtrade Database; HKUST Li & Fung Supply Chain Institute analysis.

5. Location of key apparel machinery suppliers

Apparel machinery encompasses a wide range of equipment used in the production of textiles and apparel. It supports the entire apparel supply chain and is vital for enhancing the efficiency, quality, and sustainability of apparel production.

Table 6 lists the top 10 exporters of apparel machinery in 2022 and 2023. It shows that China was the largest textile equipment supplier, with exports valued at US$9.5 billion in 2022, accounting for 30.6% of the world's total apparel machinery exports that year. Table 6 also shows that more developed countries tend to be the suppliers of textile machinery, with Germany, Japan, Italy, and South Korea among the top five apparel machinery suppliers in 2022.

Table 6: Top 10 exporters of apparel machinery in 2022 and 2023

	2022		2023	
	Export value (US$ mn)	**Share of world total**	**Export value (US$ mn)**	**Share of world total**
World	***31,076***	***100.0%***	***23,842***	***100.0%***
China	9,512	30.6%	8,178	34.3%
Germany	3,500	11.3%	3,484	14.6%
Japan	2,638	8.5%	2,556	10.7%
Italy	2,273	7.3%	1,937	8.1%
South Korea	1,606	5.2%	-	-
US	1,138	3.7%	1,102	4.6%
Vietnam	1,065	3.4%	-	-
Belgium	900	2.9%	714	3.0%
India	807	2.6%	739	3.1%
Singapore	720	2.3%	521	2.2%

Note:

1. Apparel machinery refers to the commodity groups of textile and leather machinery and parts under SITC categories 7243-7247.

2. Ranked in 2022 value as not all economies' statistics are available in 2023.

Source: UN Comtrade Database; HKUST Li & Fung Supply Chain Institute analysis

IV. Global Apparel Supply Chain of the Future

In the past, apparel supply chain was highly cost oriented, with retailers and fashion brands searching across the world for cost-effective manufacturing bases. In recent years, apparel supply chains are facing a more challenging environment due to mounting regional conflicts, global trade frictions, material price volatility, rapidly shifting consumer values and preference, fast technological advancements, and constant regulatory changes.

1. Seven forces shaping the apparel supply chain of the future

Pandemics: While the Three-year Covid-19 pandemic has wreaked havoc on all supply chains, it specifically rings the alarm bell for agility in the apparel supply chain. The concept of "just in time", which was deeply ingrained in supply chain managers' minds, has lost its lustre. "Just in case", instead, has become a more important concept of supply chain building. Sourcing diversification, nearshoring, and onshoring are gradually moving from talk to action, aiming to create apparel supply chains that can withstand unexpected and severe disruptions in the future.

Geopolitics: The world is entering a rough patch. The US-China trade war, which started in 2018, is not an ephemeral event but has escalated into competition on all fronts. Confrontation has replaced cooperation, and regional conflicts have replaced global integration. Apparel is not the sector that is most severely affected by this wave of great power competition, but many apparel supply chain managers have taken precautionary steps to diversify purchases away from China due to China's dominant position in the apparel supply chain and its status as a key suppression target for the US and its allies.

Regional tensions continue to escalate, with no signs of abating. The ongoing Russia-Ukraine war, the expanding conflicts in the Middle East, and the rising tensions in the South China Sea and Taiwan Strait, which are somewhat deliberately created, have all severely disrupted global transport routes and created price volatility for many essential commodities such as food, fertilizer, and fuel. As an apparel supply chain always spans multiple continents and travels thousands of miles, it is highly susceptible to these regional conflicts.

Production costs: Textile and clothing manufacturing remains labour-intensive and therefore labour cost- driven. The availability of a cheap but relatively efficient labour force is the key reason why developing Asia continues to be a garment manufacturing hub. For example, in 2023, the median monthly base salary for manufacturing workers was US$104 in Bangladesh and US$251 in Vietnam[10], even lower than Mexico's minimum wage of US$315.5 set in January 2023[11]. China is widely recognized as the most efficient apparel producer in the

[10] 2023 Survey on Business Conditions of Japanese Companies Operating Overseas (Asia and Oceania). Japan External Trade Organization. www.jetro.go.jp

[11] HKUST Li & Fung Supply Chain Institute analysis.

world, while its median monthly base salary was only US$510 for manufacturing workers[12], far lower than the US$3,670 in North America.[13]

Technology: Since the invention of the Spinning Jenny sparked the first Industrial Revolution, new technologies have continuously propelled the progress of the apparel industry. A new generation of technological breakthroughs in artificial intelligence, 3D printing, robotics, biomaterials, and digitalization have been increasingly used in apparel design, manufacturing, sales, recycling, and the management of an entire supply chain, shaping the apparel industry and its global supply chain.

FTAs: Free trade agreements and preferential trade arrangements always have a significant impact on the costs of apparel manufacturing. Amid the surge of global trade protectionism, we also see the flourishing of regional free trade blocs. A recent bright spot is the Regional Comprehensive Economic Partnership (RCEP) in the Asia-Pacific region. It completed the final piece of the free trade zone puzzle after taking effect in January 2022, following the European Union in Europe and the United States-Mexico-Canada Agreement (USMCA) in North America. The RCEP covers nearly all the key apparel manufacturing bases, and therefore will greatly facilitate the integration and optimisation of the apparel supply chain in Asia, especially between China and the ASEAN countries. Besides, many duty-free arrangements, such as the Generalized System of Preferences of the US and the Everything but Arms scheme of the EU Generalized System of Preferences, are crucial for poor developed countries to participate in the global apparel supply chain.

Domestic development policies: Sourcing countries are actively taking measures like improving infrastructure development, offering training programs to workers, or formulating long-term strategies to improve the competitiveness of their apparel industry and spur apparel exports. For example, government support plays a pivotal role in shaping Bangladesh's clothing industry. Since 1980s, Bangladeshi government has implemented various favourable policies and incentives, such as infrastructure development initiatives, the duty-free import of machinery, tax breaks, low-cost loans, and even direct cash incentives to develop the country's garment sector, making it the world's second-largest clothing exporter today. [14] Vietnam, another clothing manufacturing powerhouse, has just unveiled its *Textile and Garment Industry Development Strategy to 2030, Vision to 2035*, outlining detailed policies and measures to develop the textile and garment industry as its main export

[12] 2023 Survey on Business Conditions of Japanese Companies Operating Overseas (Asia and Oceania). Japan External Trade Organization. www.jetro.go.jp

[13] JETRO Survey on Business Conditions for Japanese Companies Operating Overseas (North America). https://www.jetro.go.jp

[14] Bangladesh's Garment Industry: Future growth in a changing world. 15 February 2024. www.thedailystar.net

sector.[15] Meanwhile, Cambodia has decided to build the Funan Techo Canal to improve connectivity among its main ports and reduce transport costs.

Sustainability: As the industry with the fourth highest impact on the environment and climate change, after food, housing, and mobility, the textile and apparel industry has long been under the scrutiny of the environmentalists. Nowadays, the issue of sustainability is increasingly gaining the attention of apparel consumers and legislators. This means sustainable practices are likely to become the standard across the whole apparel chain, from textile production to waste disposal, pressing all apparel practitioners to put footprint reduction on their priority agenda.

2. Five trends in the apparel supply chain

Facing the increasingly complex sourcing environment and the worsening global geopolitical landscape, more and more apparel companies and apparel retailers are adopting a sourcing diversification strategy. Sourcing diversification ensures maximum flexibility in identifying suitable manufacturers, while considering quality, cost, lead time, and other criteria, thereby enabling fashion companies to achieve supply chain resilience.[16]The sourcing diversification strategy will remain a key theme in the coming years as many companies regard the strategy as the most effective way to mitigate various market uncertainties and sourcing risks.[17]

Centred around the sourcing diversification strategy, our analysis identifies three related trends in the global apparel supply chain: the continuous dominance of China and its shifting role, the rise of Southeast and South Asia as new apparel sourcing hubs, and the long road for nearshoring and onshoring to gain significance.

On the other hand, while consumer preferences are volatile, a clear direction is that consumers are showing a growing interest in comfortable, functional, and athleisure apparel. They are increasingly prioritizing sustainability, digital shopping experiences, and personalized products as well. This shift will drive a more sustainable, responsive, and technologically advanced global apparel supply chain, fostering the innovation in fabric technology and design, and promoting manufacturing automation and more localized and agile production to better align with the values and expectations of modern consumers. Meanwhile, the sustainability issue has engaged not only brand retailers and consumers but also legislators. This means apparel supply chains will be under increased scrutiny due to incoming regulations that demand higher environmental protection standards from textile production to waste disposal. In light of these factors, we have identified two additional

[15] Vietnam textile and garment industry development strategy to 2030, vision to 2035. 30 March 2023. www.vietnamtextile.org.vn

[16] Exploring US Apparel Brands and Retailers' Evolving Sourcing Strategies. 1 December 2023. https://shenglufashion.com

[17] Patterns of US Apparel Imports in 2023 and Critical Sourcing Trends to Watch in 2024. 12 February 2024. https://shenglufashion.com

trends for the global apparel supply chain related to technology and sustainability, which are shaped not only by consumer preferences, but also by regional and country policies.

(a) The dominance and shifting role of China in global apparel supply chain

The sourcing diversification strategy in the apparel industry is closely related to China, which has dominated the apparel production chain for decades with its large scale of highly skilled labour force and mature and complete supply chain system.

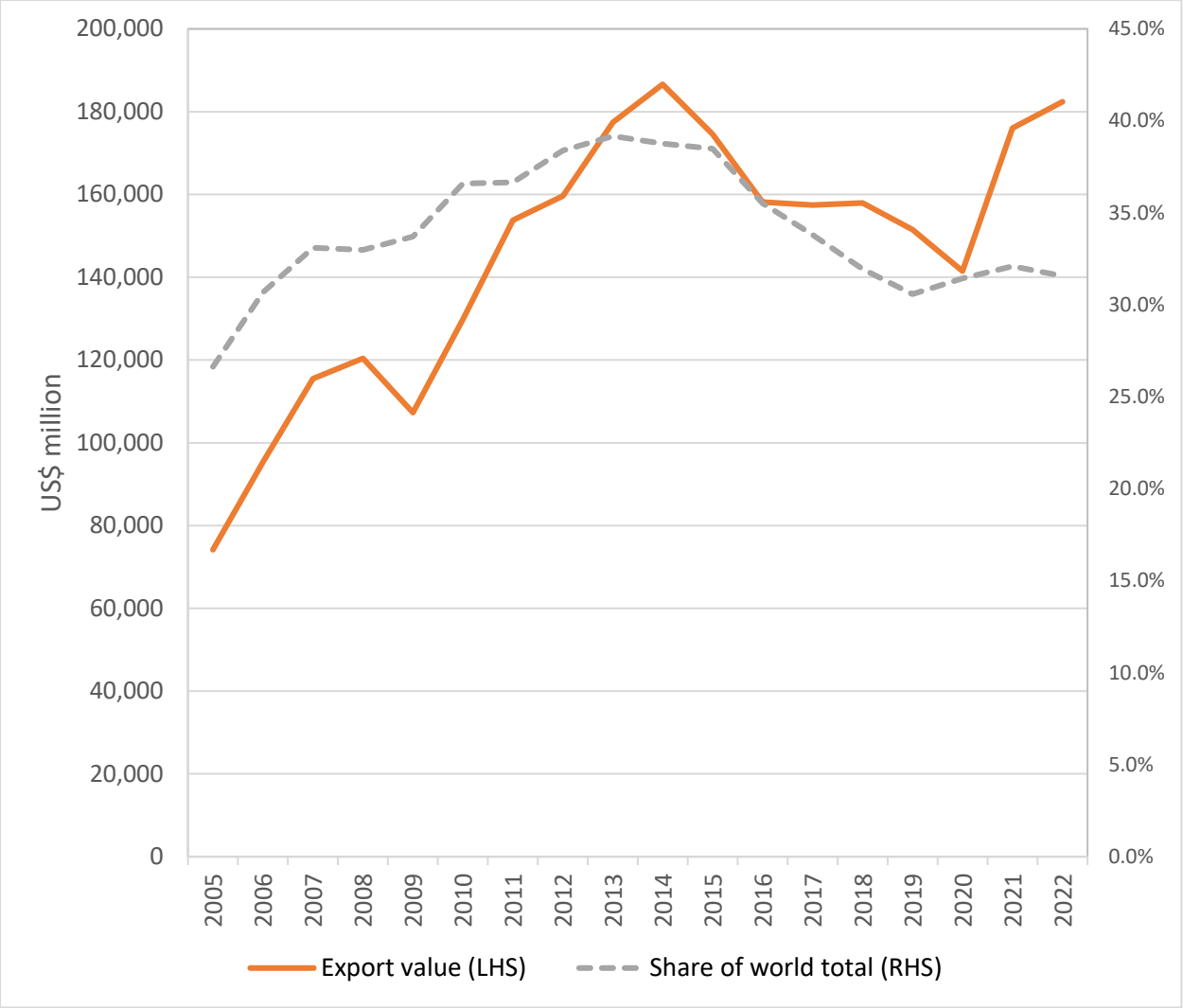
The call for reducing reliance on China has existed for more than a decade. Many reports indicate that a lot of world-famous brands have reduced their direct apparel sourcing share from China since the beginning of the century. However, global apparel brands and retailers find that viable alternatives are not easy to find. This is especially true for higher-value clothing that requires greater specialization and quality assurance. China is especially competitive in manufacturing high-value items such as outerwear and accessories, offering a good combination of cost, reliability, speed to market, and low risk of non-compliance. Few places can compete with China in this high-value segment in terms of quality, quantity, and factory safety.

