Analysis of the Textile and Clothing Industry Global Value Chains

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ANALYSIS OF THE TEXTILE AND CLOTHING INDUSTRY GLOBAL VALUE CHAINS

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ABSTRACT

The textile and apparel industry is a highly globalized, multi-trillion-dollar sector. Today, production networks are dominated by low-cost Asian countries with very large labor-pools, which has made it increasingly difficult for other producers around the world to compete, including those in Latin America and the Caribbean (LAC). While the region has participated in the industry, there are currently no LAC countries amongst the leading ten exporters. The COVID-19 pandemic, together with rising geopolitical tensions between the US and China, however, has disrupted this well-established business model over the past two to three years. This creates the most significant opportunity of the past decade to reconfigure the geography of the supply chain; as a small, but long-term supplier, with proximity to the world's largest single market, Central America is well-positioned to benefit from these changes. Nonetheless, the region needs to upgrade various aspects of their GVC participation in order to become a serious contender in the reconfiguration of the industry. Key policies should focus on developing human capital through industry-specific training initiatives; intensifying investment attraction efforts; and aggressively investing in both hard and soft infrastructure to reduce barriers to trade and enhance lead time responsiveness.

JEL Codes: F13, F23, F63, L67, N66

Keywords: global value chains, textile and apparel, trade disruptions, CAFTA-DR, Central America, post-COVID, post-pandemic, regional integration, economic upgrading

EXECUTIVE SUMMARY

The textile and apparel (T&A) industry is a highly globalized, multi-trillion-dollar sector. Labor intensive, the industry has consistently relocated around the planet over the past half century in the pursuit of low-cost workers supported by preferential trade access. Today, these apparel production networks are dominated by low-cost Asian countries with very large labor-pools supplying primarily the European and United States (US) markets. The dominance of Asia in the industry has made it increasingly difficult for other producers around the world to compete, including those in Latin America and the Caribbean (LAC). Countries from LAC have participated in this globalized industry. However, there are currently no Latin countries amongst the leading ten exporters despite their proximity to the US.

After years of geographical shifting, the past decade has seen sourcing practices in apparel and textiles industry consolidate. Supply has been concentrated in Asia, led by China, together with Bangladesh and Vietnam which collectively accounts for more than half of all exports. Brands and retailers – the lead firms in the industry – have increasingly focused on working with these locations and their suppliers which can provide consistent quality and lead times, as well as produce a wide variety of garments at a competitive price. This has favored regionalization and vertical integration of production in Asia. The region's success has been built on close proximity to a comprehensive supply of textiles and accessories, low-cost labor with broad capabilities, and highly efficient logistics operations. However, the COVID-19 pandemic and rising geopolitical tensions between the US and China have disrupted this well-established business model over the past two to three years. This creates the most significant opportunity of the past decade to reconfigure the geography of the supply chain; as a small, but long-term supplier, with proximity to the world's largest single market, Latin America is well-positioned to benefit from these changes. However, successfully taking advantage of this opportunity requires proactive changes to how the region has participated in the industry in the past.

As a region, Latin America and the Caribbean has underperformed in the textiles and apparel global value chain (GVC). It accounts for just a 4% global market share and only five countries export more than US$1.5B of apparel products. Regional exports are dominated by Mexico and four Central American countries: Honduras, Guatemala, El Salvador, and Nicaragua. Mexico has seen its

competitiveness in the industry erode steadily in the past two decades and no longer counts amongst the top ten global exporters. In its place, Honduras has taken the lead of regional exports. Together, the four small Central American countries account for over half of LAC's exports and account for the majority of growth in the region, and thus are the primary focus of this report. Their GVC role is concentrated in apparel production, with few countries engaged significantly in textiles. Apparel production, in turn, is dominated by manufacturing of basic products (t-shirts, sweaters) from cotton materials, almost exclusively destined to the US market. Few higher value services activities are undertaken. Generally, the four countries have made little progress upgrading into non-manufacturing activities, including design, branding, and sales. This GVC profile reflects the strong dependence of the region on exports under the Central American Free Trade Agreement – Dominican Republic (CAFTA-DR). This agreement requires yarn to be manufactured in CAFTA-DR countries for apparel products to qualify for duty-free access to the US market. This has favored primarily basic cotton products thanks to the supply of US cotton. Yet, the region has been unable to capture a greater share of the rapidly growing, higher value synthetics market due to limited availability of competitive synthetic textiles amongst signatories. The agreement has allowed countries from the region to remain competitive in the industry in the face of strong, low-cost Asian production, however, at the same time, it has locked these producers into the manufacture of a small set of low-value items. There has been virtually no product upgrading amongst exports since the agreement came into place in 2006.

The combination of pandemic with geopolitical disruptions, however, opens a window of opportunity for these countries to upgrade their participation in the GVC and capture a higher market share. Specifically, the disruptions to the supply from Asia as a result of both the US-China trade tensions and the COVID-19 pandemic have converged with other major trends in the industry, including the rise of fast fashion, growing interest in sustainable production, and the acceleration of e-commerce, to lead buyers to re-evaluate their sourcing strategies. Buyers are seeking production locations which minimize their risk and reduce overdependence on any one site; these must be flexible to respond to rapidly changing market demand; close to market to reduce potential logistics disruptions; sustainable to cater to consumer interest; vertically integrated to guarantee quick access to inputs, and efficient to cut lead time, all the while also providing high quality, broad production capabilities at low cost. This clearly raises the bar for participation in the GVC.

Given the importance of the industry to Central American economies – in Honduras, T&A accounts for approximately half of the country's exports – the region cannot afford to miss out on this opportunity. Nonetheless, meeting these new requirements is not simple. Central American countries need to upgrade various aspects of their GVC participation in order to become serious contenders in the reconfiguration of the industry: (1) Develop backward linkages into yarn and fabric production, particularly in synthetic fibers; (2) Focus on the production of sustainable textiles; (3) Switch from high volumes/low mix to a high mix/low volume model to facilitate product upgrading into higher value products; (4) Functionally upgrade into distribution with direct-to-consumer cross border e-commerce; and (5) Improve processes (process upgrade) to improve lead time and enhance sustainability across production.

Achieving this upgrading requires numerous policies and programs to be put in place to overcome a series of constraints that have contributed to the sector's general inertia across the region. Challenges include a limited labor pool with low levels of education, and comparatively high minimum wages with unpredictable renegotiations; significant cost and time barriers to intra-regional trade; steep electricity prices and unreliable supply; the exclusion of foreign textiles from duty-free market access; and a lack of leadership at the private sector, national and regional level to drive collaborative industrial policy for building a regional production hub. Policies should focus on developing human capital through industry-specific training initiatives; intensifying investment attraction efforts; and aggressively investing in both hard and soft infrastructure to reduce barriers to trade and enhance lead time responsiveness. The private sector in each country must also take a proactive stance. This includes developing a strategy and action plans for each country; creating a regional working group with representatives from each country association to develop a collaborative regional upgrading strategy, aligning upgrading goals across the region, coordinating capabilities development, driving vertical integration of the regional value chain, and streamlining logistics operations. Finally, the group needs to launch a joint marketing campaign to ensure buyers perceptions align with the region's existing and potential capabilities.

Participation of Select CAFTA Countries in the T&A GVC, Key Indicators, 2019

INDICATOR	HONDURAS	EL SALVADOR	GUATEMALA	NICARAGUA
GDP/Capita (2019, US$ current)	5,979	9,147	9,019	5,682
Total Exports (2019, US$B)	7.8	6.3	11.8	5.6
T&A Exports (2019, US$ B)	3.7	2.7	1.8	1.6
CAGR (2011-2019)	3.8%	1.5%	1.1%	4.3%
T&A Exports as share of total exports	47%	42%	15%	29%
Destinations	#1 US #2 El Salvador #3 Nicaragua	#1 US #2 Mexico #3 Canada	#1 US #2 Canada #3 Mexico	#1 US #2 Canada #3 Mexico
Products	#1 Sweaters #2 T-shirts	#1 T-shirts #2 sweaters #3 Others	#1 Sweaters #2 T-shirts #3 Trousers	#1 T-shirts #2 Trousers #3 Sweaters
Firm Origin (2012/5)	54% US 17% Korea	56% Domestic 38% US	57% Korea 36% Domestic	33% Korea 36% other 26% US
Labor Costs, Rank	US$297, #3	US$299, #2	US$372, #1	US$175, #4
Pandemic effects (Growth rates 2019 vs 2020)	-40%	-39%	-20%	-23%
Pandemic effects (Growth rates 2019 vs 2021)	-6%	-4%	13%	11%
Top 3 sources of textiles	#1 US #2 El Salvador #3 Guatemala	#1 US #2 China #3 Guatemala	#1 China #2 US #3 El Salvador	#1 US #2 China #3 Mexico
CAFTA qualifying share of US-bound exports (2019)	84%	92.9%	81.8%	NA 2019

Source: Authors based on AZFA (2020a, 2020b, 2020c, 2020d); EIL/RSM (2018); UN Comtrade (2021); USITC (2021); USFIA (2021).

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1. INTRODUCTION

The textile and apparel (T&A) industry is a highly globalized, multi-trillion-dollar sector. Labor intensive, the industry has consistently relocated around the planet over the past half century in the pursuit of low-cost workers supported by preferential trade access. Today, these apparel production networks are dominated by low-cost Asian countries with very large labor pools supplying primarily the European and United States (US) markets. The dominance of Asia in the industry has made it increasingly difficult for other producers around the world to compete, including those in Latin America and the Caribbean. Countries from LAC have participated in this globalized industry. However, there are currently no Latin countries amongst the leading ten exporters despite their proximity to the US. This report explores whether changes to the global industry brought about or accelerated by the COVID-19 pandemic and the changing geopolitical landscape have created new opportunities for countries from the region to take on more relevant roles.

After years of geographical shifting, the past decade has seen sourcing practices in the apparel and textiles industry consolidate. Supply has been concentrated in Asia, led by China, together with Bangladesh and Vietnam which collectively accounts for more than half of all exports. Brands and retailers – the lead firms in the industry – have increasingly focused on working with these locations and their suppliers which can provide consistent quality and lead times, as well as produce a wide variety of garments at a competitive price. This has favored regionalization and vertical integration of production in Asia. The region's success has been built on close proximity to a comprehensive supply of textiles and accessories, low-cost labor with broad capabilities, and highly efficient logistics operations. The COVID-19 pandemic, together with rising geopolitical tensions between the US and China, however, has disrupted this well-established business model over the past two to three years. This creates the most significant opportunity of the past decade to reconfigure the geography of the supply chain; as a small, but long-term supplier, with proximity to the world's largest single market, Latin America is well-positioned to benefit from these changes. However, successfully taking advantage of this opportunity requires proactive changes to the way region has participated in the industry in the past.

As a region, Latin America and the Caribbean (LAC) has underperformed in the textiles and apparel global value chain (GVC). It accounts for just a 4% global market share and only 5 countries export more than US$1.5B of apparel products. Regional exports are dominated by Mexico and four Central American countries: Honduras, Guatemala, El Salvador, and Nicaragua. Mexico has seen its competitiveness in the industry erode steadily in the past two decades and no longer counts amongst the top ten global exporters. In its place, Honduras has taken the lead of regional exports. Together, the four small Central American countries account for over half of LAC's exports and account for the majority of growth in the region, and thus are the primary focus of this report. Their GVC role is concentrated in apparel production, with few countries engaged significantly in textiles. Apparel production, in turn, is dominated by manufacturing of basic products (t-shirts, sweaters) from cotton materials, almost exclusively destined to the US market. Few higher value services activities are undertaken. Generally, the four countries have made little progress upgrading into non-manufacturing activities, including design, branding, and sales. This GVC profile reflects the strong dependence of the region on exports under the Central American Free Trade Agreement – Dominican Republic (CAFTA-DR). This agreement requires yarn to be manufactured in CAFTA-DR countries for apparel products to qualify for duty-free access to the US market. This has favored primarily basic cotton products thanks to the supply of US cotton. Yet the region has been unable to capture a greater share of the rapidly growing, higher value synthetics market due to limited availability of competitive synthetic textiles amongst signatories. The agreement has allowed countries from the region to remain competitive in the global industry in the face of strong, low-cost Asian production. However, at the same time, it has locked these producers into the manufacture of a small set of low-value items. There has been virtually no product upgrading amongst exports since the agreement came into place in 2006.

The combination of pandemic with geopolitical disruptions, however, opens a window of opportunity for these countries to upgrade their participation in the GVC and capture a higher market share. Specifically, the disruptions to the supply from Asia as a result of both the US-China trade tensions and the COVID-19 pandemic have converged with other major trends in the industry, including the rise of fast fashion, growing interest in sustainable production, and the acceleration of e-commerce, to lead buyers to re-evaluate their sourcing strategies. Buyers are seeking production locations which minimize their risk and reduce overdependence on any one site; these must be flexible to respond to rapidly changing market demand; close to market to reduce potential logistics

disruptions; sustainable to cater to consumer interest; vertically integrated to guarantee quick access to inputs; and, efficient to cut lead time, all the while also providing high quality, broad production capabilities at low cost. This clearly raises the bar for participation in the GVC.

Given the importance of the industry to Central American economies – in Honduras, T&A accounts for approximately half of all exports – the region cannot afford to miss out on this opportunity. Nonetheless, meeting these new requirements is not simple. Central American countries need to upgrade various aspects of its GVC participation in order to become serious contenders in the reconfiguration of the industry: (1) Develop backward linkages into yarn and fabric production, particularly in synthetic fibers; (2) Focus on the production of sustainable textiles; (3) Switch from high volumes/low mix to a high mix/low volume model to facilitate product upgrading into higher value products; (4) Functionally upgrade into distribution with direct-to-consumer cross border e-commerce; and (5) Improve processes (process upgrade) to improve lead time and enhance sustainability across production.

Achieving this upgrading requires numerous policies and programs to be put in place to overcome a series of constraints that have contributed to the sector's general inertia across the region. Challenges include a limited labor pool with low levels of education, and comparatively high minimum wages with unpredictable renegotiations; significant cost and time barriers to intra-regional trade; steep electricity prices and unreliable supply; the exclusion of foreign textiles from duty-free market access; and a lack of leadership at the private sector, national and regional level to drive collaborative industrial policy for building a regional production hub. Policies should focus on developing human capital through industry-specific training initiatives; intensifying investment attraction efforts; and aggressively investing in both hard and soft infrastructure to reduce barriers to trade and enhance lead time responsiveness. The private sector in each country must also take a proactive stance. This includes developing a strategy and action plans for each country; creating a regional working group with representatives from each country association to develop a collaborative regional upgrading strategy; aligning upgrading goals across the region; coordinating capabilities development; driving vertical integration of the regional value chain; and streamlining logistics operations. Finally, the group needs to launch a joint marketing campaign to ensure buyers perceptions align with the region's existing and potential capabilities.

This report is structured in the following way: First, the global industry is analyzed to fully understand how the GVC operates, how it is geographically fragmented around the world and which industry actors influence who participates in the chain. Next, the report analyzes the trends that are shaping the GVC to identify what potential opportunities are being created for suppliers. The second section of the report analyzes the role of Latin America and the Caribbean countries in the industry, focusing specifically on the countries from Central America which concentrate the majority of Latin America's apparel exports. The report concludes with proposed upgrading strategies and recommendations for policies and programs to help the region achieve these goals.

2. THE GLOBAL TEXTILE AND APPAREL INDUSTRY

The global textile and apparel industry (T&A) has expanded rapidly since the 1970s, drawing most developed and developing countries into the value chain during the course of the next half century. Today, the sector is a multi-trillion dollar global industry and the 7th most traded industry in the world (Passport Euromonitor International, 2015 - 2020; UN Comtrade, 2021). Global trade more than doubled in value between 2000 and 2019 to reach US$414B in 2019 (UN Comtrade, 2021). Labor-intensive apparel production provides employment to tens of millions of workers in some of the least-developed countries in the world (Grand View Research, 2021; ILO, 2021b; UNECE, 2018) and low-income countries account for the majority of the world clothing exports (ILO, 2021b). Indeed, apparel production is considered a springboard for economic development, and often considered a "starter" industry for countries engaged in export-oriented industrialization due to its low fixed costs and emphasis on labor-intensive manufacturing (Gereffi & Memedovic, 2003).

The sector has been the quintessential example of a buyer-driven commodity chain marked by power asymmetries between the suppliers and global buyers of final apparel products (Gereffi & Memedovic, 2003). Global buyers determine what is to be produced, where, by whom, and at what price. These lead firms include retailers and brand owners and are typically headquartered in the leading markets—Europe, Japan, and the United States. In most cases, these firms outsource manufacturing to a global network of contract manufacturers in developing countries that offer the most competitive rates, while performing the most valuable activities in the apparel value chain—design, branding, and marketing of products in their home operations or close to major global markets. As this globalized business model has matured and gained complexity, it has become increasingly common for highly capable intermediaries to take on the responsibility of coordinating these large networks (Azmeh & Nadvi, 2014; Frederick & Daly, 2019; Shin, 2019), with buyers providing oversight down to the factory level through a range of global standards. By the turn of the century, most lead firms had implemented private standards and codes of conduct based on cost, quality, timeliness, and corporate responsibility in terms of labor and environmental standards (Bartley, 2005; Gereffi, Garcia-Johnson, & Sasser, 2001). Factory performance is measured regularly, and delivery, quality, and price are tracked over time. It is common for factories to be certified by multiple buyer brands, such as Walmart, Ralph Lauren, Target, and The Gap.

Geographic global sourcing models have shifted significantly as the industry has evolved, both as a result of changes in multilateral and bilateral agreements as well as the economic development and entry and exit of supplier countries. In the early 2000s, the industry was still shaped by quotas put in place under the 1974 Multi Fibre Agreement to protect developed economy manufacturers from cheap imports from the developing world. Yet, the phasing out of these quotas by 2005, China's 2001 ascension to the World Trade Organization (WTO), and a number of preferential trade agreements saw rapid and significant changes to the geography of production. As a low-cost location, China immediately became the most relevant exporter in the industry. Trade agreements and preference schemes with specific apparel and textile clauses came into effect during this phase-out period to ease its impact on least developed countries. These trade agreements have been fundamental to enabling small countries such as Nicaragua and Lesotho to continue to compete in the global apparel industry. These agreements include the Central American Free Trade Agreement-Dominican Republic (CAFTA-DR) which provides the six Central American countries with tariff free access to the US market; the African Growth and Opportunity Act (AGOA) in which the United States provides temporary relief to sub-Saharan African producers; and the EU's Generalized System of Preferences (GSP) scheme "Everything but Arms," which provides for duty free imports from certain least developed countries to the EU, amongst others.

Trade agreements helped, but they were insufficient in the face of China's competitiveness. This plethora of trade agreements facilitated the participation of multiple, small developing countries (e.g. Honduras, Jordan) into the industry in the face of rising competition from China and other producing locations with a large, low-cost workforce. However, despite these efforts, today, the global industry is led by strong Asian suppliers. The end of quotas particularly benefited China, which rapidly increased its global market share from 26% in 2005 to a peak of 41% in 2011, accounting for an estimated 76% of global employment in the sector (Fernandez-Stark, Frederick, & Gereffi, 2011b; UN Comtrade, 2021). China's dominance over the industry has been based on low-cost labor, backward linkages into the textiles segment, and economies of scale combined with strong logistical services to reduce lead time. In addition, it developed strong capabilities across multiple product categories and in all textiles groups. Economic development in the country, however, meant rising labor costs and a reorientation of the government policies towards the domestic market and higher value industries has reduced its role in global apparel trade since it peaked in 2011 (Frederick, 2016; Gereffi & Esra, 2010; F. Li, Frederick, & Gereffi, 2018; McKinsey & Company, 2013). By 2019, median

textile and apparel wages in key manufacturing provinces had reached US$790/month (Guangdong Provincial Department for Human Resources and Social Security, 2020), and China's share of global exports had declined to 30% (UN Comtrade, 2021).

Southeast Asia and South Asia have benefited notably from China's waning participation. Bangladesh and Vietnam, which were already amongst the leading exporters in 2011, have subsequently doubled their apparel exports both in absolute terms and in market share, solidifying their positions as global industry leaders. These were followed by Cambodia and Myanmar, both of which grew rapidly during the past decade. Overall, these Asian countries benefitted significantly from low labor costs, their proximity to China and regional input production, strong influx of FDI, and supportive government policies (Lopez-Acevedo & Robertson, 2016). Other lower-cost locations, including Turkey and Pakistan, steadily increased their share as well. While Mexico had been a leading exporter during the 2000s, by 2011 the country's competitiveness vis-a-vis Asian suppliers had eroded, and no Latin American countries have ranked amongst the top ten during the past decade.

In recent years, two new drivers have begun to impact the global distribution of the industry: fast fashion and ethical and environmental awareness amongst buyers. While low-cost labor and capabilities have been decisive factors in global sourcing since 2005, resulting in a dominant Asian supply chain, other drivers emerged during the 2010s. These include the rise of the fast fashion business model which requires flexible production to meet shorter retail cycles, and a growing awareness of ethical, social, and environmental issues. Buyers are looking for competitive supplier locations with close proximity and which comply with ethical and environmental requirements, but which also boast preferential market access.

Over the decade, the rise of "fast fashion" houses, including Inditex (Zara), Fast Retailing (Uniqlo, J. Brand) and Hennes & Mauritz (H&M), has begun to alter the way business is done. Fast fashion offers fashionable clothes at affordable prices (Caro & Martínez-de-Albéniz, 2015). These brands place new designs on the market in as little as two to six weeks, allowing the market to dictate what is produced (Arigo, 2016).[1] This requires a highly responsive supply chain, prizing vertical integration of textiles production with apparel manufacturing, favoring proximity but also demanding a wide range of capabilities across multiple products. In the past, designers planned their collections up to

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[1] n Brands define their products based on fashion house trends; ongoing production and replenishment then closely follow sales data, producing what the market is demanding. These collections can be brought to market within a very short period, between two to six weeks.

18 months ahead of sales, incorporating long lead and shipping times from production sites. However, there is considerable market risk involved as inventory is produced far ahead of sales. Fast fashion business models reduce this uncertainty, and can improve the economic performance of brands (Arigo, 2016; Y. Li, Zhao, Shi, & Li, 2014). This production model favors locations with short shipping distances to market. For example, European fast fashion increased dependence to a large degree on countries in Eastern Europe and the Middle East and North Africa, including Turkey, Morocco, Egypt, and Tunisia.

The decade has also been defined by increasing ethical and environmental concerns for how clothing is produced. The 2013 disaster in Rana Plaza, Bangladesh highlighted the precarious conditions under which global apparel workers were operating and contributed to a rise in social auditing of producers (Frenkel & Schuessler, 2021). Programs such as International Labor Organisation's (ILO)- International Finance Corporation (IFC) Better Work, which provides trade support and capacity building in the sector to improve labor conditions rapidly gained momentum (Better Work, 2021), and as did international accords such as the Bangladesh Accord which bring together both employers in large MNCs and global labor representatives (Alamgir & Banerjee, 2018; Amengual, Distelhorst, & Tobin, 2019; Bair, Anner, & Blasi, 2020; Hadwiger, 2015).[2] It has also led to brands reevaluating where they produce their apparel; some firms, such as market leader PVH (#8),[3] began shifting an important share of their production to new, non-Asian sites (Mihretu & Llobet, 2017). Concerns in 2020/21 over forced labor in China's leading cotton producing region, Xinjiang Province, became a critical issue for the industry. Leading global brands, including Inditex (#1), H&M (#3), Nike (#4) and Adidas (#5) suspended their operations in the region despite the consequences of losing ground in the large Chinese market (BBC, 2021c; Hughes, 2021).[4] Despite its economy being relatively insulated from the global pandemic shutdowns, Chinese exports to the US in 2020 and 2021 compared to 2019 levels declined significantly. In 2020, it experienced the third highest percentage decline amongst leading exports to the US, while in 2021 it was experienced the largest

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[2] In Global Framework Agreements (GFAs), corporations consent to respect workers' rights and to promote decent work globally within their subsidiaries and along their GVC. These agreements address a wide range of issues including fundamental labour and social rights, working conditions, industrial relations, health and safety conditions, training, and environmental protection provisions in more than one country and often worldwide (Hadwiger, 2015).

[3] When large brands or retailers are included throughout the report, their market position for 2020 is included in parenthesis based on reviews of Annual Reports and Passport Euromonitor International (2015 - 2020).