For these reasons, we predict that China will not be easily replaced as a key supplier in the apparel industry and will continue to dominate the apparel supply chain in the foreseeable future. This trend can be seen from Figures 1 to 3, which show China's shares respectively in world's exports of apparel, textile, and apparel machinery from 2005 to 2022.

As figure 1 shows, China's share in the world's apparel exports peaked in 2013 at 39.2% and declined afterward, but stabilised at around 31% in recent four years from 2019 to 2022. We expect this leading position of China to continue. Meanwhile, China will also continue to be a key textile supplier. As Figure 2 shows, China's share in the world's textile exports continued to rise and reached 42% in 2022 (the year 2020 is an odd year due to COVID-19 pandemic).

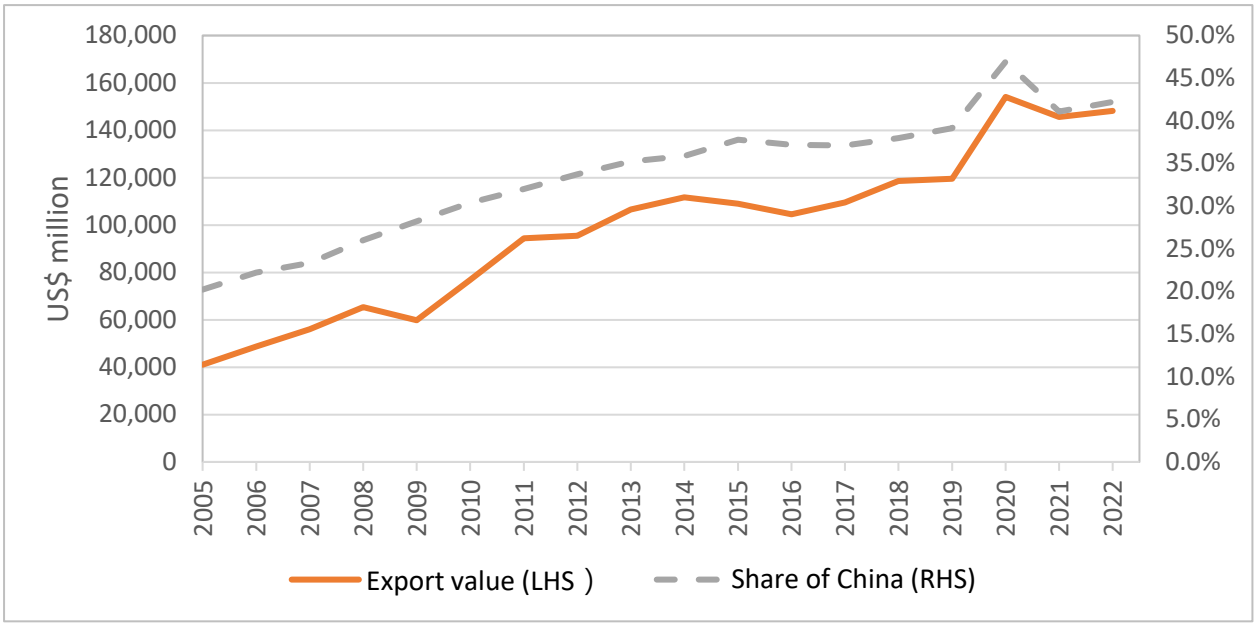
More prominently, China is increasingly becoming the dominant provider of apparel machinery along the apparel supply chains. As shown by Figure 3, China has been ranking first since 2013, and its share in the world's apparel machinery exports has grown rapidly, while the shares of Germany and Japan have remained relative stable during the same period. China's apparel machinery is mainly exported to South and Southeast Asia countries, with exports to India, Vietnam, Bangladesh, Turkey, Pakistan, and Indonesia combined accounting for 45.3% of China's total apparel machinery exports in 2022, as shown in Table 7. These countries are also the main apparel exporters to the European and US markets.

Figure 1: China's apparel exports and its share of world total, 2005-2022



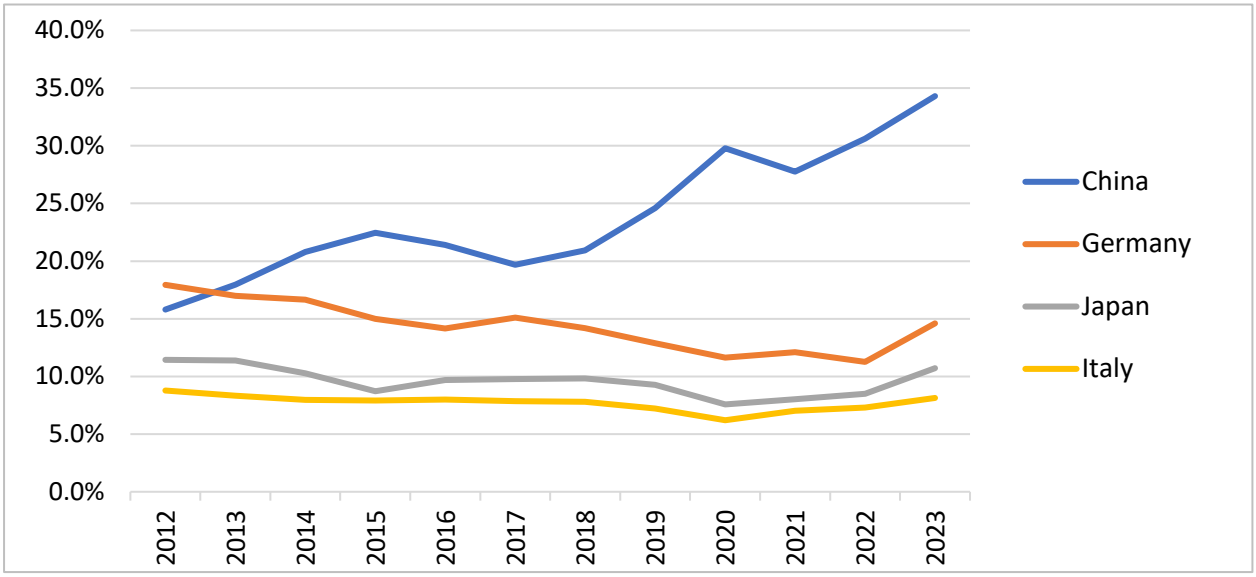
Note: Apparel refers to the commodity group of apparel and clothing accessories under SITC category 84.
Source: WTO STATS; HKUST Li & Fung Supply Chain Institute analysis.

Figure 2: China's textile exports and its share of world total, 2005-2022



Note: Textile refers to the commodity group of textile yarn and related products under SITC category 65.
Source: WTO STATS; HKUST Li & Fung Supply Chain Institute analysis.

Figure 3: Shares of top apparel machinery exporters in world total, 2012-2023



Note:
1. Apparel machinery refers to the commodity groups of textile and leather machinery and parts under SITC categories 7243-7247.
2. Ranked in 2022 value as not all economies' statistics are available in 2023.
Source: UN Comtrade Database; HKUST Li & Fung Supply Chain Institute analysis.

Table 7: Top 10 destinations of China's apparel machinery exports, 2022 and 2023

	2022		2023	
	Value (US$ mn)	Share	Value (US$ mn)	Share
Total	***9,512***	***100.0%***	***8,178***	***100.0%***
India	1,578	16.6%	1,392	17.0%
Vietnam	884	9.3%	668	8.2%
Bangladesh	587	6.2%	320	3.9%
USA	545	5.7%	668	8.2%
Turkey	533	5.6%	400	4.9%
Japan	460	4.8%	366	4.5%
Pakistan	409	4.3%	200	2.4%
South Korea	358	3.8%	240	2.9%
Indonesia	313	3.3%	255	3.1%
Brazil	297	3.1%	275	3.4%

Note:
1. Apparel machinery refers to the commodity groups of textile and leather machinery and parts under SITC categories 7243-7247.
2. Ranked in 2022 value as not all economies' statistics are available in 2023.
Source: UN Comtrade Database; HKUST Li & Fung Supply Chain Institute analysis.

In sum, China remains the key players along the global apparel supply chain, but its role is shifting from a direct supplier to the US and EU markets to one supplying key intermediate products and equipment to other sourcing countries of the European and US retailers. As the Chinese apparel industry matures and transitions from "Made in China" to "Made by China", this shift is a natural progression that would occur over time.

(b) Increasing importance of multi-sourcing and the rise of Southeast and South Asia in the global apparel supply chain

As mentioned in the previous section, it has been widely agreed that it is necessary to reduce reliance on a single sourcing base, in this case, China, for manufacturing and to source from multiple locations to maintain supply chain resilience. Amidst this trend, Southeast Asian countries and, to a lesser extent, South Asian countries—which have abundant labour forces and similar ethnic and cultural backgrounds to China, as well as government policy support for foreign direct investment and exports—are emerging as new stars.

The rise of Southeast Asian countries in the apparel supply chain has been driven by at least two waves of relocation from China. The first wave started in the 2010s, initiated by big retail brands like Adidas, Nike, Under Armour, and Gap which began shifting their sourcing out of China to lower operating cost and labour cost. [18] The second wave involves both international retailer brands and Chinese apparel firms, propelled in addition by the mounting trade tensions between China and the US since 2018.[19] This second wave is still underway and will be accelerated by the Regional Comprehensive Economic Partnership (RCEP) of 15 Asia-Pacific countries effective in January 2022. With the easing of cross-border investment and logistics processes between China and Southeast Asian countries under the RCEP, more Chinese firms are expected to relocate parts of their apparel supply chains to Southeast Asia, further strengthening the supply chains between China and Southeast Asian countries.

In addition, the escalating China-West tensions and the ongoing global trade protectionism will lead to more tariffs against Chinese exports, further increasing the costs of sourcing from China and therefore pushing more apparel sourcing from China to these two Asian regions.

Figure 4 shows the changing share of US apparel imports from top trade partners between 2017 to 2023. It clearly demonstrates the decreasing share of China and the increasing share of five Asian countries—Vietnam, Bangladesh, Indonesia, and Cambodia in Southeast Asia and India in South Asia.[20] According to McKinsey's global survey of apparel chief procurement officers (CPOs) conducted in 2023, the expected share of South Asia in the CPOs' total sourcing value over the next five years will increase to 34%, the largest share across their sourcing locations, while the expected share of China will decrease to 22%. The CPOs also see India, Vietnam and Bangladesh as the top three hotspots for sourcing for the next five years.[21]