[4] Of the top five leading companies, only Fast Retailing Co continued to produce in the province, however, they made public statements declaring that no forced labor was used in the production of their clothes (Nikkei Asia, 2020). The company is significantly exposed to the Chinese market, which accounts for approximately 30% of sales (Fast Retailing, 2020).

decline (-29%, see Figure 14), twice as much in percentage terms than any other leading exporter to the country (USITC, 2021).

Furthermore, the rising consumption of clothes which are only fashionable for a short period has compounded concerns about the environmental impact of the industry. Awareness has grown about the sector's poor sustainability performance. Water-intensity in cotton production, pollution from dyeing, emissions from manufacturing and a globalized trading system, poor recycling of clothing, and the impacts of textiles on micro-plastics have all become major issues for the industry (EMF & CFI, 2017). It is estimated that just 1% of materials used in the industry are recycled (EMF & CFI, 2017) and an estimated 92 million tonnes of textiles waste is generated every year (BBC, 2020; CALPIRG, 2021). Growing visibility of this problem, together with global climate change commitments following the 2015 Paris Agreement, has prompted leading brands to begin to take action to improve their metrics, from production to disposal. Leading brands signed up for the 2018 United Nations Fashion Charter on Climate Action, increased the use of recycled materials in production, launched recycling programs, and have put pressure on their supply chains to improve the environmental impacts of their operations (UN, 2018; UNFCCC, 2018, 2021b). However, to date, there is limited evidence that this has led to restructuring of the supply chain to favor greener locations or those that are closer to market.

The COVID-19 pandemic has significantly disrupted this well-established business model, exposing key shortcomings of the industry's sourcing patterns. Lockdowns upset global availability throughout the supply chain, from equipment to textiles, trim and accessories, as well as apparel itself. They also rapidly upset mature seasonal demand trends, with high demand for casual wear and an absolute drop-off for demand for formal business wear. Continued disruptions in Vietnam – the fourth largest exporter in the world - in supplying the global holiday season has highlighted brand overreliance on concentrated sourcing strategies. Athleisure wear companies are particularly exposed to challenges in Vietnam. Columbia, Nike, and Under Armour source more than 40% of their production from the country (CNBC, 2021b). As a result, there is emerging interest from buyers to redistribute some production to locations with vertically integrated and flexible chains in an attempt to minimize these disruptions. Finding other locations that can supply consistently, however, is challenging. Some analysts suggest that regionalization of supply could be the most effective strategy for brands. In the Western Hemisphere, this would consist of Central America servicing a greater share of the large US market. The role of Central America and its potential to rise to this opportunity will be examined in

the following sections (i.e. the next submission). This section specifically examines the evolution of the global industry, including the trends emerging as a result of the crisis.

A. THE TEXTILE & APPAREL GLOBAL VALUE CHAIN

i.   Mapping the Global Value Chain

The textile & apparel global value chain (T&A GVC) is organized around five main segments: 1) design; 2) pre-production logistics; 3) production networks made up of garment factories, including their domestic and overseas subcontractors; 4) distribution channels established by trade intermediaries; and 5) marketing and sales networks at the retail level (see Figure 1). Pre-production logistics intersects with textiles fabrication - sourcing of raw material supply (natural and synthetic fibers), the provision of components, such as the yarns and fabrics manufactured by textile companies, and the supply of accessories (e.g. buttons and zippers) and trim. As in many other sectors, the apparel GVC is both organizationally and geographically fragmented; the production of components and assembly into final products is carried out via inter and intra-firm networks on a global scale. Each of these stages of the GVC are detailed further below.

Figure 1. *The Textiles and Apparel Global Value Chain*

RAW MATERIALS &INPUTS	COMPONENTS (TEXTILES)
NATURAL FIBERS (COTTON, WOOL)	YARN PRODUCTION
SYNTHETIC FIBERS	FABRIC PRODUCTION
TRIM	KNIT
MACHINERY	WOVEN
NON-ESSENTIALS	FABRIC FINISHING

DESIGN (ODM)	PRE-PRODUCTION LOGISTICS (OEM)	APPAREL PRODUCTION (CMT)	APPAREL PRODUCTION (CMT)	APPAREL PRODUCTION (CMT)
CREATIVE DESIGN	SOURCING	CUTTING	WHOLESALERS	BRANDING
TECHNICAL DESIGN		SEWING	AGENTS	RETAILING
CAD		FINISHING	LOGISTICS FIRMS	IN STORE
				ONLINE

PRODUCT CATEGORIES

TROUSERS	SWEATSHIRTS
WOVEN SHIRTS	KNIT SHIRTS
DRESSES/SKIRTS	
MISC. & ACCESSORIES	
COATS	UNDERWEAR
SUITS/FORMAL	HOSIERY/SOCKS
BRAS	BABY

Source: Authors adapted from Frederick and Daly (2019).

1) **Design (ODM):** This stage includes actors that offer design services and product development for outputs and components throughout the value chain. Design is comprised of two categories – 1) *creative design*, which is focused primarily on aesthetics, that is, the fashion elements, and 2) *technical design* which is focused on product performance. During this stage, these two design features are developed, together with efforts to minimize production costs and identify strong competitive advantage opportunities in the target markets (Fernandez-Stark, Frederick, & Gereffi, 2011a). In the high-end segments of the

market, this design function is carried out in-house. However, in consumer brands which tend to follow the leadership of the high-end market, this design function may be outsourced to Tier 1 producers (Frederick & Daly, 2019).

2) **Pre-Production Logistics (OEM):** This stage refers to the inbound processes involved in purchasing and transporting textiles, trim and accessories. It includes physically transporting products as well as managing or providing technology and equipment for supply chain coordination. Logistics can involve domestic or overseas coordination (Fernandez-Stark et al., 2011b). Sourcing activities include procuring yarn, fabrics, trim and accessories to complete the garment design. In the early stages of globalization of the industry, this activity was undertaken by the buyer, however, today, these activities are largely undertaken by Tier 1 or OEM firms. These firms may source textiles from third parties or have vertically integrated into textiles production (Shin, 2019). This segment of the chain directly intersects with the textiles supply chain (see Box 1).

Box 1. Backward Linkages in Textile Production

Inputs: Textile production is an essential input into apparel fabrication, alongside the production of trim and accessories (buttons, hangers, tags, and zippers, etc.). Other inputs include capital equipment and machinery – such as spinning and sewing machines, packaging materials, and transversal services in transportation, logistics, human resources, etc. Textiles, however, is by far the most important category and accounts for the largest share of sourcing expenses, in some cases it can be as high as 70% (Lopez-Acevedo & Robertson, 2016).

Textiles production covers the sourcing of raw materials to produce fibers to their final production as fabric. Fibers are spun into yarn, before being knitted or woven into fabrics. These fabrics are generally classified by the type of fiber. Natural fibers include cotton, wool, silk, and flax. Of these, cotton is the most widely used, with wool and silk accounting for marginal market shares, despite having the highest unit values in apparel (UN Comtrade, 2021). Synthetic fibers are based on chemical processes and are generally classified as man-made fibers (MMF). The use of MMF has increased notably over the past two decades, with cotton steadily losing market share (see Figure 2), with unit values of apparel produced from MMF generally higher than that of cotton garments. Textiles production is generally capital and energy intensive. Energy intensity can vary by type of material used: one kilogram of apparel made of polyester uses approximately three times the energy for an equal quantity of cotton (Bowyer et al., 2019). The stages from fiber, yarn and textile production may be geographically fragmented, with specialized companies undertaking each process. The segmentation of this stage from apparel production is more clear-cut between woven fabrics and apparel, whereas knit fabric production may be more integrated with the apparel fabrication process (ASEAN, 2020).

Figure 2. *Share of Apparel Exports by Material, 2011-19*
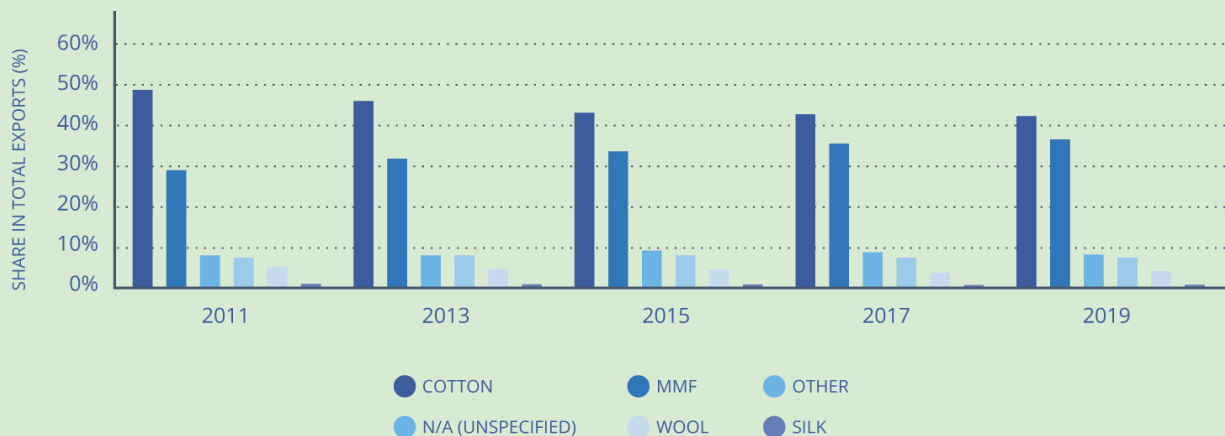
Source: UN Comtrade (2021).

1) **Apparel Production:** Apparel manufacturers cut and sew woven or knitted fabric or knit apparel directly from yarn. The cut-and-sew classification includes a diverse range of

establishments making full lines of ready-to-wear and custom apparel. Apparel manufacturers can be contractors, performing cutting or sewing operations on materials owned by others, or jobbers and tailors who manufacture custom garments for individual clients. Firms can purchase textiles from another establishment or make the textile components in-house. Most of the activities in this stage of the chain are labor-intensive and require simple technologies. There has thus been a strong pattern to locate this production stage in low-cost developing countries.

Capability requirements vary depending on the specific apparel category being produced; these can be categorized in 14 groups (Frederick & Daly, 2019): Trousers; sweaters and sweatshirts; knit shirts; coats, woven shirts; dresses and shirts; underwear and pajamas; suits and formal wear; miscellaneous apparel; accessories; athletic apparel; hosiery & socks; bras; and baby apparel. Men's wear is considered lower complexity than women's wear which tends to be more fashion-oriented; knit shirts and sweatshirts are lower value items, requiring minimal sewing and less precision in size, compared to items such as athletic apparel and underwear (bras) which are of higher value due the detailed sewing and sizing required in their production. Women's wear suppliers must have higher capacity for short lead times and more design and detail related production. Table 1 details global exports and growth of each of these product categories over the past decade.

Table 1. World Apparel Exports by Product Categories, 2011-19

PRODUCT CATEGORY	VALUE (US$, BILLIONS)					WORLD SHARE (%, 2019)	CAGR (%, 2011 - 19)
	2011	2013	2015	2017	2019		
Total	379	381	381	390	414	100%	1.1%
Trousers	72	75	76	79	84	20%	1.9%
Sweaters	53	52	51	51	56	13%	0.6%
Knit Shirts	50	49	48	50	53	13%	0.8%
Coats	34	33	35	37	43	10%	3.2%

Dresses & Skirts	27	27	27	28	33	8%	2.3%
Woven Shirts	29	29	30	29	27	7%	-0.7%
Underwear, Pajamas	21	20	20	20	21	5%	0.1%
Suits/Formalwear	20	20	18	17	18	4%	-1.4%
Misc. Apparel	14	15	16	16	17	4%	2.9%
Athletic	14	13	14	15	16	4%	2.1%
Accessories	15	15	15	14	14	3%	-1.0%
Hosiery & Socks	11	12	11	12	12	3%	0.5%
Bras	10	11	11	12	11	3%	0.7%
Baby	10	10	10	10	10	2%	-0.9%
Trousers, Sweaters, Knit Shirts	**175**	**176**	**175**	**180**	**192**	**46%**	**1.2%**
Coats and Dresses & Skirts	**61**	**59**	**62**	**66**	**76**	**18%**	**2.8%**

Source: UN Comtrade (2021). Note: The product categories are ordered by value of international trade.

2) **Distribution (OEM):** After apparel is manufactured, it is distributed and sold via a network of wholesalers, agents, logistics firms, and other companies responsible for value-adding activities outside of production. These operations include important shipping functions, with product being either shipped by sea freight or air freight (Moazzem, Crossin, Daver, & Wang, 2021). Sea freight is typically used for large volume orders, or where similar orders in the same region are destined to multiple buyers. Air freight, while faster and represents lower risk, is generally reserved for high value to volume products with small order quantities due to higher relative cost. In addition to accurately managing shipping and logistics, distribution operations must include inventory and warehousing management, and carry out forecasting and planning functions (Tanaka, Ishigaki, Suzuki, Hamada, & Kawai, 2019). This stage of the

value chain has become increasingly important in recent years due to growing demand for reduced shipping times, a push to reduce unnecessary inventory, and a need for improved visibility throughout the chain.

3) **Marketing and Sales (OBM):** This stage covers all activities associated with pricing, distributing, and selling the physical apparel product, including marketing and branding. The companies that participate in these activities are often the lead firms in the chain. These companies generally do not intervene in the product once it is received, and in many cases, factories ship directly to the distribution centers or stores of these firms. Apparel is marketed and sold to consumers (via retail channels), institutions or the government. Retail channels may include store-based, online-based, or multi-modal sales operations which combine elements of both presential and digital sales. This stage of the chain accounts for the highest value addition in the chain (Fernandez-Stark et al., 2011b).

ii. Upgrading

Upgrading within the chain, describes how different actors – both firms and countries – can increase the value captured by their participation in the industry. This is possible due to the distribution of value throughout different stages of the chain. Typically, the highest value stages of the chain are design and marketing and sales, while the lowest are in the production stages. The continual entry of lower-cost locations into the industry accentuated the value division across industries, with apparel production accounting for a considerably lower share of value compared to other activities within the chain, motivating countries in the industry to seek new avenues to gain value. As the global industry has matured, multiple upgrading pathways have been established for firms and countries seeking to gain greater value from their participation in the industry (Bair & Gereffi, 2003; Frederick, 2010; Frederick & Gereffi, 2011; Gereffi, 2005; Morris & Staritz, 2014; Rossi, 2013). These upgrading strategies have been well-documented in the literature and are detailed below and in Table 2.

Functional Upgrading Paths

Functional upgrading: entails acquiring new functions (or abandoning existing functions) to increase the overall skill content of the activities (Humphrey & Schmitz, 2002).

- **Entry into the chain via Assembly/Cut, Make, Trim (CMT):** This is the most basic stage of the apparel industry, in which garment sewing plants are provided with imported inputs for

assembly. The apparel manufacturer is responsible for cutting, sewing, supplying trim, and/or shipping the ready-made garment. The buyer purchases the fabric and supplies it to the manufacturer, along with detailed manufacturing specifications. The contract manufacturer has a variety of customers and does business on an order-by-order basis. Work is frequently carried out in Export-Processing Zones (EPZs), special economic zones, or in geographic locations that offer tariff reductions for export production to the buyer's country. It is not unusual for local firms to undertake CMT activities, subcontracted by foreign firms in other stages of the chain.

- **Upgrading to become an Original Equipment Manufacturing (OEM)/Full Package/Free on Board (FOB):** The apparel manufacturer takes responsibility for all production activities including sourcing, the CMT activities as well as finishing and distribution. The firm must have upstream logistics capabilities, including procuring and financing the necessary raw materials, piece goods and trim needed for production. In some cases, the buyer specifies a set of textile firms from which the garment manufacturer must purchase materials, and in other cases, the firm is responsible for establishing its own network of suppliers. The firm is also often responsible for downstream logistics, including packaging for delivery to the retail outlet and shipping the final product to the buyer at an agreed selling price (also referred to as FOB).4F[5] The buyer typically provides the FOB contractor with the product specifications and designs, but the buyer is not involved with the details of the manufacturing process.

- **Original Design Manufacturing (ODM)/Full Package with Design:** A business model that includes design in addition to manufacturing. A garment supplier that does full package with design carries out all steps involved in the production of a finished garment, including design, fabric purchasing, cutting, sewing, trimming, packaging, and distribution. Typically, the supplier will organize and coordinate: the design of the product; the approval of samples; the selection, purchasing and production of materials; the completion of production; and, in some cases, the delivery of the finished product to the final customer. Full package with design arrangements is common for private-label retail brands.5F[6] It is increasingly common

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[5] Free on Board (FOB) is a common term used in industry to describe this type of contract manufacturer. However, it is technically an international trade term of sale in which, for the quoted price, goods are delivered on-board a ship or to another carrier at no cost to the buyer.

[6] Private label retailers are retailers that own their brands, for example, Target's C&A brand. They do not manufacture their products. See Table 4 for a description of different types of lead firms.

for ODM operators to also outsource the lower value apparel production processes to sub-contractors, focusing on their core competencies of coordination.

- **Original Brand Manufacturing (OBM):** A business model that incorporates branding of products, in addition to or in lieu of design and manufacturing; upgrading involves a move into the sale of own brand products. Many firms in developing countries enter OBM with brand development for products sold on their domestic or neighboring country markets.

- **Backward Linkage Development into Textiles:** Full package firms have two sourcing possibilities: a) imported textiles; and b) domestic sourcing of textiles from the local industry. This latter option can create important backward linkages to the textile industry and many countries begin textile production by manufacturing textiles to be used in their apparel exports. This facilitates access to inputs, reducing lead time. This vertical integration is also occurring within firms. However, this is primarily with very large apparel producing firms also producing upstream textiles. This strategy is generally referred to in the literature as "backward linkage development into textiles" in the industry (Lopez-Acevedo & Robertson, 2016).[7] This allows the GVC actor (firm or country) to capture both the value of the textile production and the apparel production.

While functional upgrading is typically prioritized, it should be noted other upgrading strategies, such as **product and process, and market upgrading** in a country can be very important for driving growth in the industry:

- **Product Upgrading:** The production of more complex products, which requires increasing the capabilities of the firm, that is, firm "learning." As countries gain experience in the industry, they can move from low-cost commodities to higher value-added fashion goods that warrant higher returns as labor rates increase (e.g., basic to complex products). For example, moving into the production of women's apparel requires considerably more detail, from patterns and sizing to trim and accessories than a standard knit shirt. Generally, the more complex the apparel product, the higher its unit value; in most countries in the industry, the value of a knit shirt is half as much as the unit value of a dress or skirt

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[7] Whitfield, Staritz, and Morris (2020) refer to this upgrading strategy as "localization", however, the term has not yet been widely adopted.

(Lopez-Acevedo & Robertson, 2016).7F[8] Upgrading to have capabilities across a wide range of products from basic to complex makes a country a more attractive sourcing location for buyers.
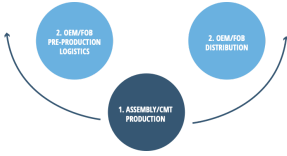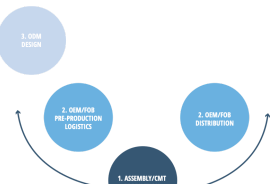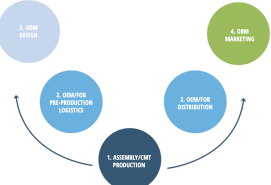
- **Process Upgrading:** This reduces cost and enhances flexibility by improving production methods; it requires capital investment and better worker skills to operate new machinery and/or information and logistics technology. Process upgrading can contribute to reduced lead time by improving efficiency across the production operations, as well as improving reliability for final products.

- **Market Upgrading or Diversification:** This upgrading strategy involves reducing dependency on specific markets by expanding the number of markets served, or by shifting from lower paying markets to markets that tend towards higher unit values. Diversifying end markets not only increases growth prospects—especially since mature markets such as (the United States and the EU-15) are experiencing a slowdown in demand—but it also reduces risks and dependency on certain markets and buyers (Frederick, 2016).

- **Environmental & Social Upgrading:** Increasingly, ethical and environmental metrics are becoming relevant for process upgrading – that is, how is the product being manufactured. This includes the incorporation of stricter labor and sustainability standards into production, such as the use of renewable energy and the reduction of pollution in operations. Environmental initiatives do not necessarily yield to higher profits (Goger, 2013) as buyers do not typically offer higher prices, however given changing priorities in the industry, this could eventually dictate whether firms can or cannot participate in the chain (Khattak & Park, 2018; Khattak, Stringer, Benson-Rea, & Haworth, 2015).
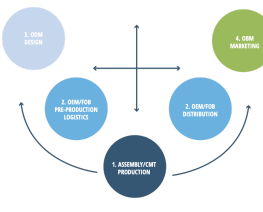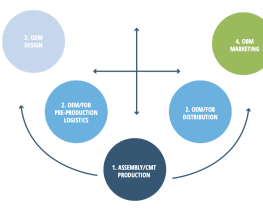
Table 2 provides detailed illustrations of these upgrading trajectories in the T&A GVC, with examples from the developing countries we are focusing on in this report.

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[8] The highest unit value, however, cannot necessarily be interpreted as having the highest value addition or the highest margins. Calculations on individual margins vary significantly by company and are complicated by individual firm strategies—some companies will take a loss on certain products in order to maintain relationships with buyers.

Table 2. *Examples of Upgrading Trajectories in the Apparel Global Value Chain*

TYPE	DIAGRAM	DESCRIPTION
Assembly/ CMT (Entry in the value chain)	1. ASSEMBLY/CMT PRODUCTION	● Assembly (CMT): the focus of the supplier is on production alone; suppliers assemble inputs, following buyers' specifications.
		E.g., Lesotho entered the value chain in assembly in the 1990s. Firms were almost entirely foreign-owned. Product focus was relatively narrow and concentrated in trousers and knit shirts. Apparel companies in Lesotho imported material inputs like fabric and clothing tags due to availability and quality concerns over local inputs
Full Package/O EM (Functional Upgrading)	2. OEM/FOB PRE-PRODUCTION LOGISTICS / 2. OEM/FOB DISTRIBUTION / 1. ASSEMBLY/CMT PRODUCTION	● Firm takes on a broader range of tangible, manufacturing-related functions, such as sourcing inputs and inbound logistics as well as production. In addition, the supplier will take on outbound distribution activities.
		E.g., Bangladesh moved into the OEM stage by developing a domestic textile industry for knitted textiles. Textile production began with knitted fabric, and moved into yarn, before finally moving into woven fabrics. Local apparel firms were responsible for sourcing these textiles locally to incorporate into final apparel exports.
Product Design (ODM) (Functional Upgrading)	3. ODM DESIGN / 2. OEM/FOB PRE-PRODUCTION LOGISTICS / 2. OEM/FOB DISTRIBUTION / 1. ASSEMBLY/CMT PRODUCTION	● Supplier carries out part of the pre-production processes such as design or product development. Can be in collaboration with the buyer, or the buyer may attach its brand to a product designed by the supplier.
		E.g., Turkish firms moved into the design segment of the value chain as part of a broader strategy to become a fashion center. Deep relationships with retailers such as M&S that required additional services eventually made design part of being a full-package supplier that needs to deliver a range of products with short lead times. In many cases, ODM firms worked with designers from the lead firms to develop new products.
Product Brand (OBM) (Functional Upgrading)	3. ODM DESIGN / 4. OBM MARKETING / 2. OEM/FOB PRE-PRODUCTION LOGISTICS / 2. OEM/FOB DISTRIBUTION / 1. ASSEMBLY/CMT PRODUCTION	● Supplier acquires post-production capabilities and is able to fully develop products under its own brand names. Two options: (1) Supplier maintains a relationship with the buyer and develops brand collaboratively (2) Supplier establishes its own distribution channels by establishing a new market channel that is typically more profitable and allows the firm to expand skills.
		E.g., In Turkey the apparel industry started shifting towards brand development for both local and regional markets. The Turkish government put incentives in place for firms to upgrade into branding and increase their competitiveness in global markets. Some brands, such as Bilsar, are also opening retail stores in Europe.

Product Upgrading		• Increase unit value by producing more complex products, which requires increasing the capabilities of the firm. Countries must move from low-cost commodities to higher value-added fashion goods that warrant higher returns as labor rates increase. Basic Complex • Examples: Men Women; Basics Niche (design focus or functional focus)
		E.g., In Sri Lanka, apparel manufacturers moved into the production of higher-value, fair trade and organic apparel products through partnerships with lead firms. Fair-trade clothing had gained popularity in the EU, especially in the UK, which is Sri Lanka's second largest export market. Local companies obtained fair-trade and organic accreditations from international certification bodies to supply this growing niche sector with increased values.
Process Upgrading		• Reduce cost and improve flexibility; requires capital investments and increase in workers skills to operate new machinery. • Machinery: improving *productivity* through new capital investments. • Information and Logistics Technology: improving the way the firm carries out these activities. Benefits both the firm and the chain because it reduces the total time, cost and increases the flexibility of the supply chain process. Buyers view this as an important service that enhances their product offering. Fax/Phone Computer-Based Orders
		Key Information Technologies in the apparel value chain: Quick Response Programs and Electronic Data Interchange; Radio Frequency Identification tags; automated distribution centers; product development and design technology: CAD systems and Product Lifecycle management.

Source: Fernandez-Stark et al. (2011b)

iii.   Competitiveness Drivers

There have been continual shifts in the location of the most significant apparel exporters, as well as their main end markets since the industry began to globalize (Gereffi & Frederick, 2010a; Gereffi & Memedovic, 2003; Whitfield et al., 2020). There are multiple factors that contribute to country competitiveness within different stages of this chain, from trade policy and labor availability to connectivity and government investment policy. The relative importance of these factors has shifted over time as the industry's global production model has matured and the international trade policy framework has evolved.

Within the apparel production segments of the chain, competitiveness during the early stages of globalization depended primarily on a combination of trade policy and low labor costs. Today, these factors are closely linked to the capabilities buyers seek in their suppliers: cost; quality, lead time, flexibility and reliability, including access to inputs, full package services, wide range of production

skills and social and environmental compliance (Lopez-Acevedo & Robertson, 2016).

- **Tariff free market access:** Trade policy has, and continues to be, a significant factor to competitiveness of countries with relatively small labor pools. Major markets continue to place tariffs on imports of both apparel and textiles, providing preferential access to select countries/groups of countries. In the US, the average import tariff on textiles and clothing products for a most favored nation (MFN) is 8.83% (2019) (WITS, 2021). It is important for apparel exporters in particular to have tariff free entry of exported apparel into key markets, but also the inflow of textiles inputs for production (Frederick, 2016; IDB, 2021a; Lopez-Acevedo & Robertson, 2016).

- **Labor costs:** Along with textiles inputs, labor costs are the largest cost factor in apparel production. The industry has steadily relocated around the world to lower cost locations, first to Mexico, then to China, followed by Vietnam and Bangladesh (Lopez-Acevedo & Robertson, 2016). Today, this has shifted to even lower labor cost locations such as Cambodia and Ethiopia. Nonetheless, many global buyers suggest that sub-Saharan Africa is the "last frontier for low cost production" (Whitfield et al., 2020, p. 1019), indicating that the search for the lowest cost labor is reaching its limits.

- **Labor skills:** While apparel production, in general, is a relatively low-skilled job that draws heavily on under-educated workers, the skills of this labor are essential for the production of quality garments (Fernandez-Stark et al., 2011b). The broader the labor capabilities available to manufacture a diverse range of products, the more competitive the location as buyers can consolidate vendor operations, allowing them to reduce transaction costs (Lopez-Acevedo & Robertson, 2016). In addition, labor productivity plays an important role in minimizing lead time. High labor productivity in Asia has given the region competitive advantage over other locations, even as labor prices rise.

- **Infrastructure and logistics:** Lead time and reliability are two key elements that global apparel buyers consider when selecting suppliers (Lopez-Acevedo & Robertson, 2016). The efficiency and reliability of transport and port infrastructure within a sourcing location have significant impact on the inflow of inputs, production process and the shipment of goods to market (Frederick & Daly, 2019; IDB, 2021a). Indeed, efficient logistics can be more important than proximity as delays in shipping due to slow or erratic customs processes can undermine

the benefits of short distances. In addition, reliable and affordable energy is important; electricity accounts for approximately 10-15% of the costs of an apparel producer (Paganini & Steenbergen, 2021).

- **Presence of domestic or regional textile sector and co-location of other inputs:** Quick access to affordable, quality textile inputs that qualify under yarn-forward agreements help manufacturers to meet demands for short-lead times and offer flexible supply chain management, and buyers to bring their products to market without facing tariffs and with limited potential for border delays (Frederick, 2016). Nonetheless, duty free imports on textiles to the production location are also important given the wide variety of fabrics required (Frederick, 2016). Asia has positioned itself as the global hub for apparel, producing all type of textiles and accessories required in the manufacture of the final product.

- **Government Support:** Prioritization of the industry, presence of export processing zones (EPZ), investment incentives and training programs are amongst the key initiatives undertaken by national governments to support industry development. These programs signal to investors that the government is committed to the industry's growth and help to reduce overall bureaucratic burdens. Apparel oriented industrial policies are common amongst exporting countries, and EPZs have become a basic requirement for participations in the sector (Farole, 2011; Whitfield et al., 2020; Zhu & Pickles, 2014).

In addition, a large domestic market can play a key role in supporting competitiveness in the development of branding capabilities, such as occurred in China (Frederick & Gereffi, 2011; Zhu & Pickles, 2014) and Turkey (Fernandez-Stark et al., 2011b). Political stability is often also cited as important (Frederick & Daly, 2019), as potential foreign buyers may be deterred from visiting new factories due to poor safety measures. Nonetheless, there are numerous locations around the world where the industry has continued to grow despite political unrest (e.g. Cambodia, Myanmar, and Ethiopia).

Within the textile production segments, competitiveness is driven by access to raw materials, economies of scale, and affordable and reliable energy sources.

- **Access to raw materials:** Backward linkages into raw materials provides countries with an advantage, securing inputs and reducing trade costs. The presence of cotton and silk supply

has helped boost India's production of textiles, while petrochemical feedstock supports the production of man-made fibers. Pakistan has likewise benefitted from its role as a leading global cotton producer to become an important supplier of cotton apparel products (Frederick & Daly, 2019).

- **Energy infrastructure and cost:** Energy costs can account for a significant portion of production costs, depending on the type of materials produced (ITMF, 2019). Synthetic fabrics tend to require more energy than natural fiber-based ones (Munasinghe, Druckman, & Dissanayake, 2021). This requires affordable and stable energy supplies for the installation of operations (Mihretu & Llobet, 2017).

- **Labor skills:** Capital intensity in textiles plants requires skilled operators and technicians to use and maintain specialized equipment from such as fiber extruders, carders, and ring spinners (Lopez-Acevedo & Robertson, 2016; Marketline, 2021).

- **Infrastructure and logistics:** The efficiency and reliability of energy, transport and port infrastructure within a sourcing location have significant impact on the outflow of textiles to apparel manufacturers.

- **Investment incentives & stability:** As a capital-intense segment of the value chain, textile factories require significant upfront investment and are difficult to divest. This creates a notable barrier to entry, and firms seek out investment locations where their operations will be considered secure for a long period. The past decade has seen numerous countries provide incentives to overcome this barrier and encourage the development of domestic textiles industries (Marketline, 2021).

b. GLOBAL TRADE

Textiles and apparel together are the 7th most traded industry in the world (UN Comtrade, 2021), although trade patterns for each have diverged in recent years. Global trade in the apparel alone has grown significantly, more than doubling in value between 2000 and 2019 to reach US$414B in 2019 (UN Comtrade, 2021). Nonetheless, exports in the industry have slowed compared to total goods trade since the global economic crisis in 2008/9. Between 2011-2019, the industry exports grew at just 1.1% CAGR compared to total goods exports at 2.1% (UN Comtrade, 2021). Textiles trade, on the

other hand, has declined over the past decade, contracting 1.4% between 2011 and 2019 as both apparel countries have developed backward linkages into textiles and raw materials providers, such as India, have upgraded into yarn and fabric production.

The global industry consists of strong Asian supply combined with European and North American demand. Asian suppliers account for 8 out of the 10 largest global exporters in 2019. Other regions, including Latin America and the Middle East and North Africa (MENA including Turkey) play more marginal roles as regional suppliers. Sub-Saharan African (SSA) countries have seen some growth in exports to the US and EU, thanks in part to the African Growth Opportunities Act (AGOA) and GSP preferences to Europe (Morris, Staritz, & Barnes, 2011; Whitfield & Staritz, 2021b; Whitfield et al., 2020), but exports from SSA are well below those of other regions. Table 3 details the ten largest apparel exporters over the past decade.

Table 3. *Top 10 Apparel Exporters by Year and Value, 2011 - 2019*

PARTNER	VALUE (US$, BILLIONS)					WORLD SHARE (%)					CAGR (%)	
	2011	2013	2015	2017	2019	2011	2013	2015	2017	2019	2011-19	2015-19
China	157	151	141	131	124	41%	40%	37%	34%	30%	-2.9%	-3.2%
EU-27	78	68	65	71	78	19%	18%	17%	18%	19%	1.3%	4.7%
Bangladesh	22	26	30	35	41	6%	7%	8%	9%	10%	7.9%	7.6%
Vietnam	14	19	24	27	34	4%	5%	6%	7%	8%	11.4%	9.0%
Turkey	16	17	16	18	19	4%	4%	4%	5%	5%	2.2%	4.5%
India	15	14	15	16	16	4%	4%	4%	4%	4%	1.0%	0.9%
Cambodia	6	7	9	11	13	1%	2%	2%	3%	3%	11.0%	8.8%
Indonesia	10	10	10	10	10	3%	3%	3%	3%	2%	0.3%	-0.5%
Pakistan	5	5	6	6	7	1%	1%	1%	2%	2%	5.9%	6.7%
Myanmar	—	—	—	—	6	—	—	—	—	1%	27.9%	38.2%
Sri Lanka	—	5	5	5	—	—	1%	1%	1%	—	2.5%	1.0%

Mexico	5	—	—	—	—	1%	—	—	—	—	-2.1%	-3.0%
Top 5	224	227	227	226	234	59%	59%	60%	60%	58%	0.5%	0.8%
Top 10	253	258	261	263	275	67%	67%	68%	69%	67%	1.0%	1.3%
World	379	381	381	390	414	100%	100%	59%	60%	60%	1.1%	2.0%

Source: UN Comtrade (2021). Note: -- indicates that the exporter was not a top ten exporter that year.

China is by far the largest exporter in the apparel GVC, however, its market share has steadily declined over the past decade, having peaked in 2011 at 41% of global exports. By 2019, it accounted for just 30% of global market share. China's dominance over the industry has been based on low-cost labor, backward linkages into the textiles segment, and economies of scale combined with strong logistical services to reduce lead time. In addition, it developed strong full-package capabilities across multiple product categories and in all textiles groups. However, rising labor costs and a reorientation of the government policies towards the domestic market and higher value industries has reduced China's role in global apparel trade since 2011 (Frederick, 2016; Gereffi & Esra, 2010; F. Li et al., 2018; McKinsey & Company, 2013). In addition, since 2017, numerous Chinese apparel exporters upgraded into direct-to-consumer cross-border e-commerce operations (F. Li, Frederick, & Gereffi, 2019; Matsakis, Tobin, & Chen, 2021),[9] in part driven by the US-China trade war and additional tariffs placed on Chinese apparel items (Euromonitor International, 2021).

Southeast Asia and South Asia have benefited the most from China's decline**.** Bangladesh (#3) and Vietnam (#4), which were already amongst the leading exporters in 2011, have subsequently doubled their apparel exports both in absolute terms and in market share, solidifying their positions as global industry leaders. These two were followed by Cambodia and Myanmar, both of which grew rapidly during the past decade, with a CAGR for 2011-20109 of 8.8% and 38% respectively. Overall, these Asian countries benefited significantly from low labor costs, their proximity to China and regional input production, strong influx of FDI, and supportive government policies (Robertson, 2021). Bangladesh is the lowest-cost country globally in the product categories it participates in – primarily basic commodity items produced in long runs made from cotton (Lopez-Acevedo & Robertson, 2016). The country is heavily dependent on the industry, with T&A accounting for 88% of

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[9] These statistics are not captured adequately in customs trade.

exports in 2019 (UN Comtrade, 2021). Pakistan has also grown notably, supported by its leading position as a global cotton producer; although unlike its Southeast Asian peers, the country's capabilities remain focused on a small set of products (e.g. trousers, knit shirts and sweaters) (Frederick & Daly, 2019). Other important South Asian suppliers like India and Sri Lanka have remained constant, growing at close to global market rates.

The EU, along with neighboring Turkey, and MENA suppliers (e.g. Morocco, Tunisia) have grown steadily during the period outpacing global growth rates. Fast fashion retailers rely on these countries for a significant share of their production to serve the European market. Latin America and the Caribbean, on the other hand, has steadily slipped within global rankings, with Mexico disappearing from the list of the top exporters at the beginning of the decade.[10]

Global Demand

Global demand continues to be led by developed country markets. The EU-27, US, Japan, and the UK are the leading importers by value, collectively accounting for 75% of imports. Nonetheless, these are mature markets with relatively low (or shrinking) growth rates. Important new markets, however, are emerging across Asia. Already sizable markets, China, Republic of Korea, Malaysia, Thailand, India, and Indonesia have all grown at over +5% CAGR since 2011 (Figure 3). This growth has been driven by rapid urbanization and expansion of the middle class combined with rising incomes in these economies (Marketline, 2021). The market in these countries has been further boosted by the rapid and massive expansion of online sales (McKinsey & Company and BOF, 2021). These markets represent an opportunity to diversify end markets, reducing risk and dependency on certain markets and buyers, particularly as the more mature markets slow down (Frederick, 2016).

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[10] Mexico's competitiveness in the sector declined steadily as a result of rising comparative labor costs, lower labor productivity, and a failure to invest in textiles expansions or in product diversification. As buyers looked to source, rather than manufacture, the strong regionalization of the supply chain in Asia along with broad combined capabilities made Asia a much more attractive sourcing location (Frederick & Gereffi, 2011).

Figure 3. *Top 10 Apparel Importers, Value (US$, billion) and CAGR (%), 2011-19*

IMPORT VALUE, 2019 (US$, BILLIONS)
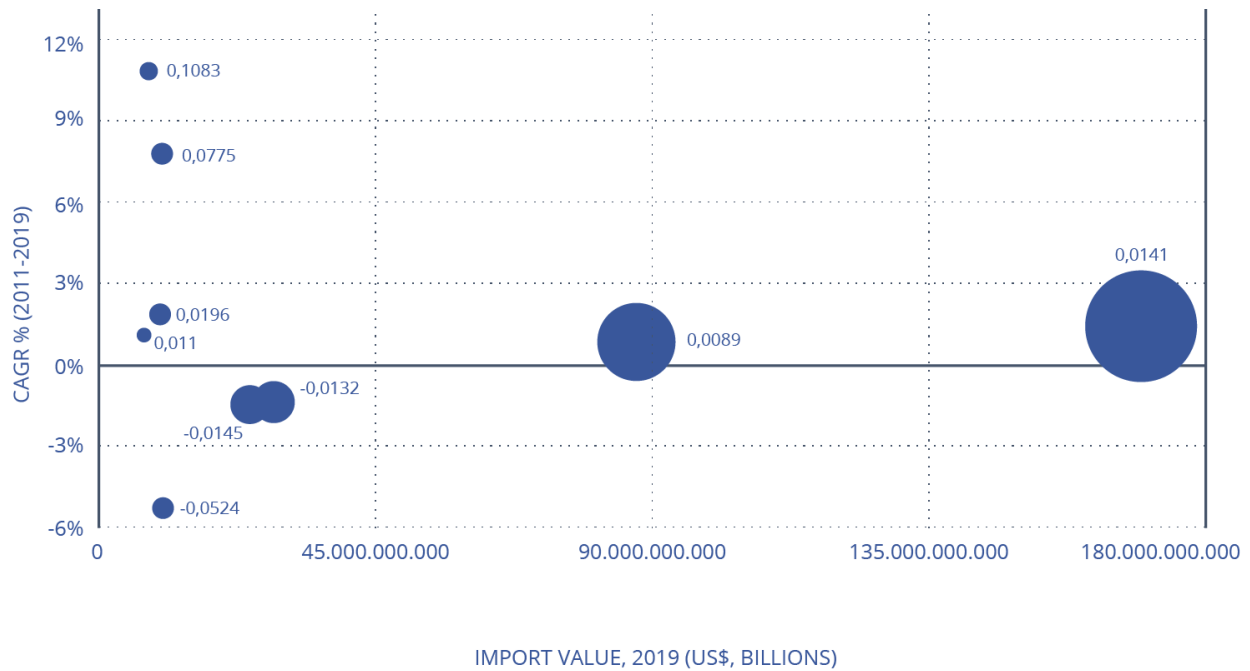
Source: UN Comtrade (2021).

Global trade in textiles has declined notably over the past decade, from US$251B to US$223B in 2019.[11] This trend has been driven principally by the decline in cotton trade, which shrank by 6.1% (CAGR) over the decade as MMF have increased in popularity (see Figure 2), vertical integration of raw materials suppliers into apparel, as well as due to the global cotton crisis which has seen sliding prices and stagnant yields since 2004 as major producers struggle with extreme weather, pest and water problems (Bloomberg, 2021; OECD-FAO, 2019) and production shares of low-yielding countries have been increasing (OCED-FAO, 2021). Six of the leading 10 exporters of cotton, including the US, China, India, and Pakistan saw their exports fall by half in value terms between 2011 and 2010. Other natural fibers – wool and silk – have also seen declines of -6.1% and -2.8% (CAGR) each during this time. Manmade fibers and filaments have also declined slightly, with China being the only country to have increased exports during the period. This provides growing evidence for the vertical integration of production locations with increased domestic provision of textiles.

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[11] Detailed trade statistics are available for all textiles categories in the Appendix.

Regionalization

Regional trade data, illustrated in Figure 4, indicates that while regional supply chains have formed to some extent, they operate in concert with the dominant global chains rooted in Asia.

- Both textiles and apparel exports from the EU-27 and the Americas are heavily destined towards their regional markets, although they account for half or less of their respective imports in apparel products. Between the two, the EU-27 is more self-sufficient upstream in the chain than the Americas, with regional textile imports accounting for 55% of the EU's inbound supply in 2019.

- The Americas have steadily increased their dependencies on extra-regional textile imports to supply apparel producers over the two decades years; between 2000 and 2019, intra-regional imports declined from 47% to 22%.

- Asian production and markets are the most self-sufficient, catering to the majority of the regional demand in both textiles and apparel imports, intra-regional textiles imports increased by 15% since 2000. The strength of the Asian suppliers globally is clear; some 75% of Asian apparel exports go abroad, indicating their competitiveness in foreign markets.

This indicates clearly that Asia has strengthened its backward linkages, while also increasing its market share abroad in final products. Meanwhile, the Americas has seen a significant decline in backward linkages into textiles, and the majority of its final products stays in the region.

Figure 4. *Regional Textile and Apparel Trade Patterns (2000 – 2019)*
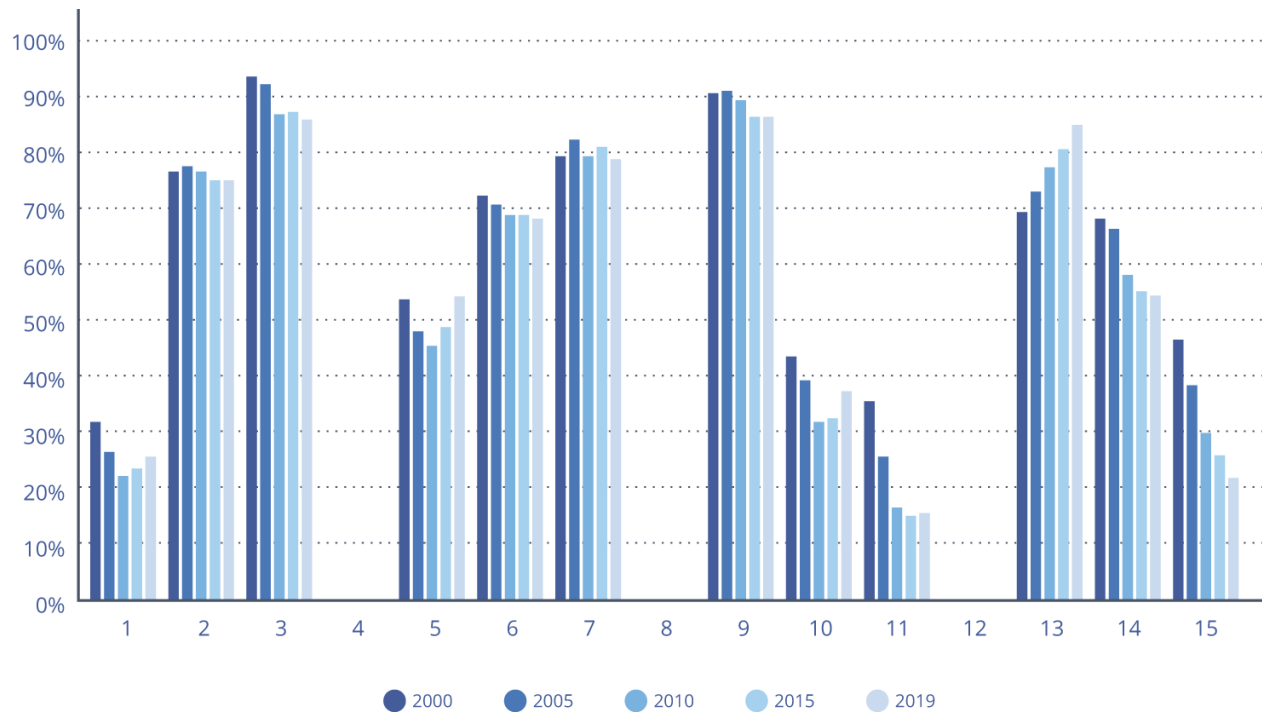
c.   LEAD FIRMS AND GOVERNANCE

Apparel is a buyer-driven chain, where profits are driven by combinations of high-value research, design, sales, marketing, and financial services that allow the retailers, designers, and marketers to act as strategic brokers in linking overseas factories and traders with product niches in their main consumer markets (Gereffi & Memedovic, 2003). Lead firms —that is, the companies that develop and sell brand-named products —have considerable control over how, when and where manufacturing will take place, and how much profit accrues at each stage, essentially controlling how basic value-adding activities are distributed along the value chain. Typically, less than 30% of the retail selling price in apparel is attributed to the manufacturing process; raw materials and labor constitute significant shares of this (+70%). The share attributable to higher value intangible activities including product development, design, marketing, branding and management contribute the remaining 70% (Hester, 2013; Newbury, 2013). These higher value activities primarily take place at the headquarters of global retailers and brands in the US and Western Europe. Two decades of consolidation of amongst retailers, combined with a proliferation of suppliers around the world has further accentuated the power differences between lead firms and factory suppliers, allowing the

former to impose even stricter, and increasingly uneven, terms for participation in the industry (Anner, 2019; Kaplinsky, 2005; Mahutga, 2014; Milberg & Winkler, 2013; Whitfield et al., 2020).

Table 4 offers examples of the main types of lead firms in the industry. These can be broadly divided in two categories – retailers and non-retailers or brands. The retail category consists of large mass merchants including hypermarkets such as Walmart and Target as well as department stores including Marks & Spencers. These firms do not manufacture the apparel products they sell. The past few years have seen multiple department stores enter bankruptcy as a result of increased shift to online sales; the category, heavily dependent on brick-and-mortar stores, was hit very hard by lockdowns during the pandemic. In addition to these traditional lead firms based on physical locations, online retailers have also emerged as a powerful group. These include Western giants such as Amazon, as well as Asian e-commerce platforms including AliExpress and Shein. By 2020, Shein alone accounted for the same market share in the fast-fashion category as H&M and Zara combined (Matsakis et al., 2021). The non-retailers category consists primarily of brand owners. Brand owners may or may not manufacturer their production as well. Leading brand manufacturers including VF, Hanesbrands, and Inditex.