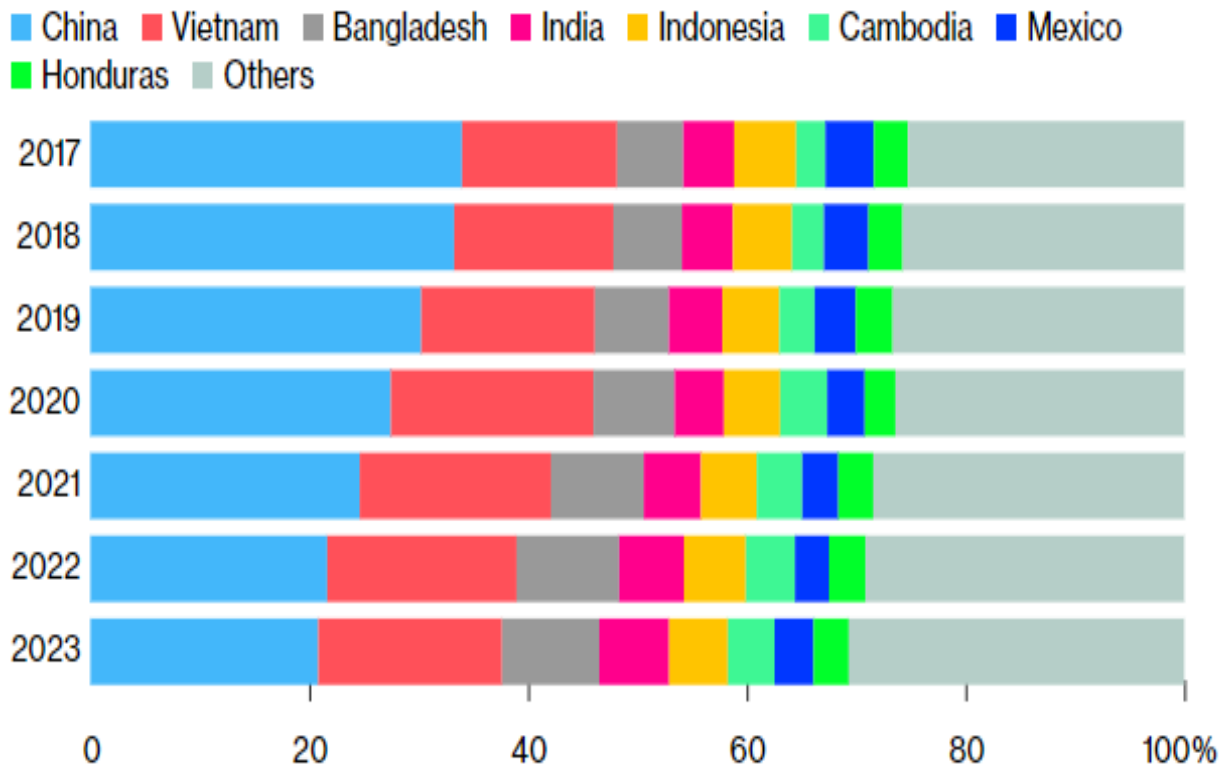
[18] Brands said they would move manufacturing out of China but the reality is more complicated. 31 August 2023. www.modernretail.co

[19] Big name fashion labels move manufacturing out of China. 5 January 2019. https://today.line.me

[20] Finding China Alternatives for Apparel Making Hits Cost, Skill Barriers. 31 October 2023. www.bloomberg.com (last accessed on 17 December 2024)

[21] Reimagining the apparel value chain amid volatility. May 24, 2024. https://www.mckinsey.com/industries/retail/our-insights/reimagining-the-apparel-value-chain-amid-volatility

Figure 4: Shares of US apparel imports from top trade partners



Note: 2023 data is updated to August.
Source: Bloomberg.

It should be noted that such relocation from China would be fraught with setbacks due to a lack of skilled workers, insufficient raw materials, and underdeveloped infrastructure and logistics networks in places outside China. The weakening consumer demand globally in recent years could be another headwind, which makes the 'China Plus' strategy and investment expansion less viable for businesses.

(c) Near-shoring and onshoring are on the rise, but it will take time for them to show significance on global apparel supply chain

Nearshoring involves relocating operations or production from distant countries, often on another continent, back to a country or region closer to customers. It is believed to allow companies to respond more quickly to consumer demand and be more flexible, and thus increase supply chain efficiency while reducing costs and carbon footprints due to shorter shipping distance.

In recent years, intensified geopolitical tensions, pandemics, and increased demand volatility have fuelled the discussions of "near-shoring" and even "friend-shoring" away from Asia, which will reconstruct the apparel supply chain. In McKinsey's 2021 survey, *Revamping fashion sourcing: Speed and flexibility to the fore*[22], chief procurement officers (CPOs) at 38 international brands and retailers said apparel companies are reshuffling their sourcing-country mix, looking to reshoring, and particularly nearshoring, to strike a balance between reliability and flexibility of the supply chain.

Despite increased discussions, reshoring and nearshoring have not yet shown up in the numbers. While it is true that apparel brands and retailers in the US and Europe are relying less on China for apparel sourcing, the share of imports from nearshoring countries such as Central America, Mexico, Turkey, and Poland to the US and the EU has remained essentially flat as of 2023.[23] A more detailed analysis below of the nearshoring situation in these two key apparel import markets, the US and the EU, shows that the nearshoring production base for the US market is emerging and will gradually gain importance in the coming years, while it will take Europe more time to develop.

The gradual formation of nearshoring production base for the US market

The nearshoring production for the US apparel market naturally points to the US's southern neighbour, Mexico, as a member of the United States-Mexico-Canada Agreement (USMCA) and, to a lesser extent, the Central American countries under the Dominican Republic-Central America Free Trade Agreement (CAFTA-DR). CAFTA-DR is a free trade agreement between the US and its six Central American neighbours—Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and the Dominican Republic, effective in 2006.[24]

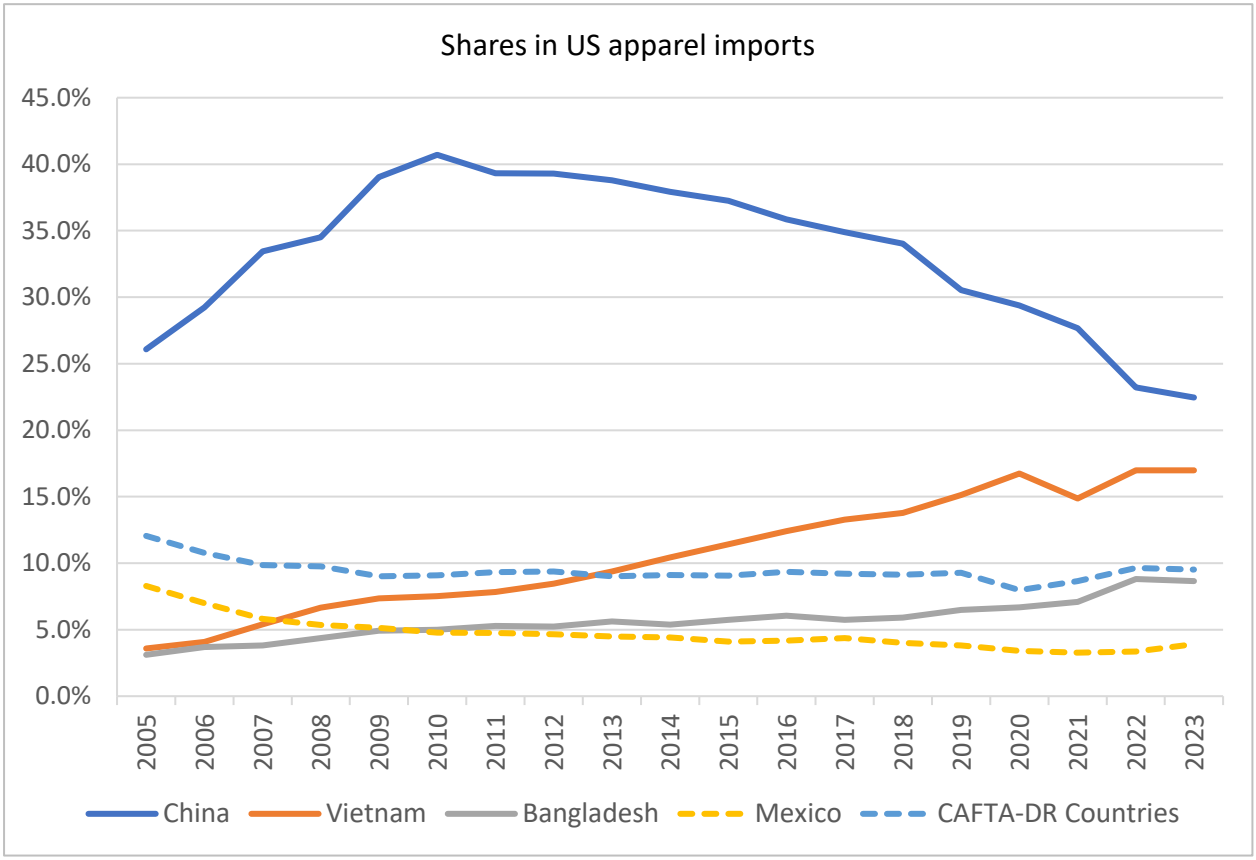
Mexico's importance as a nearshoring production base for the US market has significantly increased due to the US-China trade war started in 2018 and the supply chain disruptions caused by the COVID-19 pandemic. In 2023, Mexico, for the first time in 20 years, surpassed China to become the biggest goods exporter to the US.[25] However, within the apparel supply chain, a noticeable increase in Mexico's share of US imports is only observed in textile machinery. There has also been a slight increase in US textile imports from Mexico since 2020. This is clearly shown by Figures 5-8 below. As for the Central American countries under the CAFTA-DR, these tables show that their share in the US apparel imports remains small as of 2023.

Another clear trend in the current US apparel supply chain is that, while China remains one of the top suppliers, its share across the apparel supply chain – from raw materials, textiles,

[22] Revamping fashion sourcing: Speed and flexibility to the fore. 12 November 2021. www.mckinsey.com
[23] Supply Chain Graphic of the Week: For Apparel at Least, Little Nearshoring. 13 June 2024. www.scdigest.com
[24] Office of the US Trade Representative. https://ustr.gov
[25] Mexico replaces China as top exporter to U.S. in 2023. 8 February 2024. asia.nikkei.com.

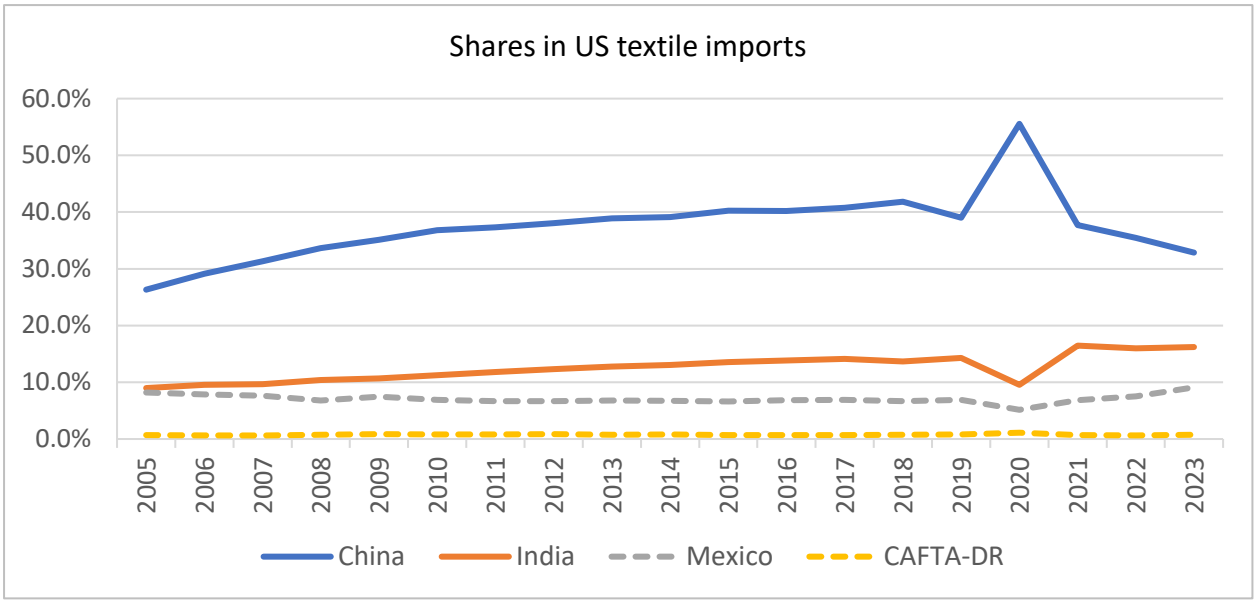
and apparel to apparel machinery – has decreased substantially. However, the lost share of China in the US apparel supply chain has mainly shifted to other Asian countries, rather than to the US's neighbouring countries.

Figure 5: US apparel imports: nearshoring (Mexico and CAFTA-DR) vs. other top sources



Note: Apparel refers to the commodity group of apparel and clothing accessories under SITC category 84.
Source: United States International Trade Commission; HKUST Li & Fung Supply Chain Institute analysis.