Table 4. *Apparel Lead Firm Types and Examples*

LEAD FIRM TYPES AND SUB-TYPES		DESCRIPTION	EXAMPLES	
			US	EU
Mixed Retailers/ Mass Merchants	Hypermarkets, Discount stores	Like department stores, but sell a wider variety of products; rather than private-label, the term "store brand" may be used	Walmart, Target, Kmart	Asda (Walmart), Tesco, Carrefour, Metro
	Department stores	Carry private label, exclusive, or licensed brands only available in the retailers' stores	Sears, Dillard's, Kohl's	Marks & Spencer, Karstadt, El Corte Ingles, Harrod's
	Online Only Retailers	Fast fashion online platforms. These are fast-growing lead firms, including several from China shipping to Western markets. Eg. Shein, AliExpress and Cider.	Amazon	

Specialty Retailers	Specialty stores	Specialty stores that carry a mix of brand types, including private, exclusive and others	REI, Dick's Sporting Goods	
	Specialty Apparel Stores	Retailer develops & owns private label brands only available in stores	American Eagle, Abercrombie & Fitch, Gap, Carter's	H&M, Mango, New Look, NEXT, C&A, TopShop,
Brand owner	Brand marketer	Firm owns brand name, but not manufacturing; products are sold at mass merchant stores and often through specialty store.	PVH, AMB, Nike	Hugo Boss
	Brand manufacturer	Firm owns brand name and manufacturing; more likely to coordinate supply of intermediate inputs	VF, Hanesbrands	Inditex (Zara)

Source: Authors adapted from Frederick (2015).

The past two decades have seen these lead firms increasingly rationalize their supply chains, seeking out fewer, and more capable suppliers which can meet their demands. Once focused on selecting the lowest cost suppliers, these lead firms have sought to reduce complexity and the transaction costs associated with global production networks and focus on working with more strategic partners (Frederick & Daly, 2019; Frederick & Gereffi, 2011; Judd & Jackson, 2021; Lopez-Acevedo & Robertson, 2016). Nike, for example, cut back the number of both footwear and garment factories in its operations between 2010 and 2020 (ILO, 2021b). While cost competitiveness remains a key factor in the selection of suppliers, buyers prefer to source from vendors that can offer a variety of products, with consistent quality and reliability and with short lead times (Lopez-Acevedo & Robertson, 2016).

This rationalization has been accompanied by the rise of powerful first tier suppliers. Many first-tier suppliers began as CMT operators and have steadily upgraded their capabilities to provide OEM and ODM functions. These firms have also taken over the coordination management of the supply chains in textile and apparel, increasingly outsourcing CMT operations to subcontractors and dealing with input suppliers. This has shifted decision making regarding which factories are included within the

chain from buyers to first-tier suppliers. Today, lead firms may or may not have a relationship with these factories or other upstream suppliers (Frederick & Daly, 2019), and local apparel producers are likely to deal more directly with first tier operators. Other functions now carried out by first tier suppliers include elements of product design and development, inventory management, stock holding, logistics and multi-factory (and multi-region) production planning (Kumar, 2020). Suppliers must establish more diverse skills sets, with capabilities in customer services, technology training, and supply chain management (Frederick, 2015). Increasingly, as the supply chain becomes more digitalized, suppliers must also manage multiple – often proprietary – digital technologies to interact with their customers. Tier one suppliers, in turn, extract margins and require lower prices from their sub-contractors. Asian firms, including those from Hong Kong, Taiwan, and Korea, dominate both this segment, and Tier two factories with production operations located across the globe, providing them flexibility to meet buyer needs (Faheem & Purkayastha, 2020; Kwak, 2015).

Contracting requirements vary depending on market segments and end-markets served by lead firms. Typically US buyers seek larger volumes and strict process standards; competitive suppliers in basic products must be able to produce large outputs; while EU buyers tend to demand smaller volumes of higher quality product, and more flexibility in operations and lead times (Gibbon, 2008; Morris & Staritz, 2014; Palpacuer, Gibbon, & Thomsen, 2005; Whitfield et al., 2020). In addition, leveraging their purchasing power vis-à-vis suppliers, global buyers use codes of conduct to require suppliers to address social concerns in their operations (Locke, Amengual, & Mangla, 2009; Nath, Eweje, & Bathurst, 2021; van Tulder, 2009). This has increased notably since the deadly Rana Plaza accident in 2013 exposed extremely poor working conditions. Lead firms have pushed suppliers to adopt improved labor standards (Amengual et al., 2019; Bair et al., 2020). There are also signals that these lead firms will also put pressure on suppliers (and supplying countries) regarding the environmental impact throughout the chain.

These power dynamics within the industry make it increasingly difficult for local firms from host countries around the world to upgrade within the industry and capture value, and for governments to use industrial policy to support them (Whitfield & Staritz, 2021a).

d. TECHNOLOGIES IN THE TEXTILE & APPAREL GLOBAL VALUE CHAIN

T&A companies are gradually integrating advanced Industry 4.0 technologies across the entire value chain, including Radio-Frequency Identification, Cloud Technology, and Big Data analysis.[12] These technologies improve supply chain management, inventory management, marketing, fast merchandising, quick shipments, retailing, and distribution processes, which result in increased customer satisfaction, cost savings, and higher revenues. The performance of these technologies is optimized by the integration of Business Intelligence Solutions (BIS) which analyze the massive data generated by them. BIS systems help connect suppliers to the retail operations, allowing them to see items which are rapidly selling and to automatically generate purchase orders when inventory reaches minimal thresholds. Leading Chinese fast-fashion firm Shein has pioneered big data analysis for product design, production, and supplier selection (Euromonitor International, 2021). Dubbed its "large-scale automated test and re-order (LATR) model," this technology directly incorporates consumers' feedback into production and design functions, allowing it to rapidly outpace other fast fashion houses, including Zara in bringing new styles to market (Matsakis et al., 2021).

Table 5 provides a description of these technologies and BIS functions, how they impact the sector and examples of adoption by T&A companies. In developing countries, the introduction of these technologies and integration of BIS is lagging due to barriers such as unavailability of software providers (required for continuous vendor support) and integration with existing systems (Ahmad et al., 2020).

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[12] The application of artificial intelligence, robotics, machine learning, and augmented reality in the T&A industry is still in its infancy (Ahmad, Miskon, Alabdan, & Tlili, 2020).

Table 5. *Industry 4.0 Technologies and Business Intelligence Solutions in the Textile and Apparel GVC*

TECHNOLOGY / BIS	DESCRIPTION	APPLIED FOR	COMPANIES DEPLOYING
INDUSTRY 4.0 TECHNOLOGIES			
Radio-Frequency Identification (RFID)	RFID is one of the main sensors connecting objects. In apparel, it is employed to collect real-time data and switch from traditional logistics and manufacturing processes to smart manufacturing using wireless technologies and IoT. RFID makes it possible to track and monitor products in the different stages of the apparel production process. Fabric suppliers often install RFID terminals in the shop floors to monitor the production progress of main fabric materials.	Warehouse management, manufacturing, customer relationship management, supply chain management, production management.	Large T&A companies such as Zara, Adidas, Marks & Spencer, Max fashion, Red Tag, and H&M.
Cloud Technology	Cloud computing is a type of Internet-based computing in which shared resources, software, and information are sent to computers and other devices on demand. This technology enables remote monitoring of manufacturing plants, allowing for the integration of distributed resources of networked manufacturing in a single manufacturing task. This leads to higher production, reduced cost and lead time and higher transparency in decision-making.	Manufacturing, supply chain management.	Zara, H&M.
Internet of Things (IoT)	IoT coordinates significant real-time information for visibility of the entire product development process and supply chain of textiles and apparels. For instance, IoT sensors are attached to machines linked together in manufacturing for equipment tracking. Also, IoT devices are becoming more and more effective at tracking and authenticating shipments and products using Global Positioning Systems (GPS) systems.	Inventory management, warehousing, logistics, automatic object tracking, supply chain management.	Zara, H&M
Big Data	Data processing allows for the integration of analytical systems with advanced technologies for decision-making. This can lead to shortened product delivery lead time, improvements in the inventory management and reduction of logistics cost of supply chain across international stores.	Warehouse management.	H&M

BUSINESS INTELLIGENCE SOLUTIONS

TradeGecko	Offers cloud-based BI solutions that enable organizations to improve online retail and wholesale processes.	Inventory management	Pink Boutique, Cloth & Co., Zara.
MicroStrategy	Empowers companies to consolidate various independent warehouses into one single platform running on HANA in-memory database.	Warehouse management and database integration	Adidas
Dematic	Improves performance in terms of productivity, responsiveness to the market demands, assets, space utilizations and labor challenges.	Supply chain management	Adidas, GAP, Next.
SAP HANA in memory database	Integrates third-party databases, sensors and Hadoop into a single platform by SAP solutions. Cloud-based SAP can process high volumes of data for data modeling at high speed.	Database integration	Adidas

Source: Authors based on Ahmad et al. (2020); Pal and Yasar (2020).

While there has been growing adoption of digital technologies to improve processes through the T&A GVC, less has been done in incorporating automated production techniques in the apparel production operations. Technology advances such as the launch of the Sewbot, automated cut-and-sew equipment, encouraged the concept of reshoring. However, the high costs of the equipment combined with the persistent low labor costs in other parts of the world have slowed down the technology adoption (Nayak & Padhye, 2018).

e. TRADE REGULATION AS A DRIVER OF GLOBALIZATION

Traditionally, multilateral agencies have played a key role in the evolution of the T&A GVC, principally through the establishment and phasing out of the quota system under the 1974 Multifiber Agreement (MFA) and the entry of China into the World Trade Organization (WTO). Agencies continue to influence the industry's operations through establishing internationally recognized norms and conducting technical cooperation with governments, employers, and workers organizations in different countries to develop the industry. Many of the initiatives with global scope, however, have been replaced by regional and bilateral trade agreements that have established

opportunities for smaller, less competitive actors to enter the value chain. This section presents the trade agreements - multilateral, regional and bilateral - that have shaped the globalization of industry over the past three decades.

When the industry first began to globalize in the 1960s and 1970s, it was shaped by a quota system based on the Long-Term Arrangement Regarding International Trade in Cotton Textiles and Substitutes under the auspices of the General Agreement on Tariffs and Trade (GATT) established in 1962. This was extended to include other materials under the Multi Fibre Arrangement (MFA) implemented in 1974 (ILO, 2005). This agreement was put in place to protect developed economies from cheap imports from the developing world, and it governed world trade in textiles and apparel for the next 30 years. Essentially, it assigned quotas for duty-free imports into leading markets to specific countries. This also protected the nascent industry in numerous developing countries from the rise of low-cost competitors. This agreement was phased out between 1995 and 2005 as textile trade was brought under the purview of the World Trade Organization's Agreement on Textiles and Clothing (ATC) (Fernandez-Stark et al., 2011b). China in particular benefitted from the end of quotas and increased its global market share from 26% in 2005 to 33% in 2008 (WTO, 2010).

Several additional multilateral trade agreements and preference schemes with specific apparel and textile clauses came into effect during this phase-out period to ease its impact on least developed countries. These trade agreements have been fundamental to ensuring small countries such as Nicaragua and Lesotho could continue to compete in the global apparel industry, although with differing degrees of success. These agreements include the 2006 CAFTA-DR agreement between the United States and six Central American countries (Costa Rica, Dominican Republic, El Salvador, Guatemala, and Honduras, and Nicaragua); the 2000 African Growth and Opportunity Act (AGOA), in which the United States provides temporary relief to sub-Saharan African producers;[13] and the EU's Generalized System of Preferences (GSP) schemes and "Everything but Arms" (EBA) (2000) which provides for duty free imports from certain least developed countries to the EU, amongst others. The US also has bilateral agreements with Jordan, Peru, and Haiti (see Table 6). This plethora of apparel trade agreements has created disparate growth patterns across developing countries.

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[13] This agreement was first signed in 2000 and continues to be used today. Country benefits may be suspended unilaterally by the United States. Madagascar lost this beneficial access in 2009 following a political crisis (Morris & Staritz, 2014), while Ethiopia was suspended in November 2021 due to US concerns over the handling of armed insurgency in the north of the country.

In Latin America, NAFTA (replaced by USMCA) was initially highly influential in supporting the development of the Mexican textile and apparel industry. Signed in 1994, it provided the country with sufficient time to develop the industry prior to the end of the MFA (Frederick & Gereffi, 2011). In Central America, CAFTA-DR has been fundamental in maintaining the region's position as an exporter to the US market; early development of the industry in Nicaragua, for example, was significantly supported by the Trade Preference Levels (TPL) which allowed it duty-free access to the US market for garments using textiles made outside of the region (Frederick, Bair, & Gereffi, 2014). In Africa, AGOA and EBA have supported the development of the export-oriented apparel in industry in numerous countries, including Ethiopia, Lesotho, and Madagascar (Morris & Staritz, 2014; Morris et al., 2011; Whitfield & Staritz, 2021a). Bangladesh, Cambodia, India, Pakistan, and Vietnam have also benefitted from the EU GSP and EBA programs (European Commission, 2019). Several of these countries expect these benefits to end over the next decade as they lose their Least Developed Country status. Nonetheless, the EU is leveraging its market power to extend preferential access benefits if these producers commit to and perform with high sustainability and labor conditions standards through its GSP+ program; Pakistan and Sri Lanka have both benefited from this arrangement in recent years (European Commission, 2021b). The US bilateral arrangements with Jordan, Peru, and Haiti have boosted their export role in the industry, despite relatively small labor pools and dislocation from the rest of the global industry; the three countries ranked 14th, 17[th,] and 20th in exports to the US in 2019 (UN Comtrade, 2021). While US agreements have principally been focused on reciprocal market access, EU agreements have begun to focus on influencing labor, sustainability and governance of partner countries.

Table 6. *Trade Agreements Covering Textiles and Apparel to the US and EU Markets*

AGREEMENT	PARTIES OR BENEFICIARY (YEAR EST.)	STATUS	ALLOWANCES
PREFERENTIAL ACCESS TO THE US MARKET			
CAFTA-DR	US, El Salvador (2006), Honduras (2006), Nicaragua (2006), Guatemala (2006), Dominican Republic (2007), Costa Rica (2009)	Active	Preferential access to the US market for all apparel that is sewn in a member country from fabric either woven or knit from yarn extruded within the region (yarn-forward rules of origin). There are exceptions to this rule: for certain cotton and MMF knit fabric, the raw cotton or MMF must be regionally produced in any CAFTA-DR country or the US (fiber-forward rule of origin). Strict "short-supply" rules allow for duty free access if the textiles are not available in the region.
NAFTA - USMCA	US, Canada, Mexico (1994, 2020)	Active	Any garment assembled in member countries is eligible for duty and quota-free treatment in another NAFTA market provided it contains yarn and fabrics produced in any of the signatory countries (yarn-forward rules of origin). The UMSCA tightens the requirements for sewing threads, coated fabrics, and some other textile inputs to qualify for UMSCA trade benefits, and strengthens customs enforcement to prevent fraud and circumvention.
Bilateral Agreements	Colombia (2012)	Active	Immediate duty-free (zero tariff) market access for all textile and apparel products that meet the yarn-forward rule of origin (yarn production and all operations forward occur in either the US and/or Colombia).
	Jordan (2001)	Active	All textile, apparel, footwear, and travel goods traded between the US and Jordan is duty-free, provided that such goods meet the Agreement's rules of origin. In general, this means that products must have sufficient Jordanian content or processing to meet the criteria (FTA's rules of origin are not substantially different from standard rules of origin).

	Peru (2009)	Active	Immediate duty-free (zero tariff) market access for all textile and apparel products that meet the yarn-forward rule of origin (yarn production and all operations forward occur in either the US and/or Peru).
	Korea (2011)	Active	Duties on the majority of qualifying textile and apparel products were eliminated upon entry into force of the agreement. The remainder were eliminated in three, five, or 10-year stages. The rule of origin is yarn-forward.
Haitian Hemispheric Opportunity through Partnership Encouragement Act (HOPE), the Food Conservation and Energy Act (HOPE II), & Haiti Economic Lift Program (HELP)	US – Haiti (2006, 2008, 2010)	CBTPA (Caribbean Basin Trade Partnership Agreement): expired in September 2020 HOPE/ HOPE II/ HELP: In place until 2025.	HOPE established unlimited duty-free treatment for various apparel products, with certain restrictions regarding the source of the yarns and fabrics used in the apparel, and duty-free treatment for certain apparel up to certain annual quota levels. Before HOPE, the CBTPA provided duty-free treatment to certain Haitian (and other Caribbean countries) manufactured textile and apparel goods. HOPE II and HELP expand these existing preference programs (HOPE and CBTPA) by allowing additional textile and apparel articles to qualify for duty-free treatment, as well as increasing some of the TPL quota levels.
AGOA	Lesotho (2001), Kenya (2000), Madagascar (2014), Ethiopia (2001), Mauritius (2001), Tanzania (2002), Ghana (2002), South Africa (2001), etc.	In place until 2025.	Provides quota-free and duty-free access to the US for eligible articles made in qualifying Sub-Saharan African countries (SSA) for a subset of AGOA-eligible countries subject to a cap. This eliminates the average MFN tariff of about 8.8% on apparel and textile imports to the US. Articles include apparel made of US yarns and fabrics, textiles and textile articles produced entirely in SSA, certain cashmere and merino sweaters and eligible hand-loomed, handmade and printed fabrics.

| Caribbean Basin Initiative Caribbean Basin Trade Partnership Act (CBTPA) | Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Curacao, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago | In place until September 2030. | Duty- and quota-free access for apparel products manufactured in designated beneficiary Caribbean Basin region under several different scenarios. The textile, apparel, and footwear articles to which the preferential treatment applies are as follows:
 - US formed fabric of US formed yarn, cut in the US.
- US formed fabric of US formed yarn, assembled with US formed thread, cut in Caribbean Basin Region (CBI).
- Apparel articles (other than socks) knit-to-shape in a CBTPA beneficiary country from yarns wholly formed in the US and Knit apparel articles (other than certain T-shirts), cut and wholly assembled in one or more CBTPA beneficiary countries, from fabric formed in CBTPA or US, from yarns wholly formed in the US.
- Non-underwear T-shirts Cut & Sew—T-Shirts (other than underwear), made in a CBTPA beneficiary countries from fabric made in one or more CBTPA beneficiary country, from yarns wholly formed in the US.
- Brassieres cut and assembled in the US or one or more CBTPA country (only if aggregate cost of fabric components formed in the US is at least 75% of the fabric). |

PREFERENTIAL ACCESS TO THE EUROPEAN UNION MARKET

EU Standard GSP Scheme	Congo, Cook Islands, India, Indonesia, Kenya, Micronesia, Nauru, Nigeria, Niue, Samoa, Syria, Tajikistan, Tonga, Uzbekistan, Vietnam (2012)	In place until the end of 2023.	Provides partial or full removal of customs duties on 2/3 of tariff lines, for low and lower-middle income countries that do not have a preferential access to the EU market through another arrangements. General GSP beneficiary countries can benefit from duty suspension for non-sensitive products and duty reductions for sensitive products (3.5 percentage points). Textile and clothing classify as sensitive products. This means that the GSP average preference margin (i.e. the difference between the MNF rate and the preferential rate applied to the same product) for textile and clothing products is lower than EBA and GSP+ average preference margins (1.62% vs. 8.01%, respectively). For example, for the top 3 products imported by the EU under the GSP in 2019 (HS 610910; HS 620342; HS 620462) the MFN tariff is 12%, the GSP Tariff is 9.6%, and the EBA/GSP+ tariff is 0%. In 2019, textiles and textile articles accounted for more than half of imports under GSP preferences.
EU GSP+	Armenia, Bolivia, Cape Verde, Kyrgyzstan, Mongolia, Pakistan, Philippines, Sri Lanka (2019)	In place until the end of 2023.	The special incentive arrangement for sustainable development and good governance provides complete duty suspensions for apparel products (and other products from a group of 66% of tariff lines) to low and lower-middle income countries, contingent on the ratification and implementation of 27 international conventions on human rights, labor rights, environmental protection, and good governance. Beneficiaries include Philippines, Pakistan, and Sri Lanka. To receive GSP+ benefits, the yarn, fabric and final garment must all originate from a beneficiary country. Also, to be eligible, a country's GSP+ exports to the European market cannot constitute more than 2% of the EU GSP+ imports from all countries. Valid through 2023.

Source: (Burfisher, Lambert, Matheson, & Lim, 2019; Development Solutions, 2018; European Commission, 2018, 2020, 2021a; Frederick et al., 2014; Frederick & Daly, 2019; GSP Hub, 2021a, 2021b; Kassa & Coulibaly, 2019; Vázquez López, 2020)

Most recently, the US-China trade relations have begun to affect the industry, through restrictions rather than preferences (Gereffi, Lim, & Lee, 2021). Under the Trump Administration, in 2019 the US Trade Representative placed tariffs on the majority of Chinese apparel imports into the US. These Section 301 tariffs were imposed to address intellectual property theft and other predatory trade practices by China. These tariffs were extended to March 31, 2021 under the Biden Administration. While Chinese apparel exports to the US were already declining, this trade legislation further accelerated the process.

At the multilateral level, in addition to trade agreements, there has been considerable multi-stakeholder engagement seeking to improve core issues with respect to workers' rights and labor conditions as well as sustainability. First, the **Better Work** program, a collaboration between the United Nation's International Labour Organization (ILO) and the International Finance Corporation (IFC), has specifically focused on bringing together key stakeholders at all levels of the apparel industry to improve working conditions within the chain. The program is active across nine countries and 1,700 factories employing more than 2.4 million workers. Better Work supports factories providing significant capacity building, as well as offering trade finance for those that comply with labor standards guidelines (Better Work, 2021). The ILO, in general, has been active in promoting labor rights in the sector under its broader Decent Work agenda. It has participated in multistakeholder accords, such as the Bangladesh Accord that brought together both employers in large MNCs and global labor representatives (Hadwiger, 2015). ILO participation in these agreements lends them credibility and legitimacy. Many of these efforts have culminated in the recently established ILO Code of Practice for the industry for safety and health (ILO, 2021a). Second, at the multilateral level, the United Nations has also launched two key sustainability initiatives, the United Nations Alliance for Sustainable Fashion and the United Nations Fashion Charter for Climate Change aimed at helping the industry to set and meet sustainability goals focused on both social issues, such as improving working conditions and remuneration for workers as well as environmental goals focused on reducing the industry's waste, water pollution and emissions.

Finally, civil society actors such as labor unions and non-governmental organizations (NGOs) have focused on core issues with respect to workers' rights and labor conditions, including the implementation of conventions on freedom of association and collective bargaining, as well as those related to occupational health and safety and minimum wage. Civil society efforts can entail various forms of activism, such as boycotting, petitions, and protests. Non-governmental organizations help

to coordinate consumer action by using certifications to communicate to buyers which products and services comply or do not comply with certain key interests. In doing so, NGOs shape the perceptions of firms in the specific end-markets in which they are located and can thus influence supply chain management and sourcing practices. Likewise, coordination between labor organizations in host countries and civil society organizations in key markets can help provide cross-national social governance (Mayer, 2014; Mayer & Gereffi, 2010). It has become increasingly common for firms to establish partnerships with NGOs to maintain a sustainable chain; while this, in part, outsources the problem to third parties, it also highlights that firms are open to making commitments to improving their operations (Bubicz, Moreira, Marques, & Barbosa-Póvoa, 2020). Table 7 highlights some of the more influential NGOs operating in the industry.

Table 7. *Influential NGOs in the Textile & Apparel Industry, Select Organizations*

NGO NAME	FOCUS	NGO DESCRIPTION
Fashion Revolution	Social	Fashion Revolution was founded in the wake of the Rana Plaza disaster in 2013. It is one of the most important fashion activism movements, mobilizing citizens, industry and policymakers through its research, education, and advocacy work. They publish the Fashion transparency Index annually.
Clean Clothes	Social	Clean Clothes is global network founded in 1989 focused on improving garment workers' fundamental rights in the fashion industry. Clean Clothes educates and mobilize consumers to make more conscious fashion purchases; lobbies companies and governments to improve conditions; and offers direct guidance and education to workers around the world.
The Fair Wear Foundation	Social	Fair Wear Foundation supports worker's rights to safe, dignified, and properly paid employment. This NGO works with 130 member brands and engages directly with factories, trade unions, NGOs, and governments to find answers to problems. Leading brands include: Acne Studios, ARMEDANGELS, Continental Collection, DAWN, Earth Positive, Enna, Fair Share, Hess Natur-Textilien GmbH, LaMunt, Madness, Salvage, Stanley, and Stella, Waschbär.
Centre For Sustainable Fashion	Social/ Environment	The Centre for Sustainable Fashion, part of the University of the Arts in London, was created in 2008. It works to find new ways to continue to create fashion at a lower environmental and social cost.
Solidaridad Network	Social	The Solidaridad Network is one of the oldest NGOs, founded in 1969 by a group of Catholic bishops in the Netherlands with the objective to connect different players in the global supply chain (including farmers) to build a more sustainable production framework: Fair Trade. Partners include Cargill, Bayer, Laudes Foundation, and BASF, among others.
Labour Behind The Label	Social	Labour Behind the Label -created in 2001- is an organization dedicated to improving the lives of workers within the fashion industry.

[Care International](#)	Social	With a focus on ending poverty as a whole, CARE International is one of the most important defenders of workers' rights in the fashion industry. Care has a presence in 95 countries. For over 20 years, CARE has worked in Cambodia's garment industry towards occupational health and safety. Between 2014 and 2020, CARE partnered with H&M Foundation to empower women thousands of entrepreneurs from poor communities globally.
[Greenpeace](#)	Environment	Greenpeace leads the Detox My Fashion campaign aimed at reducing the fashion industry's use of toxic chemicals and halting the dumping of those chemicals into waterways. Brands that have banned hazardous chemicals from their production, published wastewater data for better transparency, and publish supplier's lists include Benetton, H&M, and Inditex.
[Waste & Resource Action Programme](#)	Environment	Waste & Resource Action Programme offers practical solutions to extend clothing life and reduce clothing waste around the world. They are working to force the industry to transform their business plans and force people to consider the consequences of buying an excessive amount of clothes. Doners to Recycle Week 2020 include Britvic, Co-op, Food GB&I and Danone, Highland Spring, Ocado, Sainsbury's, Suntory Beverage and Unilever UK and Ireland.
[Textile Exchange](#)	Environment	Textiles Exchange is a global nonprofit (625 members in 45 countries) that creates leaders in the preferred fiber and materials industry. Members include leading brands such as American Eagle Outfitters, Benetton Group, Levi Strauss & Co., Lin & Fung, New Balance, Nike, and Patagonia.
[Sustainable Apparel Coalition](#)	Environment	The Sustainable Apparel Coalition works to reduce the environmental impact and promote social justice throughout the global value chain. The Coalition develops the Higg Index, a tool that standardizes value chain sustainability measurements for all industry participants. Some of the coalition members are Abercrombie & Fitch, ALDO, C&A, Carter's, Columbia, El Corte Inglés, Fjall Raven, Gap Inc., H&M Group, Inditex, Levi's, New Balance, Nike, Patagonia, Puma and Ralph Lauren.
[Ellen Macarthur Foundation](#)	Environment	The Foundation works to accelerate the transition to a circular economy, eliminating waste and pollution. They provide research, diffusion, and design process for a regenerative economy. Partners leading the T&A CGV include H&M Group, Inditex, Lacoste, Ralph Lauren, Primark, PVH, and Walmart.

Source: Authors.

While the industry has relied on a well-established business model with mature global sourcing patterns for the past decade, there are numerous trends that have been brought about or accelerated by the COVID-19 pandemic that could lead to significant reconfiguration of the global industry. These include the continued shift of formal sourcing out of China – a trend which was set in motion ten years ago; the rise of e-commerce, including cross-border transactions; further consolidation amongst buyers, accelerated by COVID-19 bankruptcies; the need for flexible production; and increased focus on sustainability.

I.   Shifting Production Out of Countries Outside the Western Hemisphere: An Opportunity for Regionalization?

Since 2011, buyers have been seeking alternatives to concentrated production in China due to rising labor costs, resulting in a decline in China's market share in the leading global market. The drop in US-destined Chinese supply was further accelerated by the US-China trade war under the Trump administration. This placed additional tariffs (up to 25%) on US-bound Chinese apparel (Fibre2Fashion, 2021b). Chinese apparel exports to the US declined by 29% in 2021 compared to 2019 levels. These trends over the past ten years have resulted in the redistribution of the supply chain, which has primarily benefitted other Asian producers, including Bangladesh, Vietnam, and Cambodia. These locations have profited from their proximity to regional production networks in Asia and have become formidable low-cost competitors with broad capabilities. Nonetheless, their vulnerability in the cheap, but long, supply chains from Asia to logistics disruptions were amplified during the pandemic causing buyers to reassess their risk exposure in any one location (IDB, 2021a; ILO, 2021b). This has prompted industry observers to suggest that a further rebalancing of the supply chain is imminent, offering regionalization alternatives (IDB, 2021a; ILO, 2021b; ITC, 2020). Thus far, however, evidence of major sourcing shifts is mixed. Italy's Benetton (#55) is one of the few companies to publicly declare it will begin to shift its sourcing out of Asia in favor of regional producers in Europe (Croatia) and MENA (Turkey, Tunisia, and Egypt) (Reuters, 2021b). Benetton's efforts are helped by the 2021 EU-PEM modernization agreement which seeks to further drive regionalization in Europe by allowing for diagonal cumulation across most countries in the EU and MENA (European Commission, 2021c; Vogue Business, 2021a).

Nonetheless, continued disruptions in Vietnam in supplying the global holiday season have the potential to be a major catalyst for rebalancing sourcing operations to reduce risk. Athleisure wear companies are particularly exposed to challenges in Vietnam. Columbia, Nike, and Under Armour source more than 40% of their production from the country (CNBC, 2021b). Finding other locations that can supply consistently, however, is challenging. PVH, for example, moved some production out of the region in 2017 to Ethiopia encouraged by supportive government policies, low-cost labor, and AGOA access to the US market (Mihretu & Llobet, 2017). Yet security challenges amid unrest in the country disrupted the industry just four years later, with Ethiopia's AGOA access being suspended (Reuters, 2021a; Voa News, 2021). Ultimately, the company continues to source primarily from Asia (PVH, 2020). On the other hand, Chinese brands have begun to market directly to US consumers, using cross-border e-commerce to find a way around tariffs and reach consumers; Shein's sales in the US doubled between 2020 and 2021, to reach US$3B, selling more than Zara and H&M combined (Euromonitor International, 2021). Whether the trend of shifting production out of China means shifting out of Asia as well will depend on the capacity potential of alternative centers (Judd & Jackson, 2021).

II.   Rising Profile of E-Commerce

E-commerce is projected to boom over the next ten years, to account for at least half - if not more - of apparel sales. Online sales have been rising steadily for the past few years, reaching an estimated 16% of total US sales in pre-pandemic 2019 (IDB, 2021a). This tendency accelerated during the pandemic, as stay-at-home orders kept retail stores closed and customers shied away from in-person contact (IDB, 2021a). Major retailers saw significant growth in their online sales. PVH saw a 40% increase in digital sales in 2020, to account for 25% of sales – the largest growth ever (PVH, 2020, p. 17); GAP's online sales increased by 56%, while in-store sales decreased 39% (GAP Inc., 2020); Inditex saw a staggering 77% increase in its online sales (INDITEX, 2020). Even luxury goods moved online, with one quarter of purchasing happening online (Bain & Company, 2021). This increase was facilitated by an omnichannel approach to provide customers with a seamless experience across all channels. Buy online, distributor fulfillment; buy online, pick up in store; and buy online, pick up curbside are amongst the most successful options that emerged during the pandemic (CFRA, 2021c). These measures allowed brands to balance fulfillment between existing distribution centers and brick-and-mortar stores, responding more quickly to the changing environment during COVID-19, but are continuing to be successful as restrictions are lifted (CFRA, 2021c). McKinsey & Company and BOF (2021) indicate that 70% of brands are expecting at least 20% year on year e-commerce growth for 2021 and are investing significantly in expanding distribution network capacity and digital capabilities to more efficiently and effectively meet two-day or faster shipping expectations (McKinsey & Company, 2021). This trend is set to be global, led by China – which had strong e-commerce apparel sales pre-pandemic (CFRA, 2021c; F. Li et al., 2019). It is also expected that other large emerging economies will see significant expansion of online sales; Deloitte (2020) anticipates online apparel retail will account for 68% in India, 56% in Brazil and 50% in Indonesia by 2030. E-commerce has also become global in scope; with 2020 marking major consolidation of cross-border transactions. Chinese manufacturers in particular have made important gains. The shift of sourcing from China left local factories looking for new outlets, and online platforms from Amazon to AliExpress and Shein have provided them with direct access to Western consumers, and by skipping intermediaries they were able to remain cost-effective. By June 2020, Shein's sales were up 250% year-on-year, and accounted for 28% of all fast-fashion sales in the US – close to H&M and Zara's combined sales (Matsakis et al., 2021).

III.   Continued consolidation amongst industry buyers, accelerated by COVID bankruptcies

While not highly concentrated, the global apparel industry has been slowly consolidating over the past decade. Since 2011, the top ten brands have steadily gained market share from 8.8% in 2011 to 11.4% in 2020 (ILO, 2021b). Nonetheless, the top 20 percentile of firms concentrate the economic profits of the industry, with the bottom 80% negatively contributing to industry value (McKinsey & Company and BOF, 2021).[14] The COVID-19 pandemic is likely to accelerate this trend by driving multiple brands and retailers into bankruptcy (Indvik, 2021). Profits fell by close to 100% in 2020 (McKinsey & Company and BOF, 2021) and apparel retailers accounted for the largest number of retail bankruptcies filed that year (CFRA, 2021c). Major lead firms in the industry facing bankruptcy across the major US and European markets include Arcadia Group #56 (Miss Selfridge, Topshop), Ascena Retail Group #38 (Ann Taylor, Loft), Brooks Brothers, J.Crew (#50), J.C.Penney, Neiman Marcus Group, Lord and Taylor, and True Religion, amongst others (CFRA, 2021c; IDB, 2021a). Many of these were brick-and-mortar shops that failed to make adequate shifts towards e-commerce pre-crisis and the stay-at-home orders in 2020 only made it more difficult for them to survive. Others were focused significantly on work attire, which experienced a notable decline in demand in 2020/1. Numerous of these brands were sold off to online stores, such as ASOS and Boohoo or brand management companies (BBC, 2021a, 2021b). Authentic Brands Management was one group to take advantage of the large number of brands under pressure from the pandemic, acquiring Arrow, Aéropostale, Barneys New York, Brooks Brothers, Eddie Bauer, Forever 21, J.C.Penney, Izod, Lucky Brand, Nautica, Reebok, and Van Heusen during the two year period (ABG, 2021). This consolidation amongst buyers could have implications for suppliers throughout the chain by reducing the number of buyers and increasing their buyer-power. Numerous manufacturers faced defaults or cancelation on orders during the pandemic resulting in their closing down capacity, charging lower prices, and in some cases even shutting down (ILO, 2020, 2021b; ITC, 2020);[15] smaller firms with weaker access to credit in particular were hard hit.

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[14] McKinsey & Company and BOF (2021) indicate that in 2019 the top 20 percentile generate 203% of profits, while the bottom 80% reported -100% in deficits in 2019.

[15] A Better Buying survey of 179 suppliers from 30 countries (including China, Bangladesh, India, and Pakistan) conducted in May 2020 found that about two thirds of apparel factories received cancellations from customers. Also, around one in five respondents reported a complete loss of accounts receivable due to order cancellations (ILO, 2021b).

IV.   The Need for Increased Supply Chain Flexibility

In the absence of reliable projections due to the COVID-19 pandemic and ongoing demand volatility, shorter lead times, flexible manufacturing and lower stocks are becoming the norm (ITC, 2020; Just Style, 2020a). An illustration of this pivot is during coronavirus lockdown, when consumers shifted to comfortable and casual clothes they could wear at home. At short notice and in the midst of a pandemic, retailers had to respond suddenly by adding more inventory in casual clothes and reducing inventory commitments on office and formal wear (Just Style, 2020a). This uncertainty in demand is pushing brands and retailers towards a more flexible, demand-driven sourcing model that is multimodal and uses strategic sourcing from different regions to ensure a faster and leaner value chain. This has disrupted the established sourcing patterns of cheaper products based on large workforces in a distant location (ITC, 2020; McKinsey & Company, 2019). The pandemic highlighted the inventory risks of a business model with long lead times or too highly dependent on one location; H&M for example, which typically sourced 70-80% of its production using long lead times, was saddled with US$4B of inventory which it could not move due to the crisis (Paton, 2018). The supply chain disruptions caused by Vietnam's lockdowns similarly indicated the tremendous risks of overreliance on a single, albeit capable and cheap, location (ITC, 2020; McKinsey & Company, 2019). In the coming decades, production is likely to shift to suppliers that are capable of meeting faster development cycles (ITC, 2020). The market will favor the most efficient and mature suppliers (McKinsey & Company, 2019) with low stocks and the ability to respond faster to the changing consumer behavior (ITC, 2020). Shein's significant growth during this period is partly due to the company's model of sourcing as few as 100 items from a factory with a lead time of just ten days (compared to fast-fashion leader, Zara with 2,000 items in 30 days) (Matsakis et al., 2021). According to a survey carried out by Lu (2020), most buyers continue to diversify their sourcing destinations, with 42.1% currently sourcing from more than 10 different countries or regions (Zhao & Kim, 2021). Analysts suggest this is likely to benefit locations that are closer to their markets (McKinsey & Company, 2019). For manufacturers, augmenting the flexibility and agility requires the following: (1) providing on-demand capacity by building a flexible pool of labor that can be called in to meet spurs in demand; (2) developing upstream partnerships to take more control of the product and service; (3) upgrading their processes, i.e. nimble internal processes, faster communication, quicker decision-making, well-planned capacity and production lead-times; (4) automate and shorter assembly lines (Just Style, 2020a). Shein's and Zara's supply chains are facilitated by highly integrated

technology platforms which provide factories with instant information on demand for specific items, allowing them to more effectively tailor production to demand (Matsakis et al., 2021).

Box 2. Flexible Sourcing Models: Inditex S.A.

Inditex (Industria de Diseno Textil, S.A.) is the world's leading apparel firm. A Spanish multinational clothing company, the company's largest brand is Zara. The fast fashion retailer constitutes 66% of the business (Aftab, Yuanjian, Kabir, & Barua, 2018) and captures 1% of the clothing and apparel market share worldwide amongst brands, following Nike (2.8%), Adidas (1.8%) and H&M (1.4%) (Statista, 2017). The keys to Zara's huge success lie it its sophisticated, highly-responsive and sustainable supply chain, which is efficiently managed through vertical integration of layers and key functions, just-in-time strategy, diversification and externalization (Aftab et al., 2018; Berbiche, Hlyal, & Alami, 2020; O'Marah, 2016; QuickBooks Commerce, 2018; SCM Globe, 2020; Uberoi, 2017).

The company pioneered its alternative sourcing approach. Inditex's business model protect it from risk and creates a buying environment that promotes more sales: a short production cycle and the renewal of inventory every two weeks (competitors generally change their designs every two or three months) encouraging customers to make more frequent trips to physical and online storefronts and make purchases. Short production runs create scarcity of given designs and a sense of exclusivity, which provides consumers a reason to buy and suppliers the possibility to last (SCM Globe, 2020). In turn, the company's inventory remains low and mark-downs unnecessary: Only 50-60% of their manufacturing is produced in advance versus the 80-90% done by competitors; Zara makes 85% of the full price on its clothes, while the industry average is 60-70%; unsold items account for less than 10%, compared with an industry average of 17-20%) (Aftab et al., 2018; QuickBooks Commerce, 2018).

Vertical integration: Zara's ownership of its supply-chain allows for more rapid product turnover and full capability to produce and deliver in less than three weeks worldwide (Berbiche et al., 2020). The vertical integration enables fast-transactional processes that set short lead-times in which non-bulky components that cause bottlenecks are always available.

Just-in-time strategy: The efficient integration of operations with warehousing, transport and distribution processes is the result of stock management system underpinned by radio frequency identification technology (RFID) which tracks every garment until it is sold. The data about the sale of each stock keeping unit (SKU), inventory levels in each store, and the speed at which a particular SKU moves from the shelf to the POS is sent on a real time basis to Inditex's central data processing center (INDITEX, 2020; Uberoi, 2017). This way, the company schedules materials, goods and labor to arrive, then replenishes them when needed, avoiding idle-time loss and increasing benefits (Berbiche et al., 2020). Inditex has also invested heavily in setting up

automated machinery for its manufacturing process; this automation, coupled with data processing, delivers flexibility and enables designers to modify an existing design or create new ones based on the daily transmission of information on the latest trend and sales (Güemes-Castorena & Ruiz-Monroy, 2020). The results are a lean inventory and high level of responsiveness to adapt and deliver products to stores with the latest fashion trends at a rapid speed.

Diversification and externalization: Zara's supply chain has a global presence, organized across 12 clusters, although there is a significant emphasis on supply in the areas nearest to the design centers: raw fabric is sourced from suppliers in Italy, Spain, Portugal and Greece; 53% of all items are manufactured in proximity markets (Spain, Portugal, Morocco and Turkey) (INDITEX, 2021). In 2020, these nearshore countries accounted for 50% of sewing factories associated with suppliers, followed by China (35%), Bangladesh (6%), India (3%) and others (INDITEX, 2020). In recent years, a regionalization trend benefited Morocco and Turkey over their EU peers: From 2016 to 2020, the number of suppliers in Spain and Portugal went from 208 to 177 and 170 to 158, respectively; Turkey gained momentum, increasing its new suppliers from 175 to 215. In Asia, China also increased its number of suppliers, going from 393 to 412 (INDITEX, 2017, 2020).

The rise of Zara also relies on the development of analytical tools (e.g. algorithms) in partnership with scientists from the MIT and London Business School resulting in innovative demand forecasting and optimization models which enable to determine key drivers and decision variables like shipment and storage quantities, markdown quantities, retail size-assortment or pricing amount of garments, subject to customers' satisfaction (Berbiche et al., 2020).

Zara's distribution center (called, "The Cube") is a huge, highly automated facility located in Zaragoza (Spain) with underground monorail links to 11 Zara-owned clothing factories within a 16 km radius. All raw materials and finished goods pass through the Cube on their way to the factories and stores, respectively (SCM Globe, 2020). The Cube is open 24 hours a day and collects information from all +7,000 Inditex stores across 88 countries and is used by teams for inventory management, distribution, design, and customer service improvements (INDITEX, 2017, 2020; Uberoi, 2017).

V.Sustainability: Reducing the Impact of the T&A Industry on the Environment

Recent years have seen a growing awareness of the negative impact of the textiles and apparel industry on the planet and its contributions to rising global emissions. It is estimated that in 2018, the global fashion industry produced some 4% of global emissions, higher than that of France, Germany, and the UK combined (McKinsey & Company, 2020). Moreover, some US$400B worth of clothing is prematurely disposed of every year (CFRA, 2021a), many of it ending up in landfills around the world (BBC, 2020; CALPIRG, 2021). Fibers used in the production of apparel derive primarily from cotton which is highly intensive in water-use and synthetics dependent on upstream petrochemicals. Also, it has been shown that about 20% of all water pollution is caused by the textile treatments such as dyeing (Nayak, Panwar, & Nguyen, 2020) and that around half a million tons of plastic microfibers shed during the washing of plastic-based textiles such as polyester, nylon, or acrylic end up in the ocean annually (EMF & CFI, 2017). The industry has thus begun to seek out ways to improve its sustainability, in a trend that is anticipated to strengthen in the future.

Major changes could occur in three areas: a shift towards more sustainable fibers and fabrics;[16] greening of the production process; and an increase in recycling of used clothes. The global sustainable fabrics market is expected to grow at a CAGR of 4.6% from 2020 to 2027, reaching US$58.3B (Grand View Research, 2020). Organic and recycled fibers can now be found in designer collections and fast-fashion brands such as H&M. Yarn spun from recycled ocean plastic has become a major ingredient in everything from Adidas track pants to Prada nylon backpacks (Financial Times, 2021). Brands are increasing pressure on their suppliers to green operations; in 2020, major brands from Adidas and Nike to GAP and H&M, sent letters to the governments of both Cambodia and Vietnam urging them to shift towards renewable energy supply or risk losing their business (Nikkei Asia, 2020; Voacambodia, 2020; Vogue Business, 2021b). Numerous brands have also launched reselling and/or recycling initiatives including Patagonia, Levis, and Diesel, as well as H&M and Zara (Debter, 2021). During the past four years, the number of clothes and accessories described as "sustainable" has quadrupled among online retailers in the US and UK (Financial Times, 2021).

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[16] Sustainable fibers used in the textile industry are those not requiring the use of any pesticides or chemicals across the entire manufacturing process and includes different manmade/regenerated (manufactured from plant fibers using various chemicals), organic (organic, hemp, cotton and others grown without use of pesticides, and synthetic fertilizers), recycled (made from 100% post-consumer recycled PET packaging) and natural fibers (produced from plant, animals, or geological processes). The 100% sustainable fibers are known as organic fibers and organic cotton accounted for the major share of the segment (GVR, 2020).

However, critics highlight that fashion companies are not implementing sustainable solutions fast enough to counterbalance negative environmental and social impacts of the rapidly growing fashion industry (Lehmann et al., 2019). Following the renewed commitment in 2021 COP26 to the United Nations Fashion Charter on Climate Action, which saw over 130 firms – including new signee LVMH - commit to further reducing their environmental impact (UNFCCC, 2021a), halving emissions and shifting to 100% more sustainable fibers by 2030 (Vogue, 2021), this trend is likely to expand rapidly in the future.

VI. LATIN AMERICA AND THE CARIBBEAN IN THE TEXTILES & APPAREL GLOBAL VALUE CHAIN

Latin America and the Caribbean accounts for a small part of global apparel exports with just a 4% market share. Regional exports are dominated by Mexico and four Central American countries (Honduras, Guatemala, El Salvador & Nicaragua). In recent years, Honduras has overtaken Mexico as the leading LAC exporter as the latter sees its participation in the industry decline. The region's role is concentrated in apparel production, with few countries engaged significantly in textiles production. Exports are dominated by basic products, including knit shirts along with sweaters and trousers. Overall, there has been little diversification out of these product categories so far. In addition, exports are dominated by cotton products, due to the rules of origin regulating Central American apparel exports to the US under the 2006 CAFTA-DR agreement. This section discusses the participation of Latin America and the Caribbean as a region in the textiles and apparel global value chain, before analyzing the participation of the leading Central American countries in further detail.

A. OVERVIEW OF REGIONAL PARTICIPATION

As a region, Latin America and the Caribbean accounts for a small share of global apparel exports with just a 4% market share (Table 8). Growing more slowly than the global industry, the region's share has steadily slipped from 4.5% to 4.3% since 2011. Regional exports are dominated by Mexico and Central America. Mexico, however, has seen the industry steadily contract over the past 10 years at -2.1% (CAGR), following years of rising labor costs, low labor productivity, and underinvestment in textiles (Frederick & Gereffi, 2011). Mexico's leadership in the region has been overtaken by Honduras, which has been growing at 3.8% (CAGR), at three times the global rate (1.1%). While Honduras' participation remains very small compared to the larger global exporters (China, Bangladesh and Vietnam), it is the #14 global exporter despite its comparatively smaller population (US$4.3B in 2019). Like Honduras, Nicaragua has seen a notable rise in exports, despite the end of TPLs with the US. Yet, the country still falls short of its northern neighbor. El Salvador and Guatemala's shares have remained constant, growing at the same pace as global exports. Other smaller players include Haiti, Peru, the Dominican Republic, Colombia, and Brazil. Of these, only Haiti and the Dominican Republic have increased their exports in the past decade.

Table 8. *Latin America & Caribbean Apparel Exports, Value (US$, billion), Shares (%) and CAGR (%), 2011 – 2019*

PARTNER	VALUE (US$, BILLIONS)					LATAM SHARE (%)					WORLD SHARE (%)		CAGR (%)	
	2011	2013	2015	2017	2019	2011	2013	2015	2017	2019	2011	2019	2011 – 19	2015-19
World	**379**	**381**	**381**	**390**	**414**	—	—	—	—	—	—	—	1.1%	2.1%
LATAM	16.9	16.9	17.0	16.9	17.8	100%	100%	100%	100%	100%	4.5%	4.3%	0.6%	1.3%
Honduras	3.2	3.2	3.3	3.5	4.3	19%	19%	20%	21%	24%	1%	1%	3.8%	6.2%
Mexico	4.6	4.5	4.3	4.3	3.8	27%	26%	26%	25%	21%	1%	1%	-2.1%	-3.0%
El Salvador	1.9	2.0	2.2	2.2	2.1	11%	12%	13%	13%	12%	0%	1%	1.5%	-0.4%
Nicaragua	1.4	1.5	1.6	1.6	2.0	9%	9%	9%	10%	11%	0%	0%	4.3%	6.1%
Guatemala	1.5	1.5	1.6	1.6	1.6	9%	9%	10%	9%	9%	0%	0%	1.1%	-0.4%
Haiti	0.8	0.9	1.0	1.0	1.1	5%	5%	6%	6%	6%	0%	0%	4.6%	1.7%
Peru	1.3	1.2	1.0	1.0	1.1	8%	7%	6%	6%	6%	0%	0%	-2.4%	1.9%
Dominican Republic	0.7	0.7	0.9	0.8	0.8	4%	4%	5%	5%	5%	0%	0%	1.7%	-1.7%
Colombia	0.7	0.7	0.5	0.5	0.5	4%	4%	3%	3%	3%	0%	0%	-3.7%	0.4%
Brazil	0.2	0.1	0.1	0.1	0.1	1%	1%	1%	1%	1%	0%	0%	-1.9%	4.7%

Source: UN Comtrade (2021).