Figure 6: US textile imports: nearshoring (Mexico and CAFTA-DR) vs. other top sources

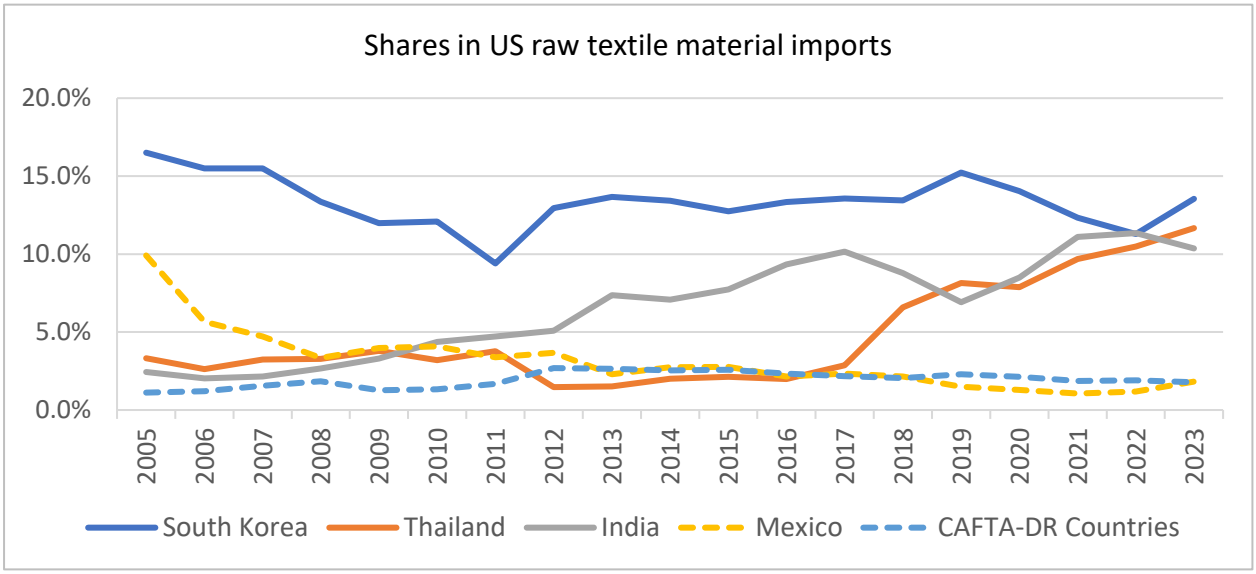


Note:

1. *Textile refers to the commodity group of textile yarn and related products under SITC category 65.*
2. *Mexico is the third source of US textile imports.*

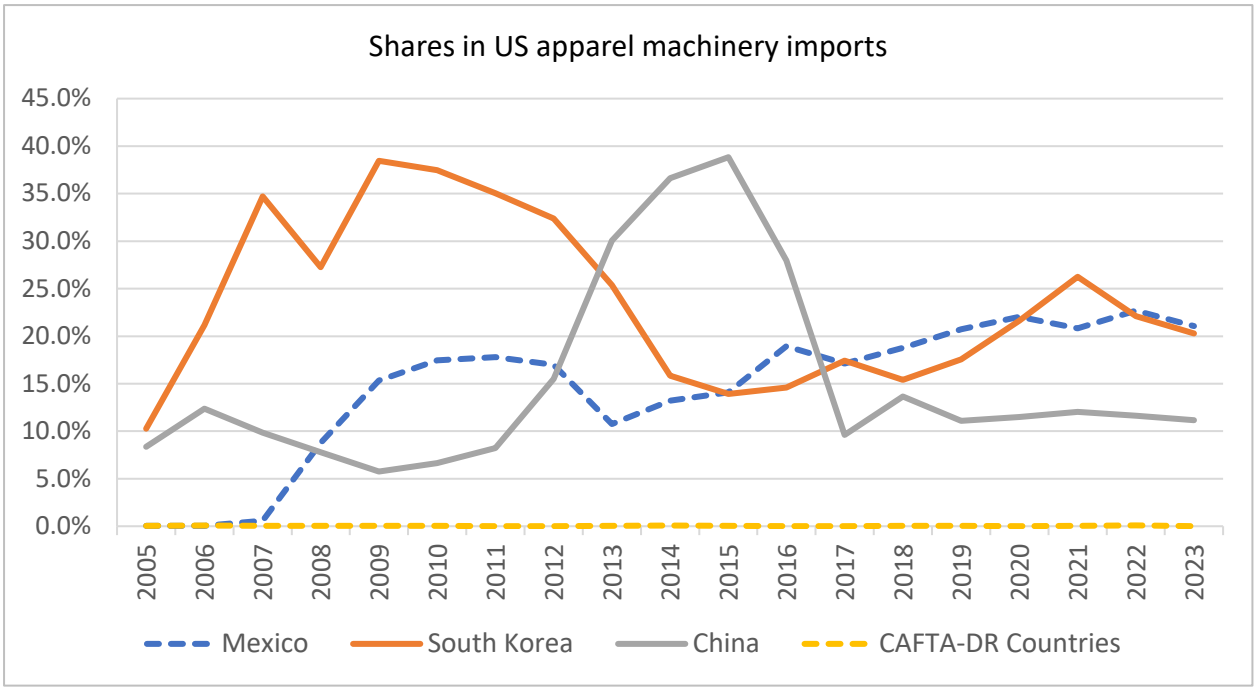
Source: United States International Trade Commission; HKUST Li & Fung Supply Chain Institute analysis.

Figure 7: US raw textile material imports: nearshoring (Mexico and CAFTA-DR) vs. other top sources



Note: Raw textile materials refer to the commodity group of textile fibres under the SITC category 26.
Source: United States International Trade Commission; HKUST Li & Fung Supply Chain Institute analysis.

Figure 8: US apparel machinery imports: nearshoring (Mexico and CAFTA-DR) vs. other top sources



Note:

1. *Apparel machinery refers to the commodity groups of textile and leather machinery and parts under SITC categories 7243-7247.*
2. *Mexico was the largest source of US apparel machinery imports in 2023.*

Source: US International Trade Commission; HKUST Li & Fung Supply Chain Institute analysis.

Nevertheless, we believe the nearshoring trend for the US apparel market will gradually gain importance. The reason is that, while some famous American brands like Levi's, Victoria's Secret, Under Armour, and Nike have already had established sourcing bases in Mexico,[26] most US fashion companies have only decided to make concrete investments in nearshoring bases since 2020. This means that most supply from these nearshoring bases will not be available until at least 2025.[27]

For example, in February 2023, Columbia pledged to purchase up to US$200 million in products from the "Northern Triangle" of Guatemala, Honduras, and El Salvador, creating nearly 7,000 jobs over five years. Target committed to increase its sourcing in the region by US$300 million in 2022. Clothing maker Gap Inc. pledged a US$150 million increase by 2025, supporting 5,000 additional jobs.[28] SanMar, a US-based apparel wholesaler, announced it would increase its purchases in Honduras by US$500 million, creating 4,000 additional jobs at Elcatex, an apparel manufacturer in Choloma. The Spanish textile industrial group Nextil committed in 2023 to allocating US$40 million to its new factory in Guatemala to produce

[26] What Are the Clothing Brands Made in Mexico?. 5 November 2022. www.zipfox.com
[27] Exploring US Apparel Brands and Retailers' Evolving Sourcing Strategies. 1 December 2023. https://shenglufashion.com
[28] As Apparel Makers Move Work From China to Central America, Jobs Could Dent Migration Crisis. 12 June 2024. https://pulitzercenter.org/

garments and elastic fabrics. Half of the allocation has already been invested. The company expects that this investment would generate more than 1,300 direct jobs and another 3,000 indirect jobs.

Our Li & Fung business unit also reported that there is a large inflow of Asian companies establishing joint ventures with local manufacturers in Mexico over the past three years, in an effort to build production capacity closer to their main markets in the Western Hemisphere. For example, Pakistani firm Artistic Milliners and Vietnamese firm Phong Phu International (PPJ) are transferring orders for GAP and Target to Mexico. South Korea-based clothing manufacturer Hansae Co., Ltd. is establishing a localized sourcing stream for synthetic textiles for its Haitian manufacturing operations through a strategic partnership with fabric manufacturer Willbes Dominica Synthetic Mill. The company also entered into a strategic alliance with Northern Textiles, a brand new and state-of-the-art circular knitter and a subsidiary of GK Global located in Honduras, in July 2023 to enhance its fabric sourcing and production capabilities in the Central America region and maximize the advantages of nearshoring.

To sum up, despite the political instability, corruption, violence, and economic and policy barriers in Central American countries, the US's intensifying competition with China and the geographical proximity to the US market make Mexico and Central America appealing bases for production for the US market. However, this potential might also face setback in the short term, as the current US President Donald Trump erratically uses tariffs as a weapon to address trade deficits and non-economic issues with other countries, irrespective of ally or foe.

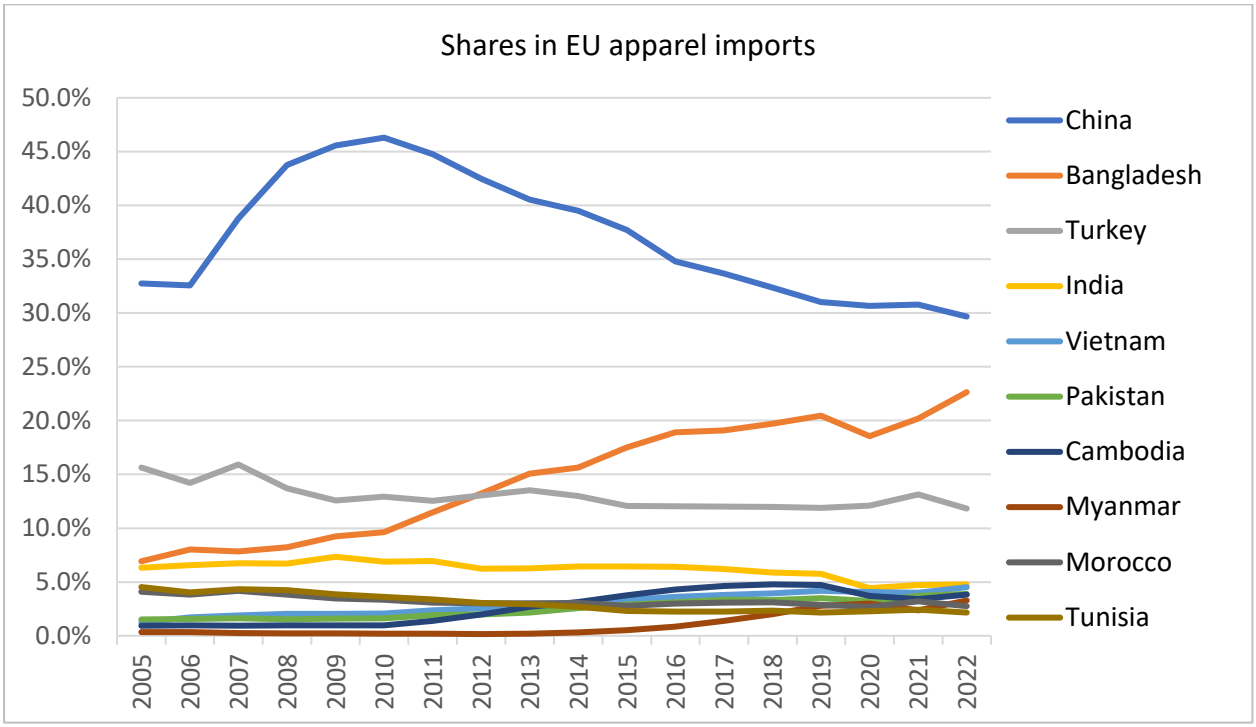
Nearshoring for the European market needs time to gain significance

For European apparel brands, nearshoring bases usually refer to countries located in Eastern Europe, North Africa (Morocco and Tunisia), and Western Asia (Turkey). Figures 9 to 12 show the top 10 non-EU sourcing economies of the European Union (EU) in the apparel supply chain. They indicate that China is the leading supplier in the EU's apparel supply chain. China's share in the EU's imports has only decreased in the apparel segment. Its shares in the other three main segments—textiles, raw materials, and machinery—have either continued to grow or stabilized at high levels over these years. The decrease in China's share of the EU's apparel imports occurred long before the US-China trade war and was mainly due to increasing labour and facility costs in China.

These charts indicate that China will continue to be a dominant import source in the European apparel supply chain. In the EU's apparel imports, while China's share is decreasing, only the share of Bangladesh is increasing. The shares of other non-EU exporters have not changed much or have even decreased, as shown in Figure 9.

Turkey is a rare bright spot in the EU's nearshoring production. It is a key apparel supplier to the EU, ranking 2nd in the EU's imports of textiles and raw textile materials, and 3rd in apparel imports, accounting for 11.8%, 20.7%, and 14.8% respectively in 2022. However, Turkey's share in the EU's imports in these three segments has not increased over the years. On the contrary, it has slightly decreased from the peak years in the first decade of the 2000s (apparel from 15.9% in 2007 to 11.8% in 2022, textile from 25.6% in 2014 to 20.7% in 2022, and fibre from 17.4% in 2007 to 14.8% in 2022). We expect that Turkey's share will be hard to increase primarily due to Turkey's high labour costs and a less stable domestic environment. As for other nearshoring locations, all account for very small proportions of the EU's imports. For the Eastern European countries, their significance in other sectors may be increasing rapidly, but this is less the case in the apparel industry.