Knit shirts and sweaters dominate exports, followed by trousers. Overall, there is little diversification out of these product categories so far. The main product categories exported from the leading countries have remained largely the same over the last 20 years; knit shirts, sweatshirts, trousers, and underwear/socks (Bamber & Frederick, 2018). These products are typically long run, low mix/high volume commodity items. This brings the region into direct competition with Asian producers, in particular Bangladesh, in low value products. The exception is Mexico's growth in athletic apparel (included in the others category); the only category in which Mexico increased exports between 2011 and 2019. Products have been dominated by cotton exports, although the dominance has eroded slightly in favor of MMF, which has seen important increases in Honduras, El Salvador, Nicaragua, Guatemala, and Haiti. This follows global trends which have seen cotton's share of the apparel market decline over the past decade (see Figure 2). Nonetheless, absolute cotton output remained relatively steady in the region as total apparel production increased; this is

supported by the rules of origin of the CAFTA-DR agreement which allows yarn-forward products to enter the US duty free and favors cotton products. Peru's exports in cotton are closely tied to the country's legacy role as a high value Pima cotton exporter (Fernandez-Stark, Bamber, & Gereffi, 2016). The product and material composition of LAC exports are detailed in Figures 5 and 6.

Figure 5. *Latin America & Caribbean Apparel Exports by Year and Product Category (US$, billion), 2011-19*
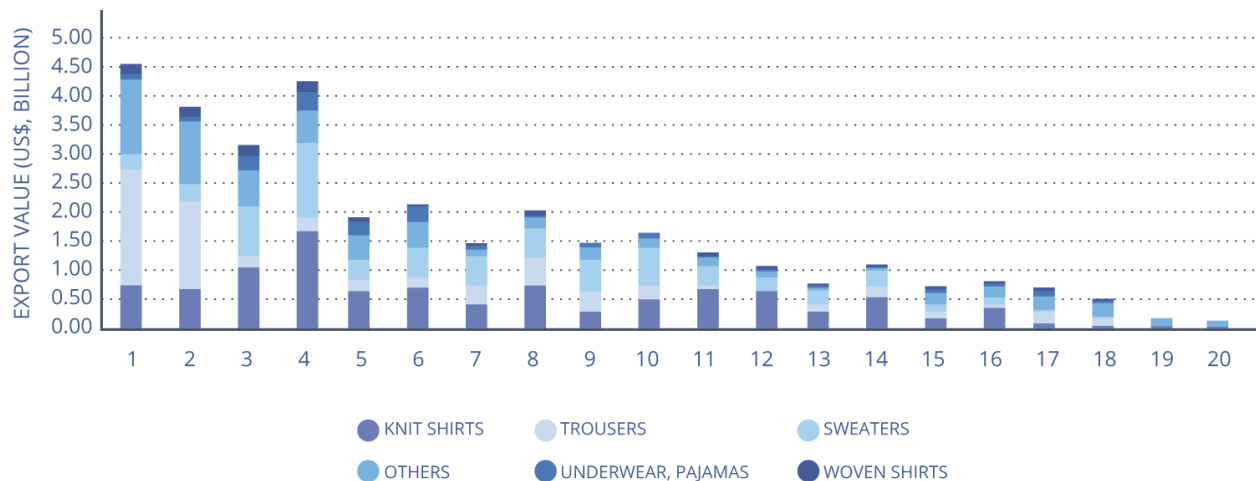
Source: UN Comtrade (2021).

Figure 6. *Latin America & Caribbean Apparel Exports by Year and Material (US$, billion), 2011-19*
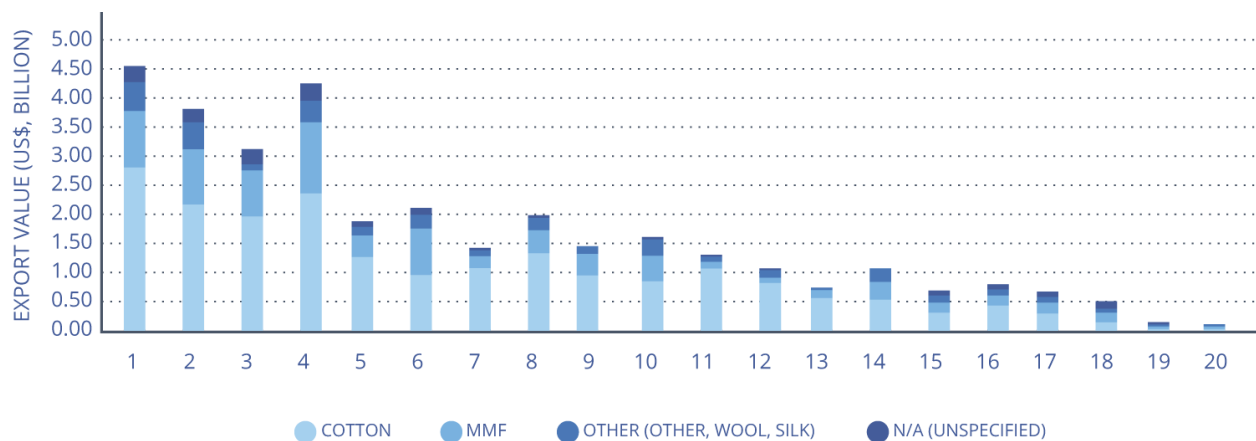
Source: UN Comtrade (2021).

Latin American exports are highly concentrated in very few markets, with minimal diversification occurring since entry into the industry. Latin American exporters are focused principally on regional markets, in Northern and Latin America (Figure 7). The U.S. is the principal market, accounting for

79.9% of exports in 2019, down slightly from 81.9% in 2011. Extra-regional exports remain marginal, and are primarily to the EU.

Figure 7. *Latin America & Caribbean Apparel Exports by Year and Destination (US$, billion), 2011-19*

Legend: NORTHERN AMERICA — LATIN AMERICA AND THE CARIBBEAN — OTHERS — WESTERN EUROPE — EASTERN ASIA
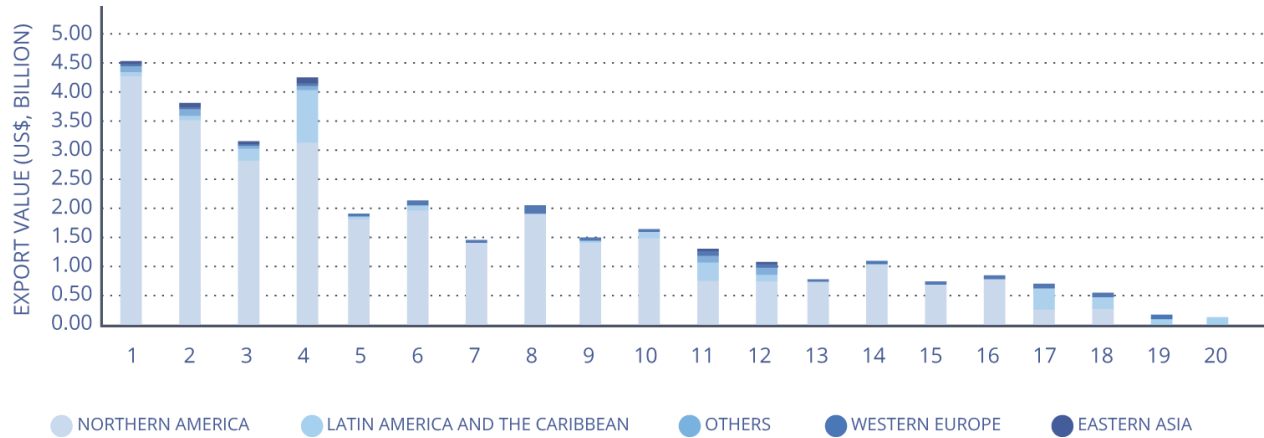
Dependence on the US market increases the region's vulnerability as it directly competes with leading global apparel exporters in the same product categories (i.e. knit t-shirts, sweaters). The top five exporters to the US are all Asian, and account for 63% of imports (see Table 9). While LAC has increased its exports to the US by US$400M since 2011, this growth is small compared to these larger Asian competitors which have grown significantly more. Vietnam (US$7.1B; 9.3% CAGR), Bangladesh (US$1.3B; 3.3%), India (US$800M; 2.4%) and Sri Lanka (US$400M; 2.9%) have all experienced high growth rates, far outpacing total import growth (0.9%). Mexico is the 6th largest exporter to the US, but has seen a decline in value and market share since 2011 (-1%). CAFTA-DR as a group has seen its market share hold steady (since 2005), with Honduras and El Salvador leading exports. Growth from this group (+US$900M) has made up a decline in exports from other Latin American players. Honduras has become the largest supplier of t-shirts and the second largest sweatshirt supplier to the US (AHM, 2021a).

Table 9. *Top 10 Apparel Exporters to United States, by Year and Value, 2011 - 2019*

PARTNER	VALUE (US$, BILLIONS)					WORLD SHARE (%)					CAGR (%)	
	2011	2013	2015	2017	2019	2011	2013	2015	2017	2019	2011 - 19	2015-19
World	81.5	83.7	89.1	83.6	87.5	100%	100%	100%	100%	100%	0.9%	-0.4%
China	31.2	31.6	32.3	28.4	26.4	38%	38%	36%	34%	30%	-2.1%	-4.9%
Vietnam	6.8	8.3	10.9	11.8	13.9	8%	10%	12%	14%	16%	9.3%	6.3%
Bangladesh	4.6	5.0	5.5	5.1	5.9	6%	6%	6%	6%	7%	3.3%	2.1%
Indonesia	5.2	5.2	5.2	4.7	4.6	6%	6%	6%	6%	5%	-1.7%	-3.0%
India	3.5	3.4	3.9	3.9	4.3	4%	4%	4%	5%	5%	2.4%	2.5%
Mexico	4.0	3.8	3.7	3.7	3.3	5%	5%	4%	4%	4%	-2.4%	-3.0%
Honduras	2.8	2.6	2.8	2.6	3.0	3%	3%	3%	3%	3%	1.0%	1.4%
Cambodia	2.7	2.6	2.6	2.2	2.8	3%	3%	3%	3%	3%	0.7%	2.3%
El Salvador	1.8	1.9	2.0	2.0	1.9	2%	2%	2%	2%	2%	0.8%	-1.2%
Sri Lanka	1.5	1.8	2.1	2.0	1.9	2%	2%	2%	2%	2%	2.9%	-3.3%
Top 5	51.4	53.6	57.6	53.9	55.0	63%	64%	65%	65%	63%	0.8%	-1.1%
Top 10	64.1	66.4	70.9	66.5	67.9	79%	79%	80%	80%	78%	0.7%	-1.1%
LATAM	13.9	13.7	14.1	13.7	14.3	17%	16%	16%	16%	16%	0.3%	0.2%
CAFTA - RD	8.1	8.2	8.6	8.2	9.0	10%	10%	10%	10%	10%	1.2%	1.0%

LAC also plays only a small role in the global textiles production and trade with relatively weak backward linkages within the T&A GVC. The region accounts for just 3.4% of global upstream textiles exports (see Table 10). The largest regional apparel producers continue to import a large share of their textiles requirements, while only Brazil and Mexico export over US$1B in upstream textiles products. These two countries account for close to two-thirds of textiles exports from the region. Brazil is the only country in the region amongst top ten exporters of specific textiles products,[17] owing to its role in cotton production. However, its exports are dominated by unprocessed cotton bales. Cotton textiles also account for a large share of Mexico's exports, although the country has seen an expansion of "impregnated, covered or laminated textiles" destined for industrial use such as the automotive sector in North America (see Table 20 in the Appendix). No Latin American countries feature amongst leading exporters of MMFs.

Table 10. *Latin America and the Caribbean Textile Exporters, Value (US$ million), Regional and Global Share (%) and CAGR (%), 2011 & 2019*

EXPORTER	VALUE (US$, MILLION)		SHARE OF LATAM TOTAL EXPORTS (%)		SHARE OF WORLD TOTAL EXPORTS (%)		CAGR (%, 2011 – 19)
	2011	2019	2011	2019	2011	2019	
World	**251,175**	**222,882**	**—**	**—**	**100%**	**100%**	**-1.4%**
LATAM	**7,791**	**7,307**	**100%**	**100%**	**3.12%**	**3.38%**	**-0.4%**
Brazil	2,935	3,012	38%	41%	1.17%	1.35%	0.3%
Mexico	1,644	1,583	21%	22%	0.65%	0.71%	0.2%
Argentina	857	507	11%	7%	0.34%	0.23%	-6.4%
El Salvador	477	398	6%	5%	0.19%	0.18%	7.0%
Peru	241	395	3%	5%	0.10%	0.18%	-2.2%
Guatemala	178	310	2%	4%	0.07%	0.14%	9.4%
Colombia	438	239	6%	3%	0.17%	0.11%	-7.3%
Uruguay	304	236	4%	3%	0.12%	0.11%	-3.1%

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[17] See Tables 16-21 in the Appendix.

Honduras	129	176	2%	2%	0.05%	0.08%	7.2%
Costa Rica	40	102	1%	1%	0.02%	0.05%	12.4%
Chile	116	101	1%	1%	0.05%	0.05%	-1.7%
Ecuador	131	65	2%	1%	0.05%	0.03%	-8.4%
Paraguay	64	56	1%	1%	0.03%	0.03%	-1.7%
Dominican Rep.	49	36	1%	0%	0.02%	0.02%	-3.7%
Panama	108	19	1%	0%	0.04%	0.01%	-19.2%
Bolivia	23	18	0%	0%	0.01%	0.01%	-2.9%
Nicaragua	15	16	0%	0%	0.01%	0.01%	0.7%
Others	42	40	1%	1%	0.02%	0.02%	-0.7%

Source: UN Comtrade (2021).

B.   CAFTA-DR: LEADING LAC APPAREL EXPORTS

The section above clearly indicates that CAFTA-DR countries are the leading exporters of apparel from Latin America and the Caribbean. The CAFTA-DR group of countries comprises the signatories of the 2006 trade agreement with the US, namely: Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, and Nicaragua. The textiles and apparel sector in these countries has directly benefited from this free trade agreement with the US (see Box 3). Nicaragua also benefited from additional TPLs between 2007 and 2014 (Frederick, Bair, & Gereffi, 2015). Of the six countries, the **Northern Triangle group of El Salvador, Guatemala, and Honduras, together with Nicaragua,** have been the most successful in maintaining their position within the GVC. Costa Rica and the Dominican Republic play a minor role in the export industry, with their economies orienting towards higher value sectors due to higher labor costs (Bamber & Frederick, 2018). This section thus focuses on the four leading countries from this trade block to discuss their participation in the GVC further. Table 11 summarizes their current performance in the GVC.

Table 11. *Participation of Select CAFTA Countries in the T&A GVC, Key Indicators, 2019*

INDICATOR	HONDURAS	EL SALVADOR	GUATEMALA	NICARAGUA
T&A Exports (2019, US$ B)	3.7	2.7	1.8	1.6
CAGR (2011-2019)	3.8%	1.5%	1.1%	4.3%
T&A Exports as share of total exports	47%	42%	15%	29%
Destinations	#1 US #2 El Salvador #3 Nicaragua	#1 US #2 Mexico #3 Canada	#1 US #2 Canada #3 Mexico	#1 US #2 Canada #3 Mexico
Products	#1 Sweaters #2 T-shirts	#1 T-shirts #2 sweaters #3 Others	#1 Sweaters #2 T-shirts #3 Trousers	#1 T-shirts #2 Trousers #3 Sweaters
Firm Origin (2012/5)	54% US 17% Korea	56% Domestic 38% US	57% Korea 36% Domestic	33% Korea 36% other 26% US
Labor Costs, Rank	US$297, #3	US$299, #2	US$372, #1	US$175, #4
Pandemic effects (Growth rates 2019 vs 2020)	-40%	-39%	-20%	-23%
Pandemic effects (Growth rates 2019 vs 2021)	-6%	-4%	13%	11%
Top 3 sources of textiles	#1 US #2 El Salvador #3 Guatemala	#1 US #2 China #3 Guatemala	#1 China #2 US #3 El Salvador	#1 US #2 China #3 Mexico
CAFTA qualifying share of US-bound exports (2019)	84%	92.9%	81.8%	NA 2019

Source: Authors based on AZFA (2020a, 2020b, 2020c, 2020d); EIL/RSM (2018); UN Comtrade (2021); USITC (2021).

Source: Authors based on USFIA (2021).

This section discusses the importance of textiles and apparel to the export baskets of these countries, their participation in the GVC and upgrading to date.

First, the industry is of considerable importance to these countries; apparel exports are the most important export category for Honduras, El Salvador, and Nicaragua. Table 12 details the role of textiles and apparel in the export baskets of these countries. Dependence on the industry is highest in Honduras, where it accounts for as much as 47% of exports, and lowest in Guatemala which has diversified into other industries. These products also dominate individual product exports, accounting for the leading exports in all three countries. Guatemala is less dependent on the industry, potentially due to higher labor costs in the country. Knit shirts and sweatshirts account for

approximately half of apparel exports from these countries.

Table 12. *Textiles & Apparel Share of Total Exports: Select CAFTA Countries, 2019*

	GDP/CAPITA (2019, US$ CURRENT)[A]	TOTAL EXPORTS (2019, US$B)[B]	TEXTILES & APPAREL EXPORTS (2019, US$B)[B]	TEXTILES & APPAREL SHARE OF ALL EXPORTS (2019, %) [B]	APPAREL PRODUCTS IN TOP 3 EXPORTS (2019)[B]
Honduras	5,979	7.8	3.7	47%	#1 Knit Sweaters ($1.25B) #2 Knit T-shirts ($948M)
El Salvador	9,147	6.3	2.7	42%	#1 Knit T-shirts ($783M) #2 Knit Sweaters ($392M)
Nicaragua	5,682	5.6	1.6	29%	#1 Knit T-shirts ($697M)
Guatemala	9,019	11.8	1.8	15%	--

Source: [a] World Bank (2021c); [b] UN Comtrade (2021).

Second, there has been minimal product upgrading, and the main product categories exported from the four countries have remained largely the same over the last 20 years: knit shirts, sweatshirts, trousers, and underwear/socks. The top three subsectors have accounted for approximately 73% of exports since 2005 (Bamber & Frederick, 2018; UN Comtrade, 2021). These products, which are primarily basic, cotton knits, are products that were, and still are, produced by the few existing vertically integrated North American OBM apparel firms, including Hanes and Gildan. These are also the products that are cost competitive to produce in the region, due to a combination of the lead firm's long history producing them (leading to efficient production systems), market share, and historical protection policies for US textiles and cotton (Bamber & Frederick, 2018). Many of the manufacturers in the region have been in business for over 30 years and have gradually expanded their geographic and supply chain footprint over the years (from basic sewing, to include cutting, dyeing/washing, trim, finishing, fabric production, and yarn) (Bamber & Frederick, 2018). While these products have been supported by access to subsidized US cotton, the weak availability of competitive synthetic textiles qualifying for CAFTA market access has constrained the region's ability to upgrade into a range of other products (Field Research, 2021). Guatemala and El Salvador have been more successful that Honduras and Nicaragua in upgrading into more complex

items, including synthetics based on the development of local textiles (Field Research, 2021), however, they remain marginal in terms of total export value.

Figure 8. *Select Central American Countries Apparel Exports by Year and Product Category (US$, billion), 2011 – 2019*
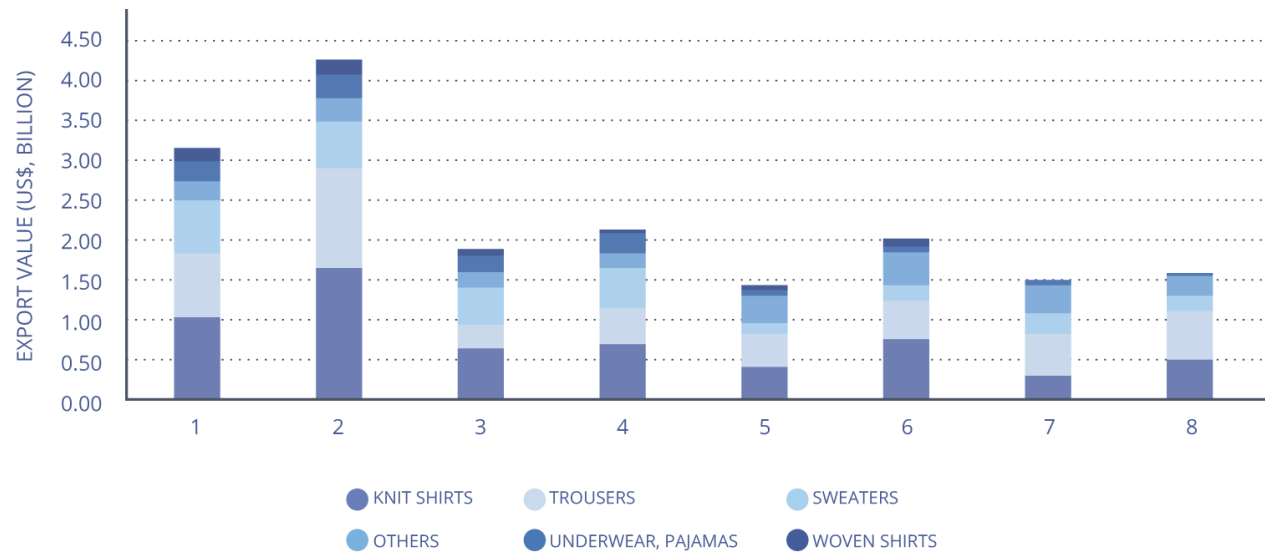
Third, the countries have undertaken less functional upgrading into higher value services activities. Generally, the four countries have made less progress upgrading into non-manufacturing activities, including design, branding, and sales. While there are differences in capabilities across the region, with some suppliers offering more skilled services operations,[18] overall, functions are limited to manufacturing. In part, this has been the result of the high participation of foreign firms in the region and the role of domestic firms as Tier 2 contract suppliers. In Guatemala, 90% of textile and apparel factories are Korean; in Nicaragua, most plants are US, Korean, and Taiwanese-owned; in Honduras and El Salvador, the majority of factories are owned by US firms (70% in the latter). The majority of factories operate as full-package providers in terms of coordinating production and sourcing textiles. Higher value activities such as design and sales, however, often take place at the buyers or Tier 1 manufacturers' headquarters in Asia or the US (Bamber & Frederick, 2018; Gereffi & Frederick, 2010b).

Fourth, the region has begun to develop stronger backward linkages into the production of textiles. The most significant development in the region has been upgrading through the

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[18] For example, several Guatemalan factories offer design-based services and have developed more relational governance models with buyers. On the other hand, operators in Nicaragua carry out only basic cut-and-sew functions with no inputs into the process (Field Research, 2021).

development of backward linkages in fabric and yarn production. Textile mills were initially built and operated by US and Korean foreign investors in the 2000s. Today, several of these are now owned and operated by regional investors. Fabric and yarn mills that are part of the supply chain of vertically-integrated OBM firms are captive to the brand (Fruit, Hanes, Gildan), while other mills in the region sell to multiple buyers (Bamber & Frederick, 2018). Much of this early investment was focused on cotton-based textiles, with cotton raw materials provided from the US under the yarn-forward agreement and knit fabric development and yarn production have expanded. However, in recent years, there has been greater impetus to develop synthetics-based textiles production in the region. For example, in 2019, Kattán Group and Tegra Global Corporation set up a 63,000 square meters modern and sustainable plant in Honduras to produce synthetics-based sports clothing for brands such as Nike and Under Armour (Baquedano, 2021). This has been necessary to facilitate product upgrading, as apparel produced from imported MMF from Asia does not classify for CAFTA entry into the US. The following subsection analyses this development in further detail. Figure 9 illustrates the development of these backward linkages by country.

Figure 9. *Select Central American Countries in the Textiles & Apparel GVC*

Note: Participation Intensity refers to the number of firms undertaking these activities and the share of downstream production/exports served by upstream firms

Source: Bamber and Frederick (2018).

Development of the Textiles Sector in CAFTA-DR

Raw material inputs account for some two-thirds of cost, and thus reducing these costs is key to remaining competitive (Lopez-Acevedo & Robertson, 2016). One way to do so is to co-locate textiles production with apparel production to reduce both logistics and transaction costs involved between

the two segments of the supply chain. While textiles production remains small with the CAFTA-DR region, it has begun to develop in recent years, and textile imports have fallen slightly across the region despite an increase in apparel exports as greater supply has become available (see Figures 10-12). Overall, textile imports from the US, the region's major supplier thanks to the CAFTA-DR rules, declined 21.5% from US$3.76B to US$2.95B between 2011-2019 (UN Comtrade, 2021).

Figure 10. *Select Central American Countries Textile Imports by Category, Value (US$ billion), 2011 – 2019*

Figure 11. *Select Central American Countries, by Importer and Category, Value (US$ billion), 2011 - 2019*
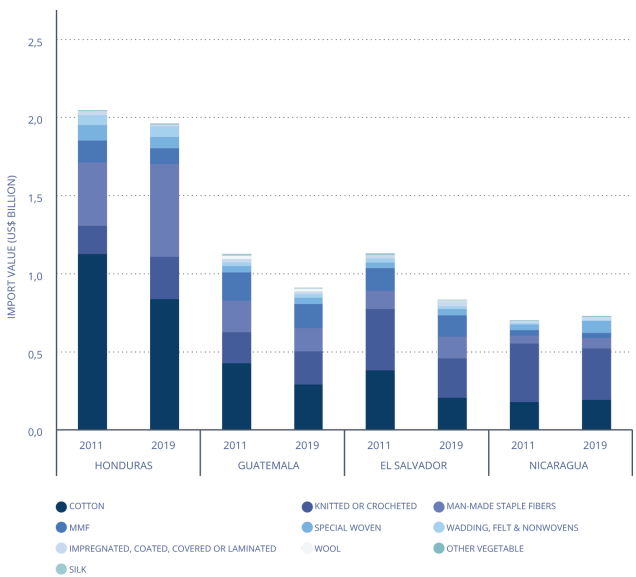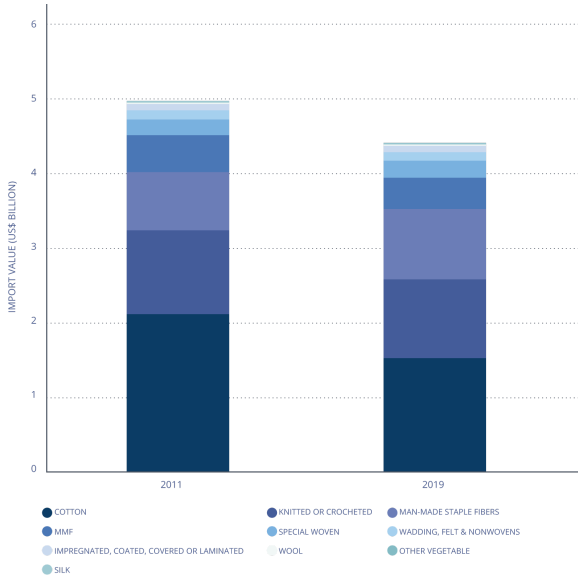
Figure 12. *Select Central American Countries Textile Imports, by Country and Exporter, Value (US$ billion), 2011 - 2019*
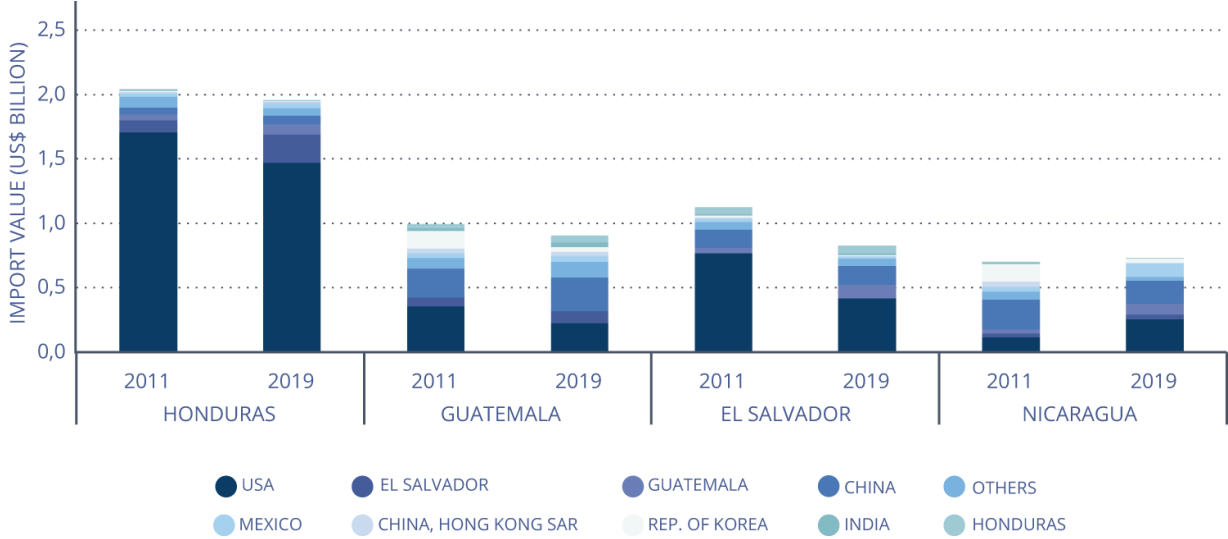
Note: Import values from Nicaragua and Honduras corresponds to exports from the world to these countries.

Honduras, El Salvador, and Guatemala have also seen an increase in local fabric production in recent years. The yarn-forward requirements of the CAFTA-DR agreement made this a necessity for the region to move beyond the basic cotton product output that has characterized its exports over the past two decades. The scale requirements for textiles production facilities have also seen an increase in regional trade of these textiles as no individual country can fully absorb output. However, overall integration of the textiles and apparel value chain across Central American producers continues to be weak and the region continues to import significant amounts of textiles from the US.

- **Honduras is the largest fabric producers in the region (IDB, 2021a)**; an important share of this is used in domestic apparel production. While it continues to import a notable amount of textiles from abroad, the relative share of imported fabric to yarn and fibers is declining as the country installs more fabric production capabilities. Cotton yarn now accounts for the second and third largest import category to Honduras (UN Comtrade, 2021). Honduras sources a significant amount of yarn from the US; it is the US's leading yarn importer accounting for close to one quarter of US yarn sales (AHM, 2021b; IDB, 2021a). At the same time, however, the country has also expanded its synthetic textiles production: between

2018 and 2019, two synthetic yarn plants were installed in Honduras, in addition to one synthetic fabric plant, for a total investment of US$170M (Dinero HN, 2018). These investments enabled the country to receive a US$80 investment in an industrial park that manufactures exclusively sports synthetic-based products for Adidas, Nike and Under Armor (Baquedano, 2021; Field Research, 2021).

- **El Salvador has also increased textiles production and is the largest exporter of the four countries,** resulting in a decline in textiles imports despite increases in apparel exports. El Salvador's imports of textiles has decreased steadily since 2005, reaching US$816M in 2019, but yarn imports have increased as have fiber imports, as the country has improved its fabric production capacity (Bamber & Frederick, 2018). El Salvador's decline in imports were mostly due to a decline from the US, which fell by close to half between 2011 and 2019. Comparatively, China's share increased from 12% to 18% (UN Comtrade, 2021).

- **Guatemala, likewise, has seen its fabric production grow and is the second largest textile exporter of the four countries.** Imports decline marginally (8%), primarily as a result of a reduction in imports from Korea and the US. Korean imports fell dramatically, shrinking by over 50% during the past decade (Figure 12). However, the country maintains strong imports from China, which account for 30% of its total textile imports.

There has been some strengthening of regional supply of textiles amongst neighboring countries in the region (Figure 13). Intra-regional textiles trade amongst the four Central American countries has increased by 87% over the past decade.[19] (UN Comtrade, 2021). El Salvador, the largest exporter in the region, increased its exports by 28%, while Guatemala came close to doubling their textiles exports almost exclusively destined to other CAFTA-DR countries. Even Honduras saw an increase in regional textile exports (~37%) despite an important increase in its apparel exports. Growth has been most significant in knitted fabric –the region's primary cotton apparel exports. Knit fabric bilateral trade at least doubled, and at most increased by 6.8 times. Exports from Guatemala tripled to Nicaragua and increased from US$11M to US$75M to El Salvador. While smaller, regional exports in MMF also increased across all three countries.

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[19] 2011-2019.

Figure 13. *Exports of Northern Triangle Countries to Latin America and the Caribbean, by Destination and Textile Category, Value (US$ million), 2011 - 2019*
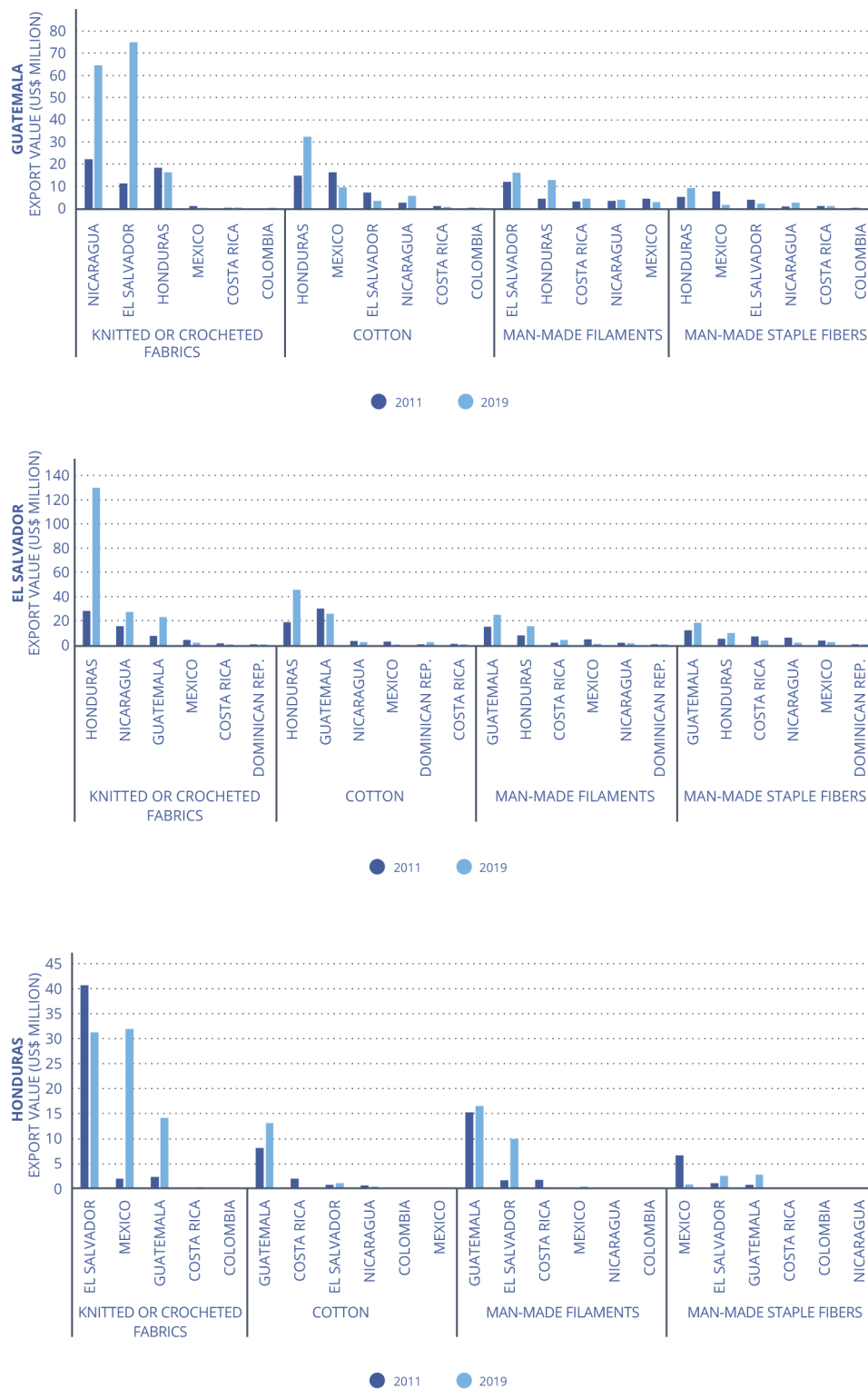
Source: UN Comtrade (2021).

The 2020 outbreak of the COVID-19 pandemic had significant impact on the textile & apparel global value chain, as it did on most globalized industries, as a result of major disruptions at all stages, from lockdowns preventing factories from operating, major shipping delays due to port closures and backlogs, to retail stores being forced to close their doors. Within the first six months of 2020, apparel trade collapsed; in the US, EU and Japan, imports of apparel declined by 26%, 25% and 17% from January to June, respectively (ILO, 2020). In some cases, exports of some of the main global producing countries dropped by as much as 70%. The largest decreases were observed in China, India, the Philippines, and Sri Lanka (ILO, 2020).[20] A May 2020[21] survey of suppliers found that about two thirds of apparel factories received cancellations from customers in the first two months of the pandemic. Also, around one in five respondents reported a complete loss of accounts receivable due to order cancellations (ILO, 2020). While demand recovered during the second half of the year, supply chain challenges initiated in the early stages of the pandemic were exacerbated by severe disruption to logistics operations and sporadic shutdowns of factories in supplier countries as they responded to COVID-19 waves/surges. It became increasingly clear that past consolidated sourcing practices were at high risk.

Analyzing US imports during the pandemic provides important insights into the resiliency of these apparel suppliers. Figure 14 illustrates the percentage change of US apparel imports by exporter. The data analyzed compares imports from the US's leading suppliers for the same months from 2019 to each of the two pandemic years, 2020 and 2021. Leading suppliers can be divided into three groups: (1) Resilient suppliers, (2) Bounce-Back suppliers, (3) Hard-Hit suppliers. (1) Resilient suppliers were those that were able to increase exports to the US in both years of the pandemic. This includes Turkey and Cambodia; both countries saw their apparel exports to the US increase significantly between 2019 and 2021 with respective increases of 36% and 25%. (2) Bounce-Back suppliers included those that were hard-hit in 2020 by the pandemic disruptions but that were able

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[20] China's declining exports, a significant share of which was previously destined to the United States, were also due to the imposition of tariffs on Chinese apparel by the US government, which began in May 2019 and were steadily increased to 25% over the following 18 months. With the exception of a small number of HS codes, these tariffs covered almost all apparel imports in categories HS2002 61+62.

[21] 179 suppliers from 30 countries (including China, Bangladesh, India, and Pakistan) conducted in May 2020 by Better Buying.

to adapt their systems and return with higher supply in 2021. Pakistan is the most notable supplier in this category, with a 42% increase over 2019 exports. The country's exports to the US had seen a decline between 2011 and 2017, with 2019 exports placing it as the 14th supplier to the US. Its resiliency during the pandemic catapulted it to 9th place. Bangladesh and Vietnam were able to regain their footing by September 2021, although the latter has since experienced significant disruptions to its supply to the extent that buyers have resorted to air transportation to sufficiently meet holiday season demand (CNBC, 2021b; Hutt, 2021; MAERSK, 2021). The final group (3) Hard-Hit suppliers struggled to export to the US through both years of the pandemic. The pandemic accelerated the decline of apparel supply from both Mexico, Indonesia, Thailand, and Sri Lanka to the US; these suppliers face the greatest risk of permanently losing market share in the world's second largest apparel market. The pandemic also eroded gains made by both India and Jordan over the past decade. China continued to lose market share, but more as a result of a continued downward trend since 2011 combined with 10-25% US tariffs in place between 2019-2021.

Figure 14. *Percentage Change of US Apparel Imports by Exporter: 2019 to 2020 & 2019 to 2021 (January – September; Top 20 Exporters)*
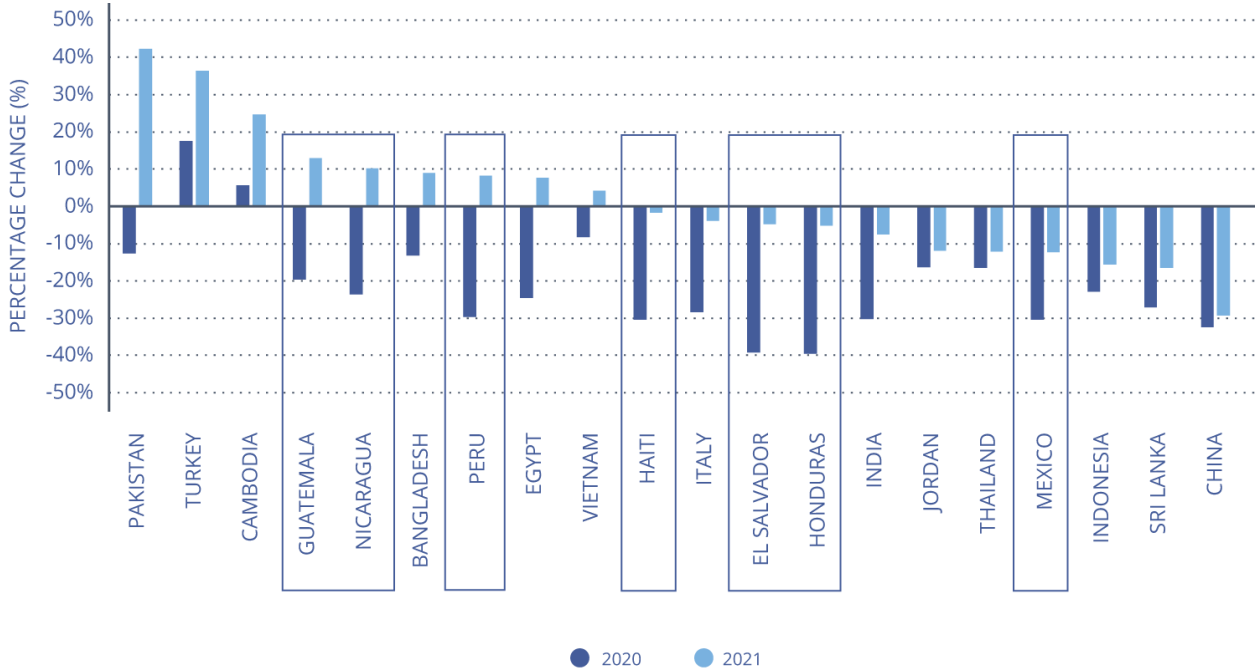
Source: USITC (2021).

Central American Response

Results from Central America were mixed, due to differing approaches to the pandemic. Honduras and El Salvador experienced the most significant declines in 2020, with exports shrinking by close to 40% compared to 2019. Honduras slipped from 7th to 8th supplier to the US, while El Salvador lost its position as a top ten supplier to Nicaragua. Both countries had their operations closed as a result of strict pandemic protocols during the second quarter of 2020 (Field Research, 2021). Guatemala and Nicaragua saw less severe contractions. Guatemala and Nicaragua were able to recover from their setbacks in 2020, with each country seeing more than 10% growth in exports in 2021 compared to 2019. Neither country required the factories to shut down at any point (Field Research, 2021). In Guatemala, clothing production was not classified as an essential service, but could remain open with "special permission" from the Ministry of Economy (Hoskins & Mayorga, 2020). These approaches are clear from worker layoffs. Early on in the pandemic (May 2020) saw close to 75,000 apparel workers across El Salvador and Honduras laid off from their jobs, comparatively Nicaragua only saw 6,000 lay offs in the same period (Just Style, 2020b; Maquila Solidarity Network, 2020). Figure 15 detail the response measured by exports to the US. While 2020 monthly exports in Guatemala and Nicaragua declined to about half their 2019 levels in April, May, and June, they fell to just a fraction in Honduras and El Salvador. By September 2021, all four countries had recovered to close to their 2019 levels. It is worth noting that 2019 had been a strong year for most of these suppliers, with factories operating at maximum capacity that year (Field Research, 2021).

Figure 15. *Monthly Apparel Exports from Select Central American Countries to US, 2019-2021*

GUATEMALA

HONDURAS

NICARAGUA

EL SALVADOR

2019   2020   2021
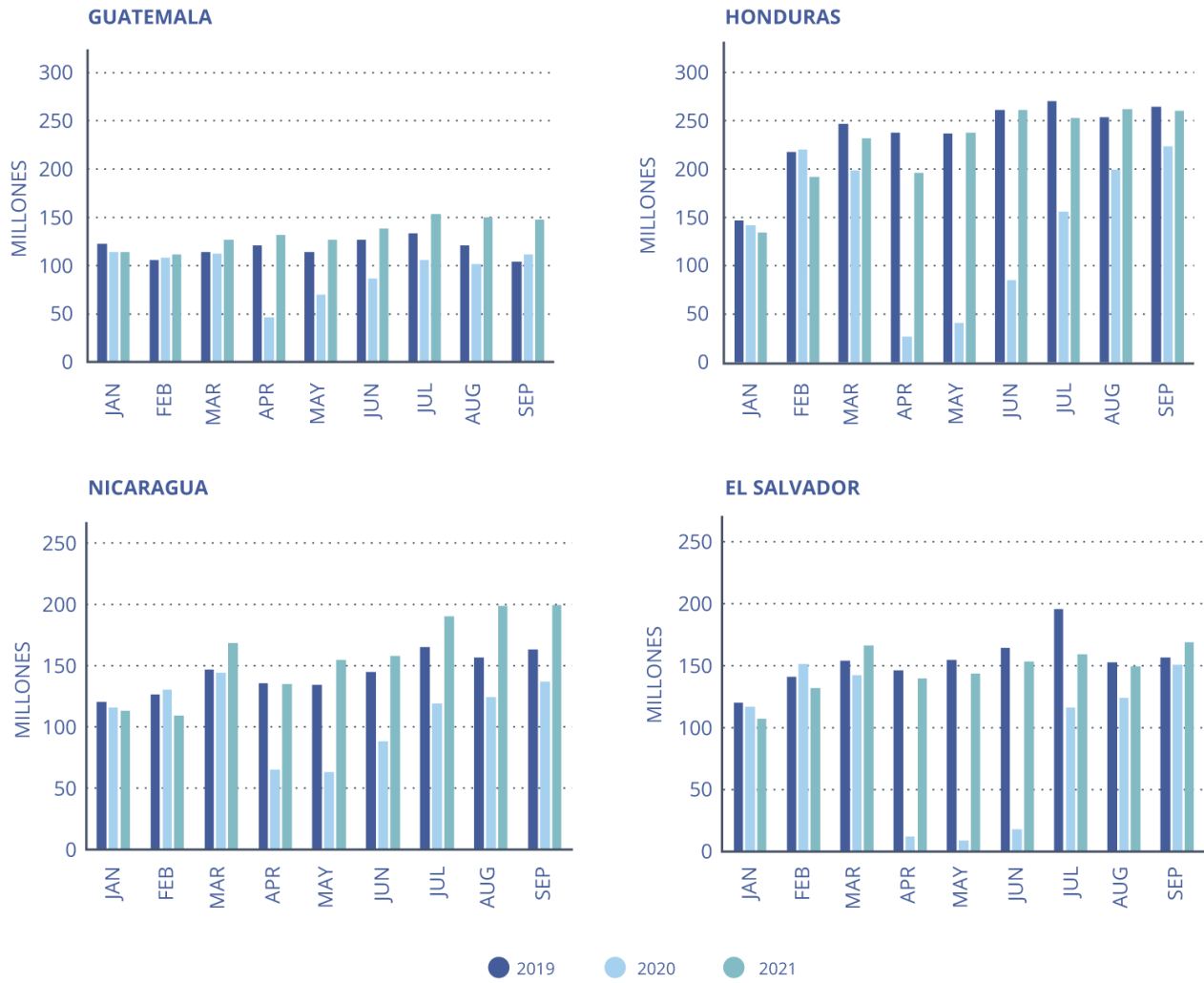
Source: USITC (2021).