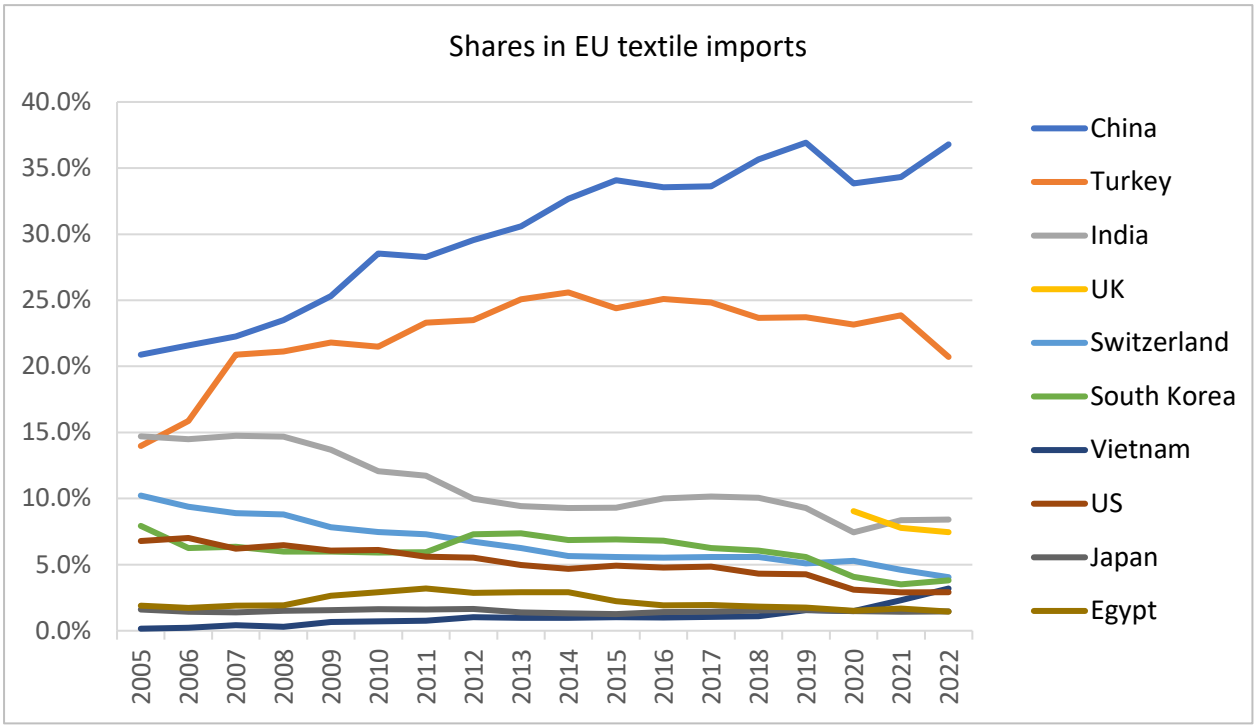
Figure 9: Top 10 non-EU apparel sources for EU imports, 2005-2023



Note: Apparel refers to the commodity groups of apparel and clothing accessories under HS categories 61 and 62.

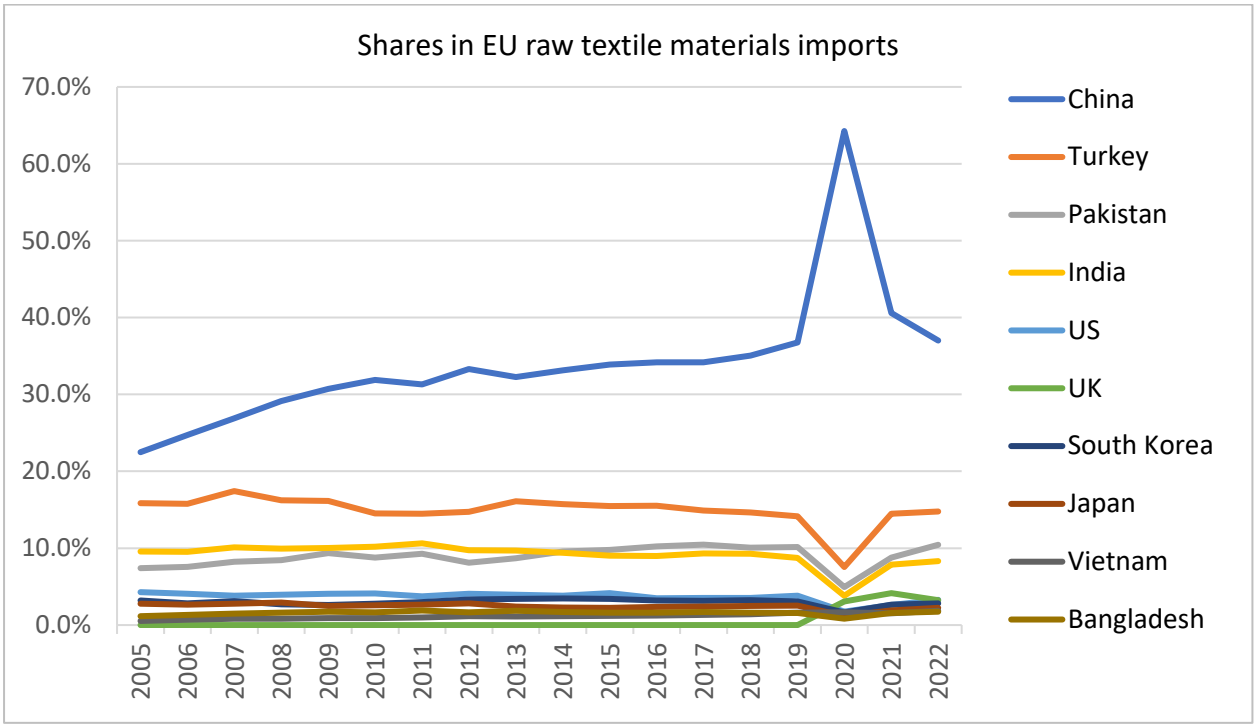
Source: WTO STATS; HKUST Li & Fung Supply Chain Institute analysis.

Figure 10: Top 10 Non-EU Textile Sources for EU Imports, 2005-2023



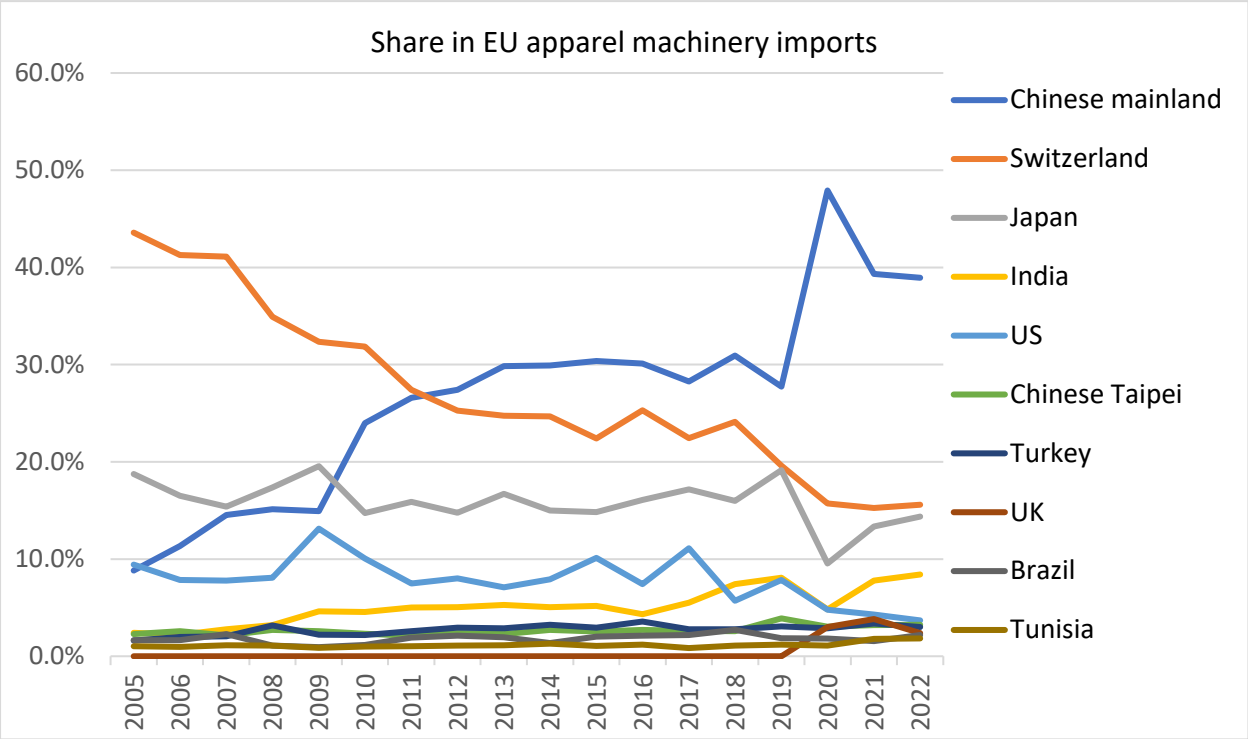
Note: Textile refers to the commodity groups under HS categories 57-60.
Source: WTO STATS; HKUST Li & Fung Supply Chain Institute analysis.

Figure 11: Top 10 non-EU raw textile material sources for EU imports, 2005-2023



Note: Raw textile materials refer to the commodity groups of textile fibres under the HS categories 50-56 and 63.
Source: WTO STATS; HKUST Li & Fung Supply Chain Institute analysis.

Figure 12: Top 10 non-EU apparel machinery sources for EU imports, 2005-2023



Note: Apparel machinery refers to the commodity groups of textile and leather machinery and parts under HS categories 8444-8449.
Source: WTO STATS; HKUST Li & Fung Supply Chain Institute analysis.

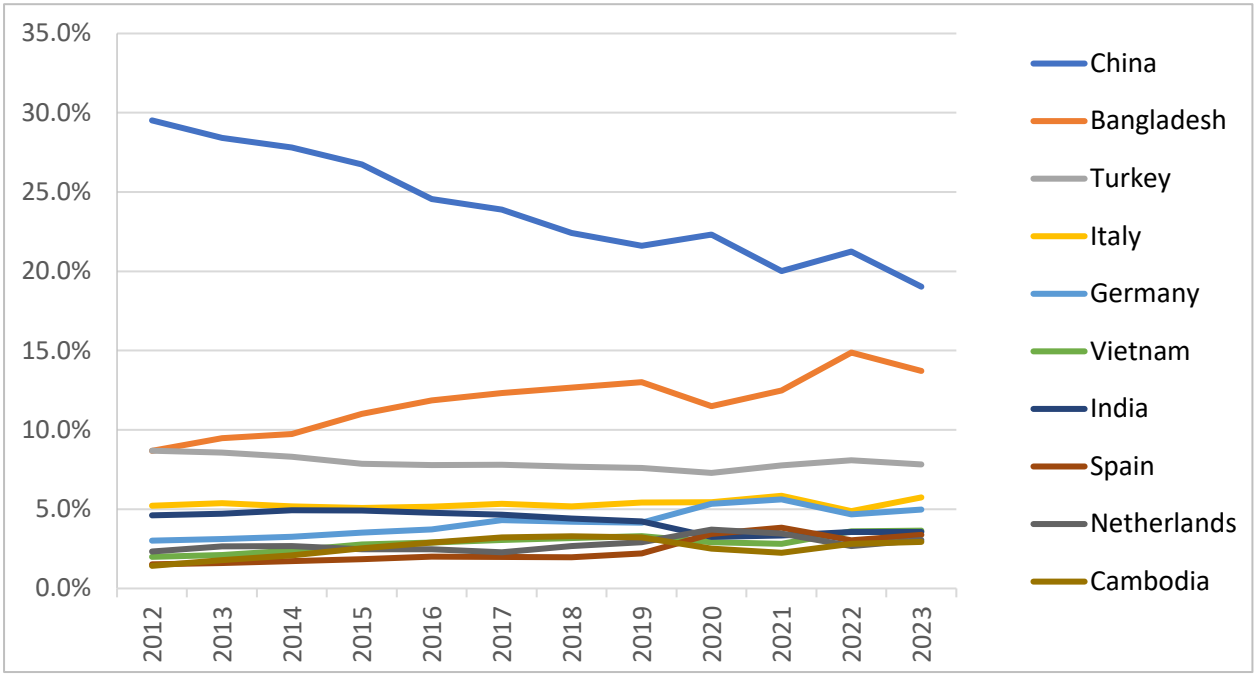
A table aggregating the imports of the six key European apparel importers (see Figure 13) shows that, while China's share has substantially decreased (from 29.5% in 2012 to 19.0% in 2023), it was mainly taken up by other Asian countries like Bangladesh (from 8.7% in 2012 to 13.7% in 2023) and European countries including Italy (from 5.2% in 2012 to 5.8% in 2023), Germany (from 3.0% in 2012 to 5.0% in 2023), and Spain (from 1.5% in 2012 to 3.4% in 2023). Turkey, a nearshoring country for the European market, ranked third in 2023, but its share decreased from 8.7% in 2012 to 7.8% in 2023, likely due to higher labour costs compared with other Asian countries. No other nearshoring countries (such as Morocco, Tunisia, Poland, Romania, or Bulgaria) has a share larger than 2.5% in 2023.

When examining the global top 10 sources for each of the six key apparel import countries in Europe—France, Germany, Italy, the Netherlands, Spain, and the UK, as shown by Figures A1 to A6 in Appendix 1, we noticed another notable feature of the European apparel supply chain: China's share has substantially decreased in each of these countries. However, the lost shares of China were mainly absorbed by Bangladesh, another Asian country (especially for Germany, the UK, and Spain).

Anecdotal reports indicate that some designer clothing brands in Europe have been moving production home or to adjacent countries to increase control over supply chains. Britain's

Burberry and Germany's Hugo Boss, for example, are trying to capitalize on the 'Made in England' and 'Made in Germany' labels to drive luxury sales.[29]

Figure 13: Shares of top 10 sources in apparel imports of selected European countries, 2012-2023



Note:
1. Apparel refers to the commodity group of apparel and clothing accessories under SITC category 84.
2. Selected European countries are France, Germany, Italy, the Netherlands, Spain, and the UK.
Source: UN Comtrade Database; HKUST Li & Fung Supply Chain Institute analysis.

(d) Innovative fabrics, automation, and e-commerce brands to lead technology competition

Since the invention of the Spinning Jenny sparked the first Industrial Revolution, the apparel industry has been propelled by technological advancements. New technologies will continue to play a crucial role in shaping its future. We identified three key themes in the upcoming technology competition within the global apparel supply chain: innovative fabrics and the innovative use of fabrics, continuous automation in manufacturing, and the burgeoning e-commerce-based brands.

Innovation in fabrics and innovative use of fabrics

Apparel industry is fabric-based. At present, synthetic fibres such as polyester and nylon account for nearly 70% of global fibre production. Cotton accounts for about 24% of global

[29] European apparel brands increasingly shifting production out of China/ 8 October 2019. https://www.cbi.eu/news/european-apparel-brands-increasingly-shifting-production-out-china

fibre production, while other traditional fibres like wool, linen, and silk, account for less than 10%.[30]

Fabrics have a significant impact on the quality, efficiency, comfort, and sustainability of apparel. In recent years, fabric innovations have been explosive, but the adoption of new fabrics in the coming years will focus on two key themes: performance and sustainability. This is primarily driven by changing consumer preferences towards comfortable, functional, athleisure, and environmentally friendly apparel.

Innovations and technologies are enhancing the performance characteristics of functional fabrics. In recent years, the demand for better performance clothing in sports, healthcare, and comfort has increased. The global athleisure market, valued at around US$300 billion at present, is expected to reach US$517 billion by 2026.[31] To meet this increasing demand, apparel manufacturers are adopting more moisture-wicking and breathable fibres. Thermal fabrics that retain heat, ideal for winter clothing and outdoor activities will also create more value in the apparel industry. Smart fabrics embedded with sensors to monitor health metrics like heart rate, temperature, and hydration levels will also be applied more widely in apparel production.

Moreover, the growing consumer demand for cleaner, fresher, longer-lasting textiles will drive manufacturers and brands to incorporate more antimicrobial fabric treatments and odor-control technologies into their products.[32] Nanofabrics with properties like stain resistance, waterproofing, and self-cleaning capabilities will also see wider use in the apparel industry.[33] To provide more comfortable clothing, extremely fine synthetic fibres that create a soft, smooth texture, along with the eco-friendly Modal and Tencel derived from wood pulp, known for their softness and breathability, will also become more widely used in the textile industry.

Technologies and practices are increasingly being applied to create sustainable textiles. As one of the most polluting industries[34], the apparel industry faces growing pressure to reduce its environmental impact. To address these concerns, the reuse and recycling of materials will be increasingly adopted to minimize waste. Recycled materials such as discarded textiles, plastic bottles, fishing nets, and fibres extracted from agricultural waste products like leaves and rinds are being increasingly used to make apparel. Technologies for recycling textile waste are also gaining popularity. For example, brands like COS and H&M have chosen

[30] Circular Economy and Sustainability of the Clothing and Textile Industry. 6 July 2021. https://link.springer.com; Global Textile Production by Fiber Type 2025. https://worldostats.com
[31] The Growing Market for Performance Athleisure Apparel. 3 July 2023. www.330trading.com
[32] New Innovations in the Textile Industry & Trends in 2024. www.microban.com
[33] Modern Advances in Textile Technology: The Fabric Revolution. 20 November 2023. https://knowingfabric.com
[34] Waterless Dyeing Technology. 4 October 2023. www.wto.org

cupro as one of their fabric sources. Cupro is produced from cotton linter, a waste product from cotton plants, using closed-loop technology.[35]

Innovative dyeing techniques[36] are also being increasingly adopted to reduce pollution. Hong Kong-based apparel manufacturing company Esquel has invested over RMB 10 million (about US$1.4 million[37]) over eight years to develop their own waterless dyeing technology. Since its first iteration in 2014, this technology has saved 95% of the water conventionally used in the dyeing process and consumes over 60% less water across all their production processes.[38]

These new fabrics not only enhance the performance of apparel and reduce the carbon footprint of apparel production but also reduce the dependence on traditional raw materials, thereby reducing fluctuations in the global apparel supply chain.

Many important fashion brands, including Nike, Adidas, Patagonia, and Lululemon, have already adopted innovative fabrics. The key hurdles for adopting new materials are the fabrics' high costs and the fashion industry's lack of genuine commitment to changing its mindset and manufacturing practices.[39] Therefore, even with a projected compound annual growth rate (CAGR) of 80% between 2022 and 2026, these next-generation materials will only account for 3% of the fabric market by 2026.[40] The good news is that significant investment have been made in these new materials since 2020s, which may help remove these hurdles. Participants in the apparel supply chain must be prepared for these emerging trends because key breakthroughs in the industrialization of these new materials may be achieved in an explosive manner in the coming years, creating brand-new apparel supply chains at a fast pace.

Wider adoption of automation in manufacturing processes

Innovative automation systems and robotics equipped with advanced sensors and programming can handle intricate tasks such as fabric cutting, sewing, and even packaging efficiently with minimal human intervention. This reduces labour costs and significantly improves the consistency and quality of textile products.[41]

Germany and Japan are at the forefront of apparel automation technologies. Manufacturers in these countries are using advanced robotics, computerized sewing and cutting machines,

[35] 7 sustainable fashion technologies for eco-friendly production. 24 September 2024. https://3dlook.ai
[36] Modern Advances in Textile Technology: The Fabric Revolution. 20 November 2023. https://knowingfabric.com.
[37] US$1=7.1124 RMB on 30 August 2024.
[38] Esquel Group's Waterless Dyeing Technology is recognized by Ministry of Science and Technology of the PRC. 11 January 2022. https://www.esquel.com
[39] The Most Promising Fabric Innovations in Sustainability in 2024. 27 May 2024. https://goodonyou.eco
[40] These materials are replacing animal-based products in the fashion industry. 6 October 2021. www.weforum.org
[41] The Impact of Technology on Textile Manufacturing. 22 June 2024. https://vooinc.com

and digital printing systems to achieve high-quality production, customization, and efficient manufacturing processes. Meanwhile, US manufacturers are leveraging automation to reshore production and reduce reliance on overseas manufacturing.[42]

Developing countries, particularly in Asia, have become garment manufacturing hubs due to the availability of cheap labour and natural resources. However, as production is becoming fast-paced, ensuring good quality and consistency in products has become necessary to face stiff competition. Although the initial investment is high, manufacturers across countries are adopting automation technology to enhance production efficiency, improve quality, and stay competitive in the global market.

From China, Turkey to India, apparel manufacturers have invested in automation, adopting automated cutting, sewing, and assembly systems to streamline operations, reduce labour-intensive tasks, enhance product quality and improve overall efficiency.[43] The Bangladeshi and Vietnamese governments have implemented policies to promote technological advancement and encourage investment in automation technologies. These policies have attracted many international apparel companies, such as TAL Apparel (HK), Thygesen Textile (Denmark), H&M (Hennes & Mauritz AB, Sweden), PVH Corp (the US), Esquel Group (HK), as well as many Chinese mainland companies, to establish highly automated plants in these two countries.

It is clear that developed and developing countries alike have realized that the integration of automation in the textile and apparel industry is essential for maintaining competitiveness and ensuring high-quality production in a rapidly evolving market. Therefore, while textile and apparel manufacturing remains labour-intensive and cost-driven, we expect automated machinery to increasingly replace manual processes in the textile and apparel production process in the coming years.

E-Commerce-based brands: shaping and being shaped

The development of e-commerce and social media has made a new breed of fast-fashion companies significant players in the apparel supply chain. Direct-to-consumer e-commerce brands like Shein, Temu, ASOS, and Boohoo have deployed strategies focused on speed, pricing, and customer experience. These e-commerce-based companies are growing at record speed and have shifted, and will continue to shift, more apparel purchasing power online.

According to McKinsey, Shein has developed an industry-leading tech backbone that synchronizes its systems with a sizable supplier base in China, involving around 6,000

[42] Automation in Garment Making. www.fibre2fashion.com

[43] Mohapatra, L.(2023. August). Automation in Garment Making. *Fibre2Fashion*. www.fibre2fashion.com

clothing factories[44]. The integration reduces the lead time from concept to customer to just 15 to 21 days, compared to approximately four to six weeks for traditional fast-fashion giants like Zara and H&M.[45] Most of these companies rely on China's powerful supplier base, in certain ways countering the multi-sourcing trend of relocating outside China and altering the supply chain shaped by traditional apparel retailers.[46]

However, since their inception, fast fashion businesses and mass production models have been criticized for producing vast amounts of waste and returns. E-commerce apparel brands are no exception. While a large portion of fast-fashion consumers say they are unwilling to give up the variety, cheap prices, and convenience offered by fast fashion companies, an increasing number of consumers are becoming aware of the issues and are demanding more sustainable practices. Shein, the most popular online-only fashion brand, has chosen to address these concerns directly and swiftly. Shein commits to sustainability and transparency by launching a roadmap called evolutionSHEIN in (year).[47] The roadmap includes several initiatives to decarbonize its supply chain, source responsible materials, protect biodiversity and animal welfare, optimize resource efficiency, design circular systems, and accelerate sustainable innovation. It is expected that more e-commerce-based companies will follow suit.

We also expect that, while e-commerce-based apparel companies and platforms have more flexibility in choosing their supply chain, they will also face increasing regulation similar to that of traditional retailers. Thousands of small apparel manufacturing firms in China and other developing countries benefit from these online apparel platforms, but these small firms will also increasingly be subject to compliance requirements.

(e) Environment protection and low carbon practices: From initiative to legislation

The textile and apparel industry has the fourth highest impact on the environment and climate change, after food, housing, and mobility.[48] As a result, it has long been under the radar of environmentalists. In the past, many well-known brands based in Europe and the US launched sustainability initiatives and advocated for others in the industry to follow suit. Many non-governmental organisations have also called for actions. Over the last few years, there has been a surge in proposed bills and regulations concerning environmental protection and carbon reduction in the industry. This indicates a transition in the apparel industry from voluntary self-regulation to mandatory standards for sustainable practices.

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[44] Shein Is the World's Most Popular Fashion Brand—at a Huge Cost to Us All. 17 January 2023. https://time.com

[45] Reimagining the apparel value chain amid volatility. 24 May 2024. www.mckinsey.com

[46] How SHEIN and Temu Conquered Fast Fashion—and Forged a New Business Model. 25 April 2023. https://hbswk.hbs.edu

[47] SHEIN official website, www.sheingroup.com

[48] European Commission (2023. July 5). Extended Producer Responsibility for textiles. https://ec.europa.eu

Leading the charge is the EU, which aims to become the world's first climate-neutral continent by 2050. As a front-runner in climate protection, the EU has published numerous initiatives, strategies, regulations, and directives to reduce carbon emissions and build a more sustainable future. The apparel industry is naturally a key target of this framework. For example, the European Commission proposed the *Waste Shipment Regulation* in 2021 (to restrict the export of textile waste), the *Ecodesign for Sustainable Products Regulation* in 2022, the *Empowering Consumers in the Green Transition Directive* in 2022, and the *Green Claims Directive* along with a revision to the *Waste Framework Directive* in 2023[49] (introducing mandatory and harmonized extended producer responsibility schemes that would require fashion brands and textile producers to pay fees to help fund textile waste collection and treatment costs).[50] On 27 May 2024, the *Ecodesign for Sustainable Products Regulation*,[51] which creates a framework to set ecodesign requirements for products, including textiles, was approved into law by the European Council and entered into force on 18 July 2024.[52]

Along with these legislative activities, in March 2022, the EU specifically launched the *Strategy for Sustainable and Circular Textiles* (SSCT) to reinvent the full lifecycle of textile products. The strategy is gradually being incorporated into new and existing regulations to become the cornerstone of EU's efforts to establish a circular economy across all industries.

The EU is also active in addressing carbon emission across the global supply chain. To put a fair price on the carbon emitted during the production of carbon-intensive goods entering the EU and to encourage cleaner industrial production in non-EU countries, the EU, since 1 October 2023, has placed a levy on imported carbon-intensive products through the Carbon Border Adjustment Mechanism (CBAM). This mechanism has a transitional phase from 2023 to 2025 and a definitive regime starting in 2026. The CBAM initially applies to imports of certain goods and selected precursors whose production is carbon-intensive and at significant risk of carbon leakage, such as cement, iron and steel, aluminium, fertilizers, electricity, and hydrogen. When fully phased in, it will capture more than 50% of the emissions in sectors covered by the EU Emissions Trading System (ETS)[53]. Textiles and garments, as a carbon-intensive sector, will undoubtedly be subject to this tax with the expansion of the CBAM's scope, according to experts at Li & Fung, a world-leading apparel supply chain management company. Sourcing agents and manufacturers in the textile and apparel sectors must undertake sustainability initiatives now to reduce their carbon

[49] EU strategy for sustainable and circular textiles. https://environment.ec.europa.eu
[50] Waste framework directive: Council set to start talks on its revision. 17 June 2024. www.consilium.europa.eu
[51] Ecodesign for Sustainable Products Regulation. https://commission.europa.eu
[52] Green transition: Council gives its final approval to the ecodesign regulation. 27 May 2024. www.consilium.europa.eu
[53] Carbon Border Adjustment Mechanism. 7 January 2025. https://taxation-customs.ec.europa.eu

footprint if they want to maintain a competitive edge in the global supply chain.[54] However, this regulation also raises concerns about climate justice by charging developing and even poor countries in the apparel supply chain.[55]

In the US, measures addressing the environmental impact of business practices have been developed at both the federal and state levels, with most of these bills currently under review in Congress or state legislatures.[56] For example, in 2022, New York State proposed the *Fashion Sustainability and Social Accountability Act*, which requires fashion sellers to adhere to standardized environmental due diligence policies and establishes a fashion remediation fund.[57] The bill was back on the agenda of the New York State Legislature in 2023. If the Act is ultimately signed into law, apparel, footwear, and handbag companies operating in New York and with more than US$100 million in annual revenue worldwide would have to remap their entire supply chain to be environmentally sustainable.[58]

A clear trend is emerging that apparel supply chains could be under increased scrutiny due to incoming regulations that demand higher environmental protection standards from textile production to apparel waste disposal. Apparel retailers, brand owners, apparel and textile suppliers and producers, and even apparel consumers around the globe need to revamp their business models and consumption behaviours to comply with these new environmental rules.[59]

Sourcing managers, especially those targeting the EU and US markets, must now embed climate change considerations in their location choices and educate their suppliers on complying with environmental regulations to avoid fines or loss of market share. Supply chain players offering sustainable products without compromising on performance, quality, or price are poised to gain a first-mover advantage, although such practices are likely to become standard in the future.[60]

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[54] Executive Summary, *Country Sourcing Report* 2023, Fung Business Intelligence.

[55] European Union's Carbon Border Adjustment Mechanism puts a disproportionate burden of decarbonisation on developing countries. 18 July 2024. www.cseindia.org

[56] Overview of U.S. sustainability regulations relevant to the fashion industry. 3 June 2024. www.carbonfact.com

[57] Sustainable Fashion: How Regulations are Reshaping the Fashion Industry. 26 October 2023. www.linkedin.com; Senate Bill S4746A, 2023-2024 Legislative Session. www.nysenate.gov; A Look into the New York Fashion Sustainability and Social Accountability Act. 25 March 2024. www.keramida.com

[58] Is the New York Fashion Sustainability and Social Accountability Act Gaining Steam?. 11 April 2024. www.mrllp.com

[59] *The State of Fashion 2024.* 29 November 2023. www.mckinsey.com

[60] McKinsey & Company. (2024. May 24). Reimagining the apparel value chain amid volatility. www.mckinsey.com

V. Conclusion

In this analysis, we examined the current status of the global apparel supply chain by identifying the locations of leading players across key segments: consumer market, importers, retailers, apparel exporters, textile exporters, raw textile materials exporters, and apparel machinery exporters. We found that the US and China are the world's two largest apparel consumers, while the US and the EU are the world's two largest apparel importers. On the supply side, China dominates the global apparel supply chain—it is the leading exporter of clothing, textiles, and textile machinery, and the third largest exporter of raw textile materials. Countries in Southeast Asia, and to a lesser extent South Asia, are also strong exporters along the apparel supply chain.

However, the increasingly complex sourcing environment and worsening global geopolitical landscape have forced more apparel companies and retailers to adopt a sourcing diversification strategy, specifically aiming to relocate out of China, the dominant supplier in the global apparel supply chain. Our analysis finds that while China will continue to dominate the apparel supply chain, it will transition from being a direct apparel exporter to also becoming an intermediate component provider and a significant investor in other apparel manufacturing bases. Meanwhile, Southeast and South Asian economies are becoming the new apparel sourcing bases due to their relatively abundant and low-cost labour force. The apparel nearshore bases in Mexico and Central America, for the US market, need more time to gain significance in the apparel supply chains.

On the other end of the supply chain, consumers are increasingly prioritizing sustainability, digital shopping experiences, and personalized products, while showing a growing interest in comfortable, functional, and athleisure apparel. This shift in preferences will drive a more sustainable, responsive, and technologically advanced global apparel supply chain. It will foster innovation in fabric technology and design, the continuous automation of manufacturing process, and the growth of e-commerce brands to better align with the values and expectations of modern consumers.

With the growing involvement of legislators in the sustainability issues, sustainable practices are likely to become standard across the entire apparel chain. Supply chain players offering sustainable products without compromising on performance, quality, or price are poised to gain a first-mover advantage, although such practices are likely to become standard in the future.

Appendix 1. Shares of top 10 sources in apparel imports for selected European countries

Figure A1: Shares of top 10 sources in Germany's apparel imports, 2012-2023

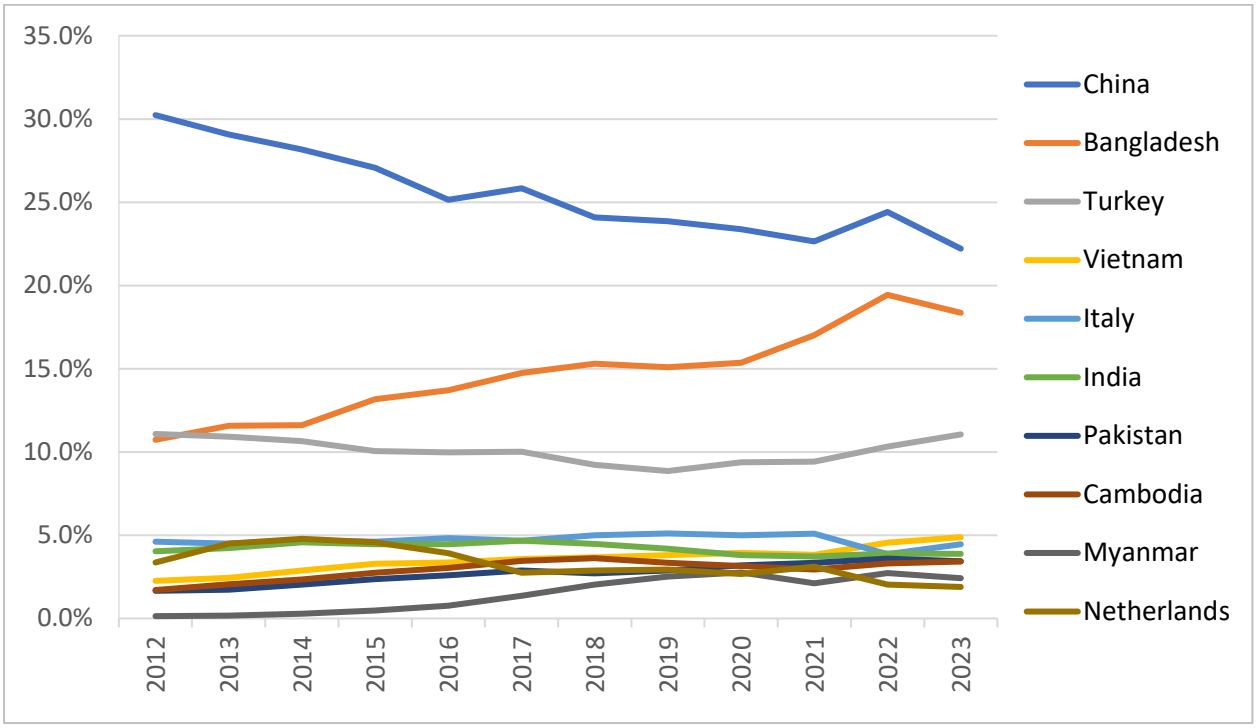


Figure A2: Shares of top 10 sources in France's apparel imports, 2012-2023

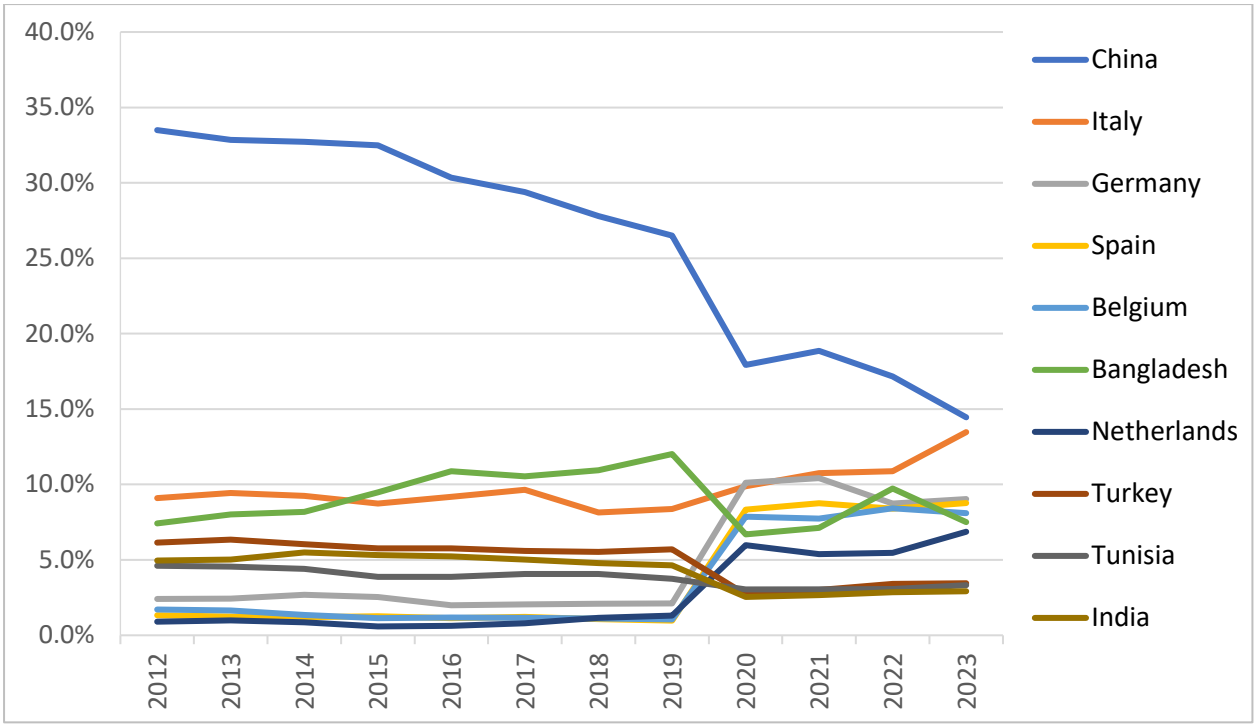


Figure A3: Shares of top 10 sources in UK's apparel imports, 2012-2023

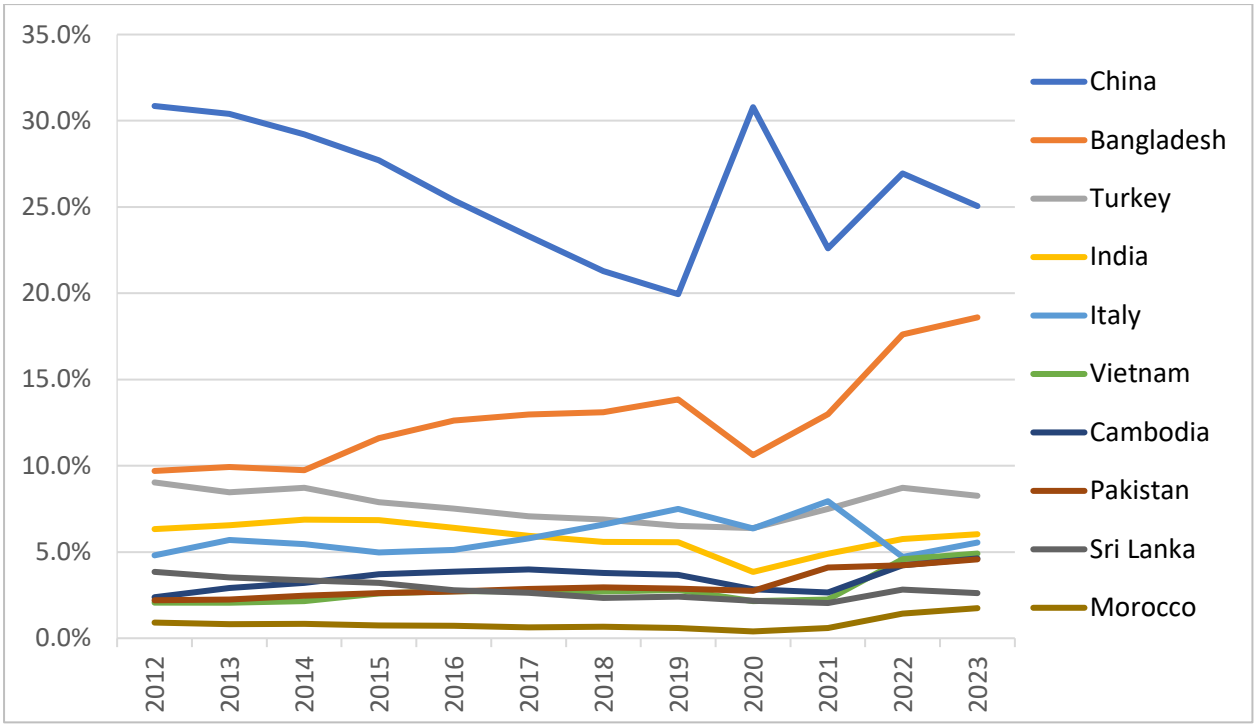


Figure A4: Shares of top 10 sources in Spain's apparel imports, 2012-2023

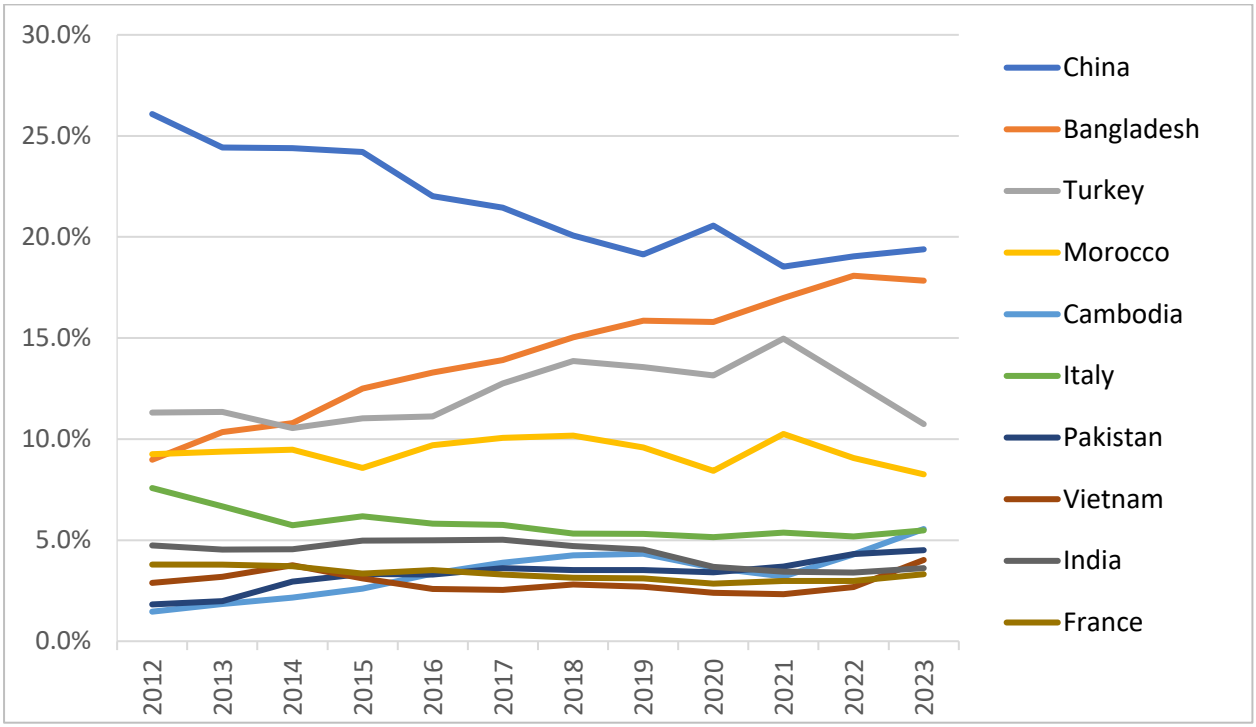


Figure A5: Shares of top 10 sources in Netherlands' apparel imports, 2012-2023

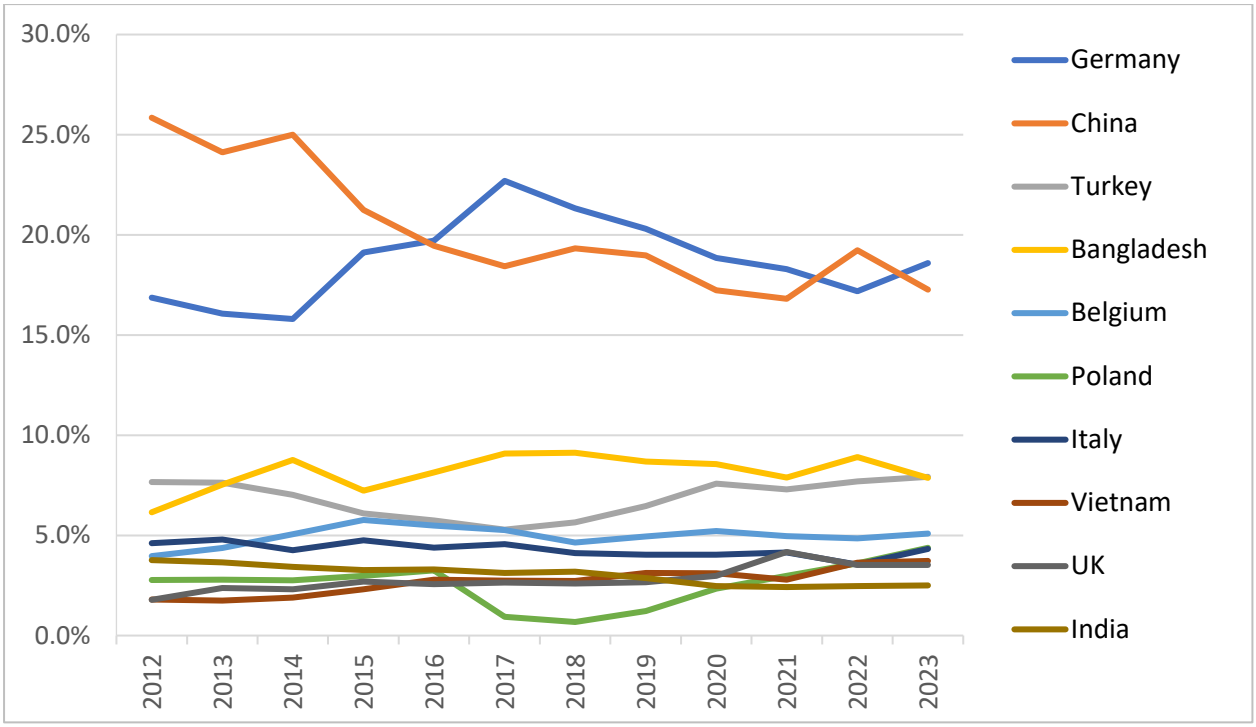
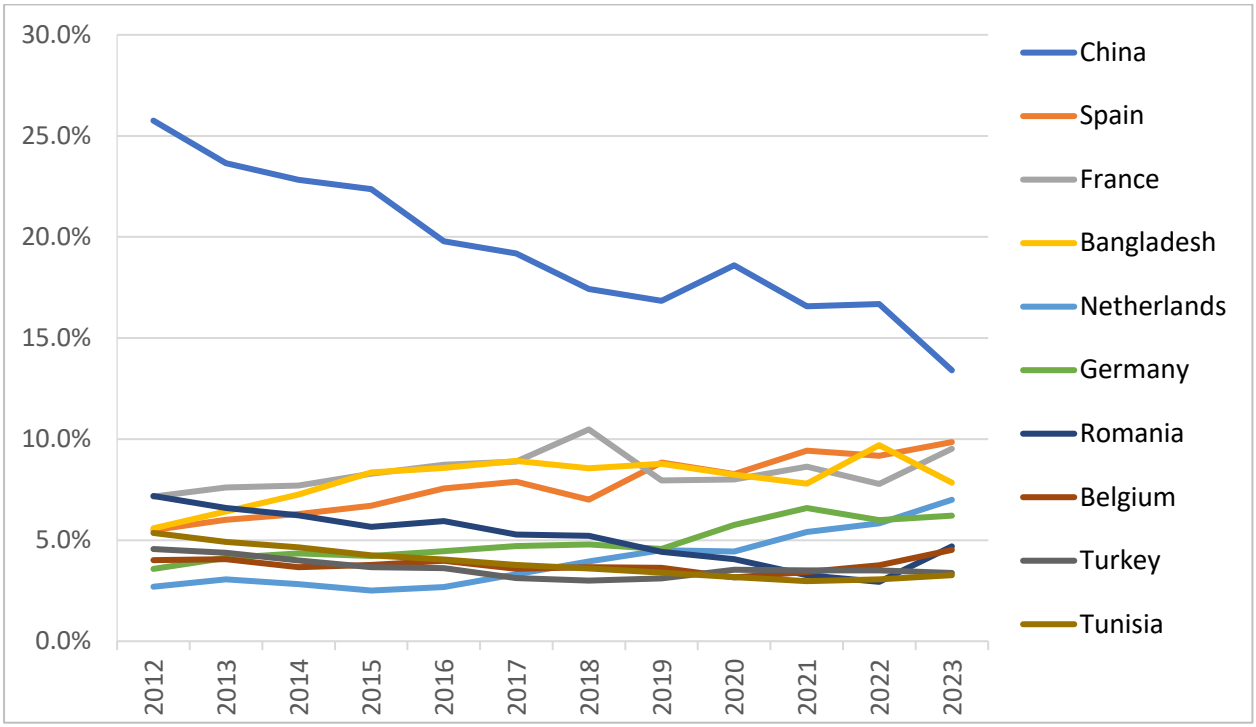


Figure A6: Shares of top 10 sources in Italy' apparel imports, 2012-2023



Note: Apparel refers to the commodity group of apparel and clothing accessories under SITC category 84.
Source: UN Comtrade Database; HKUST Li & Fung Supply Chain Institute analysis.

Our Global Supply Chain Analysis by Industry

Electric Vehicle

Charged Up: The Rise of Electric Vehicles and the Race for Critical Minerals and Components

View

Solar PV

Chasing the Sun: Will the Global Solar Supply Chain Find New Horizons?

View

Apparel

Beyond Borders: The Global Landscape of Apparel Supply Chains and China's Evolving Role

View

Medical Device

Embracing Multipolarity: Post-COVID Evolution of Global Medical Device Supply Chain

View

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The HKUST Li & Fung Supply Chain Institute accelerates the creation, global dissemination, and practical application of new knowledge and technologies for managing supply chains. Jointly established by international research university HKUST and supply chain industry leader Li & Fung, the Institute engages in collaborative research, exchanges, professional development and executive education to drive real-world impact across the region and globally, while contributing to Hong Kong's development as a multinational supply chain management center.

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