Temporary Relief: The Rise of Demand for PPE

The pandemic led to a surge in demand for personal protective equipment (PPE) in the US. PPE includes a wide range of protective gear, from face masks to gloves and medical coveralls (Bamber & Gereffi, 2013; Hamrick & Bamber, 2019). Central American countries generally do not actively participate in this global market (<1% of US imports). However, the huge demand created a small window of opportunity for Central American factories to temporarily reorient their operations. With past apparel orders from major buyers cancelled or on hold, factories in all four countries shifted temporarily to manufacture facemasks and other PPE products both for the domestic market and export to the US.

Between March and November 2020, during the peak of the pandemic, US demand for PPE in general, and facemasks in particular, increased dramatically (see Figure 16). This offered an opportunity for the Central American countries to diversify exports into medical supplies. However, it has not proven to be a sustainable long-term market. Monthly US PPE imports peaked in May 2020 at US$4.1B and fell significantly following this. US monthly imports, as a whole, stabilized between US$500M and US$1B.

Figure 16. *Evolution of US PPE Imports by Product Group, Value (US$ billion), September 2019 – September 2021*
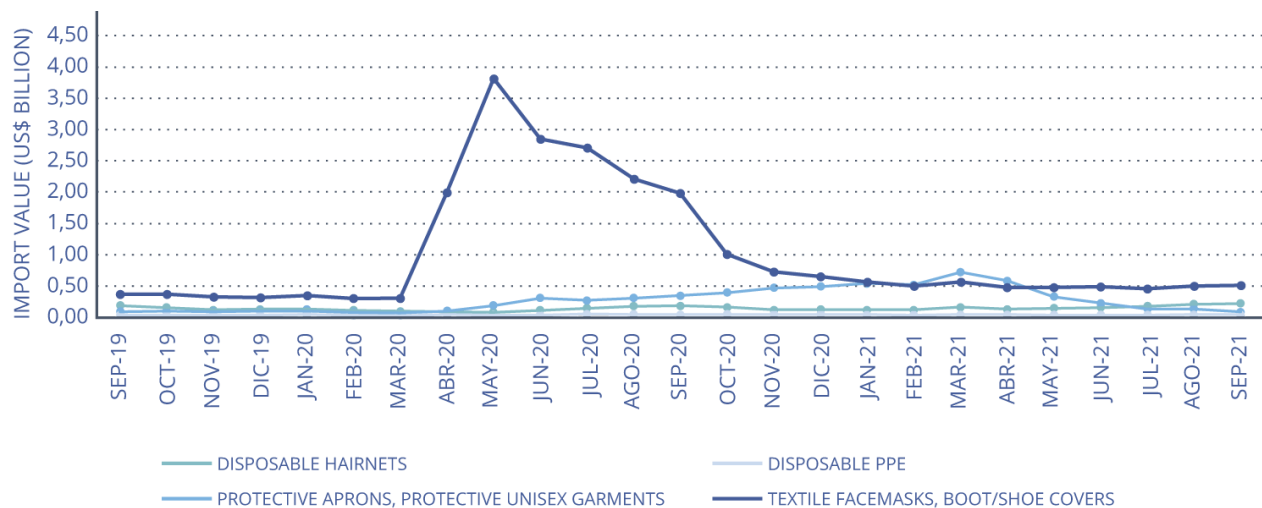
The response of Central American countries to this spike in demand was notable, as factories shifted production lines to facemask production. Prior to the pandemic, using 2019 as the base year, these countries contributed very little PPE exports, accounting for just 0.44% (US$35M) of US imports.

Guatemala had been the primary supplier, accounting for 59% (US$20M) of these exports in 2019, followed by Honduras (22%, US$7M) and El Salvador (15%. US$5M). PPE exports from Nicaragua were negligible. Pre-pandemic exports in PPE, nonetheless, were marginal compared to textile & apparel exports to the US in all four countries, which reached approximately US$7.8B in 2019. Figure 18 details these monthly exports by country, pre-, during, and post-pandemic peak.

Figure 17. *Monthly PPE Exports from Select Central American Countries to US, 2019-2021*
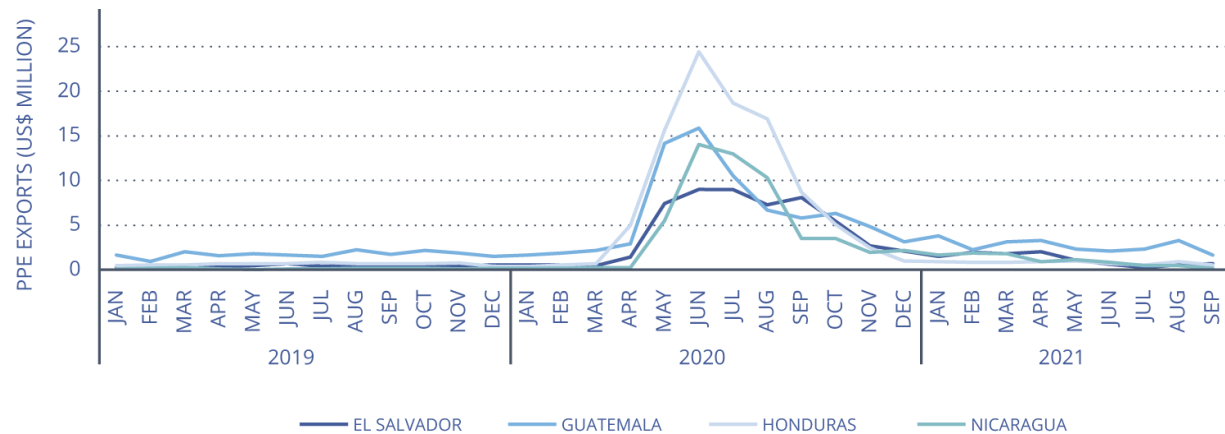
Source: USITC (2021)

During the pandemic peak in 2020, all four countries, however, were able to increase their PPE exports. Taken as a whole, the countries exported eight times more in value terms than prior to the pandemic (US$284M vs US$35M). The exports of all four countries peaked in June 2020, totaling US$63.3M, and accounting for 1.2% of US imports at the peak of the crisis (Q2-2020). Given its larger apparel production base, Honduras rapidly increased exports and was the most significant exporter of PPE amongst these countries during the crisis. In June 2020, it exported some US$24.4M. Nicaragua also performed notably, exporting almost the same amount as pre-pandemic leader, Guatemala, despite little experience in these products prior to the pandemic. Indeed while Guatemala produced some 240 million face masks for the US market (Field Research, 2021), the country did not maximize on this opportunity to increase their exports, increasing exports by less than a factor of 4. Following the pandemic peak, both Honduras and Guatemala returned to 2019 export levels as their production lines reconverted back to apparel. Nicaragua is the only country that maintained its PPE exports considerably higher than pre-pandemic levels. While the four Central American countries increased their market share during the peak, they returned to their

pre-pandemic level by Q3-2021. The principal beneficiary of increased US demand in PPE was China, which increased its market share from 64% (US$1.4B) to 84% (US$8.1B) as it responded to the major spike in demand.[22]

Figure 18. *US PPE Imports by Exporter, Q3-2019 – Q3-2021*
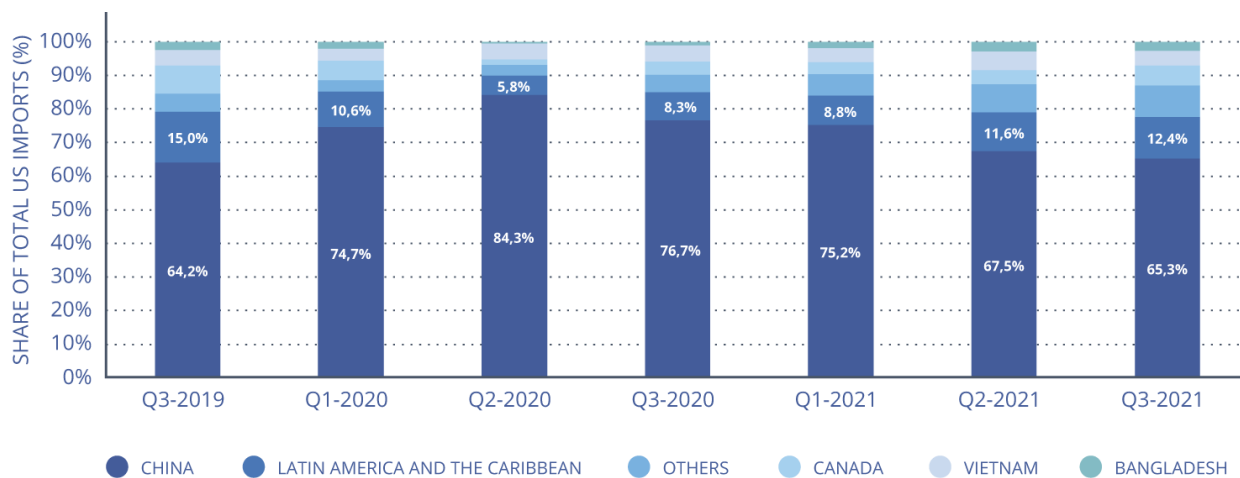
Source: USITC (2021)

Production of PPE products provided an important buffer for factories, allowing them to maintain a share of their workers on staff and the factories operating, however, financially, this could not fully cover the losses experienced as a result of canceled orders. The tremendous rise in PPE exports from the region however, was short lived, occurring from April to June 2020. After, exports started to decline, reaching 2019 levels by Q2-2021. The stabilization of US demand combined with the drop off in exports from Central America and their return close to their pre-pandemic market share (2019: 0.4%, 2021[p]: 0.56%) suggests that these products do not represent long term market prospects for the countries analyzed. This market share was considerably lower than their apparel market share at 10%, and US-bound PPE exports, even at their peak of US$283.6M, remained a small fraction (4.69%)[23] of textile & apparel exports (US$5.7B, 2020). While Central American countries demonstrated their capabilities to produce PPE under pressure, they proved to be less competitive than other producers around the world. At the same time, as the demand recovered for apparel

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[22] While this provided some relief from a downturn in apparel demand, Latin America as a region actually underperformed in terms of its response to PPE demand for the US market compared to competitors. Prior, to the pandemic, the region accounted for 15% of PPE imports into the US; however, during the pandemic peak in Q2-2020, it represented just 5.8% of supply (Figure 17).

[23] Table 23 in the appendix provides a month by month comparison for 2020 of PPE exports calculated as a percentage of T&A exports.

products, factory operators preferred to return production lines to pre-pandemic products. The demand for apparel products accelerated significantly, reaching levels higher than 2019. Given the low margins and high competition associated with disposable facemask production, which dominated PPE during this time, it was more profitable for these firms to return to apparel production for the US market.

Recovery: New Opportunities?

By the end of Q3-2021, the countries were back to their 2019 export levels, their best year to date. Industry associations from all four countries indicated that they were operating at maximum capacity by the end of 2021; the Guatemalan industry association highlighted that the country has the next 10 months of production capacity fully committed. While trade data is as of yet unavailable, for the final quarter of 2021, El Salvador, Guatemala, and Nicaragua reported monthly exports to the US over and above their 2019 levels (Field Research, 2021). The recovery has been driven by the convergence of three key elements.

First, **there has been increased interest from buyers in the US looking to cover production** they are unable to source from Asia. Asian factory shutdowns and a logistics crisis in shipping from Asia to the US (Farrer, 2021) meant that many buyers were resorting to expensive air freight and have become willing to pay more for production delivered ahead of time (Field Research, 2021). Industry associations from the US report that several companies that previously did not source from Central America are investigating the region's capabilities, production operations, and how these may intersect with their needs (Field Research, 2021). Buyers are tapping into existing supplier capacity, while a small number of Asian suppliers have identified opportunities to expand in the region, such as Grupo Hansae's announcement to expand in Nicaragua (Field Research, 2021).

Second, **MMF textiles investments in the region finally began to gain traction**. Access to locally-produced MMF textiles, under the current trade regulation, is seen as a vital step for increasing the region's participation in the industry, supporting both expanded apparel exports and product upgrading into a wider range of apparel items, including athletic clothing such as high performance t-shirts (Field Research, 2021). By December 2021, textile and apparel associations were reporting that every textile maker in the region was completely sold out (Field Research, 2021),

indicating high demand for sourcing in the region. Guatemala and Honduras have seen large textiles investments announced since the outbreak of the pandemic. In Guatemala, recent investors are Korean and Spanish; the latter (Nextil Group) starts to operate in Q1 2023 and will focus on mass production.[24] (Fibre2Fashion, 2021a; Gamarro, 2021). In 2022, textile investment in Honduras is expected to reach US$400M-US$600M, the majority from US companies (Field Research, 2021). Investment in Nicaragua was relatively less strong than in its regional peers, with announcements from a Chinese company. The presence of more textiles regionally increases the region's attraction as a sourcing location.[25]

Third, there is **high profile US support for regionalization of apparel production** into the region to help slow down illegal immigration to the US. The most important of these is the Partnership for Central America launched by the Biden Administration under Vice President Harris's office in 2021. The initiative is focused on spurring economic activity in the region to drive job creation and is a central component of the Biden administration's plan to address the root causes of migration from Central America (Partnership for Central America, 2021). One of the major investments announced was into Honduras – yarn company Parkdale Mills arrives to Honduras under the Biden Administration's Call to Action (Just Style, 2021a). The US private sector is also engaged in initiatives to boost regionalization. The **Think HUGE** Business and Investment Council connects the private sectors of the Central American Northern Triangle countries and the US to encourage a favorable environment for strategic regional investments. This regional alignment offers economies of scale, opportunities to enhance infrastructure, and competitive advantages, all of which creates opportunities to reduce illegal immigration to the US, increase the participation of regional qualified suppliers, and foster economic growth and employment in Central America (Think Huge, 2021). In addition, the Regional Trade Facilitation and Border Management Project (2018 – 2023, US$ 17.5 M) financed by USAID aims at optimizing border processes and improving border control systems and infrastructure amongst the Northern Triangle countries, El Salvador, Guatemala, and Honduras. Reducing cost and time to trade goods regionally and intra-regionally would further boost the industry (USAID, 2021).

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[24] Nextil Group will continue to produce value-added specialties in Spain and the US, while relocating mass production to Guatemala (Fibre2Fashion, 2021a; Gamarro, 2021).

[25] While there is strong consensus that the availability of textiles in the region is critical for it to leverage buyer interest for longer-term growth, not all stakeholders believe that building local capabilities is the correct approach. For example, the American Apparel & Footwear Association (AAFA) has shared policy recommendations with US authorities, including the opportunity to modify rules of origin to ensure more availability of materials in Central America, which in turn would spur investment from US companies (Reuters, 2021c).

Box 4. Automotive Textiles: A Potential Upgrading Trajectory for the Central American Textile & Apparel Sector?

As Central American countries continue to work on initiatives to enhance their participation in the textiles & apparel GVC, it may be worthwhile to analyze adjacent industries for potential alternative upgrading pathways. This box briefly discusses the automotive textiles industry. The region's proximity to the North American regional automotive value chains, together with its low-cost labor have helped several Central American countries to enter into the automotive GVC in a limited manner. Honduras and Nicaragua have slowly emerged over the past decade to become new assemblers of automotive wire harnesses for the auto industries in both Mexico and the United States (Bamber & Frederick, 2018). This raises the question as to whether countries in the region can gain more traction in the industry. This box thus explores the automotive textiles industry, key tendencies, major actors, and critical elements for attracting investment in this area and entering the chain.

Automotive textiles are those used in the production of vehicles, from light weight passenger cars to heavy duty trucks. The materials are used in a wide range of applications, although they are primarily used in interior systems production including carpets, seat upholstery, roof and door liners, seat belts, and airbags (Parmar & Malik, 2007). Due to the roles they play in passenger safety and comfort and the extreme conditions they are exposed to, these products are considered technical textiles. With the exception of leather products, they rely to a large degree on synthetic, man-made fibers, including polyester and nylon. These textile yarns are subsequently treated, including coating or lamination, to enhance performance. They are considered highly sophisticated materials, dependent on significant R&D. This subsegment of the automotive GVC, which is primarily categorized as "interior systems" (Sturgeon, Daly, Bamber, Frederick, & Gereffi, 2016), can be itself divided in three stages: textiles production, textiles finishing and product manufacturing.

Demand for automotive textiles is driven primarily by cycles in new vehicle manufacturing, with a small part from the aftermarket. Over the past few years, there has been a decline in global automotive output (CFRA, 2021b), however, in the long term there are strong indicators for growth in the mid to long term. While automotive demand generally fluctuates according to global economic trends (Dargay, Gately, & Sommer, 2007), anticipated growth will largely be fueled by the rapid uptake of electric vehicles and the strong push by governments to switch transportation towards these more carbon friendly alternatives. Demand for electric vehicle is expected to grow at 18% CAGR over the next decade (Allied Market Research, 2021b). It is estimated that 30% of vehicles sold in the US in 2030 will be EVs (CFRA, 2021b).

Carbon zero goals, together with advances in digital technologies, has also provided impetus for innovation in automotive textiles. Car manufacturers are seeking to reduce fuel consumption

and CO_2 emissions, and textiles have been identified as one way to do so. The textile content of cars has been steadily increasing; a mid-size car today contains approximately 35kg of textiles, up from 20kg in 2000 (Fisher, 2020). The most important trends are the increased use of smart fabrics and sustainable textiles. Smart fabrics are embedded with multi-sensors increasing user functionality. In sustainable textiles, there is increasing pressure for all textiles to be both recyclable and based on recycled materials (Fisher, 2020).

Three different sets of firms operate within this automotive interiors subsegment. First, the production of automotive fabrics may be undertaken by textile producers with industry-specific downstream applications. These firms serve a wide variety of downstream industries, from automotive and aerospace to construction and medical supplies. Large textiles suppliers serving this sector include Arvind (India), Dow Industries (US), Huvis (South Korea), and Toray Industries (Japan). Second, interior systems suppliers are primarily involved in the production of modules for inside vehicles, including seat production, seat belts, and airbags amongst others. These firms may also be vertically integrated into the production of the textiles inputs themselves. Major automotive suppliers with linkages into fabric production for their parts include Lear Corporation (US), Joyson Safety Systems (China), and Adient (US). Third is smaller specialized third-party fabric producers, which purchase yarns for fabric production andfinishing and sell them to interiors suppliers.

As a key automotive module supply, this sub-segment mirrors the geographic distribution patterns of the highly regionalized automotive GVC. These follow a core-periphery structure, connecting lead firms and suppliers within a single world region. There are three principal regional chains together with the domestic chain in China. In the Western hemisphere, the automotive chain is dominated by North American countries, Canada, Mexico, and the US, supported to a small degree by peripheral actors in Central and South America. In Europe, France and Germany dominate the chain, with a range of other actors, particularly in Eastern Europe playing key roles for lower cost labor. In Asia, Japanese lead firms dominate with supply and assembly from South East Asian countries including Thailand (Sturgeon et al., 2016; Sturgeon, Van Biesebroeck, & Gereffi, 2008). The Chinese value chain has emerged largely as domestic chain due to national policies that fostered inward development; however, increasingly Chinese brands, manufactured and assembled almost entirely in the country, are making their way into global markets (N. Oliver, Holweg, & Luo, 2009; S. Oliver, 2015).

As a specialized, technical product, automotive textiles production typically has been based in the developed countries within this core-periphery structure. However, as developing country automotive clusters have grown, there has been a tendency to offshore the production of the interior components using these textiles, such as seatbelts and seats, closer to the vehicle assembly hubs. This has generated greater demand for textiles in these locations. In 2016, for example, approximately half of US technical textiles were exported to Mexico for component production and installation (SelectUSA, 2019). Due to the scale of investment required for the

textiles operations, these firms tend to locate production sites close to strong centers of demand (multiple car assemblers), and thus technical textiles investment tends to occur after a cluster is well-established. Investment attraction in automotive textiles prizes proximity to automotive manufacturing hubs; available, cost-competitive workforce with access to higher education; low turnover rates; access to efficient logistics; and political and economic stability (Gutierrez, 2019; MexicoNow, 2021; Velazquez, 2019). In addition, quality production is a critical factor in attracting investment due to the highly regulated nature of these products (Allied Market Research, 2021a).

The North American Automotive Regional Value Chain

Within the North American Automotive RVC, Mexico plays a major role as a lower-cost location. It is the 6th largest global manufacturer of automobiles; almost exclusively export-oriented, the country produces approximately 3 million vehicles annually, over 80% of which are sold abroad (International Trade Administration US, 2021). The country hosts numerous assembly plants from most major automotive brands around the world; the presence of these plants has contributed to the emergence of at least nine clusters with a large number of suppliers – including those of interior systems – co-locating in the country.

Major interior systems producers from around the world which use and produce automotive textiles, such as Adient (US-Ireland), Autoliv (Sweden), Forvia (France, previously Faurecia), Lear Corporation (US) and Joyson Safety Systems (China, Ningo Joyson Electronics), have all established multiple manufacturing plants across the country. Lear Corporation has as many as 50,000 employees in Mexico (source). Mexico's role in the industry is facilitated by both its proximity to the US automotive sector, but also NAFTA and subsequently USMCA free trade agreements. The Mexican federal and state governments have actively focused on deepening the country's participation in the GVC over the past twenty years (Garcia Garnica & Martinez, 2018).

With the rise of its assembly operations and the presence of a vast number of interior systems suppliers, the demand for locally produced textiles has risen. Large global automotive textiles manufacturers have established production operations in the country, contributing to the exiting automotive ecosystem. For example, Guanajuato, has attracted a major investment from Japanese specialized textile manufacturer, Seiren Viscotec, to supply the diverse number of automotive manufacturers, from to GM to Mazda and Toyota located in the area (Velazquez, 2019). Lear Corporation likewise have established both textiles manufacturing operations and their largest global sewing plant for automotive interiors in Ciudad de Juarez, Chihauhua, and the biggest plant of its 257 operations with some 6,000 employees (D&B, 2021; MexicoIndustry, 2018). Lear's decisions with regard to location are in response to the search for lower salaries, the reduction of transport costs and the needs of its main customers (Chrysler, General Motors,

Volkswagen, etc.) (Lara, 2006). Chihuahua is home to numerous assembly plants from both Tier 1 suppliers and automotive brands (Tecma, 2021).

Central American Potential?

Comparatively, Central America has played a very small role in the automotive GVC to date. The automotive industry in Central America is mainly comprised of the manufacture of wire harnesses for passenger vehicles and has primarily been driven by Honduras and Nicaragua's entrance (Bamber & Frederick, 2018). In Honduras, growth in the sector led to exports of close to US$820M in wire harnesses by 2021 (UN Comtrade, 2021).25F[26] These labor-intensive activities were attracted to the region as a result of its low-cost and trainable workforce. The Tier 1 wire harness assemblers serve a range of global car brands, from US-brands Chrysler, Ford and General Motors, to Korean firms Kia and Hyundai and high end European brands, BMW and Audi. Exports are oriented strongly to assembly in the US, but an increasing amount is also being directed to Mexico for installation in cars there before being re-exported. This initial integration into the automotive industry via the North American regional value chain illustrates one entry point for potential integration with automotive GVC. Could this offer a similar strategy for the automotive textiles subsegment?

Expansion into the automotive textiles subsegment offers several potential benefits for the region, including job creation, export revenues and diversification. Amongst the most relevant for the region is high employment potential in sewing positions. These jobs could leverage the strong experience and expertise developed in the apparel GVC. Access to low-cost labor makes it an attractive potential addition to the North American chain, as does the CAFTA-DR trade agreement. However, there are multiple headwinds to potential entry into the subsegment. Following the Mexican example, the likely entry point is through the production of interior components, rather than automotive textiles themselves. In this stage, there are several competitiveness barriers to entry; first, Mexico has become the well-established low-cost incumbent in the chain, developing as an outsourcing location by strengthening its position in multiple stages, and creating a vibrant ecosystem of suppliers, distributors, and buyers as well as access to trained workers. Competing against the country requires a combination of lower-cost labor with similar conditions in terms of supply chain logistics and market access. While market access is assured through CAFTA-DR, regional logistics in Central America, which is a critical element for this just-in-time lean manufacturing chain, remain inefficient. Second, the industry has high regulatory requirements for safety reasons, quality production, and standards compliance that must be met. Establishing these production standards adds to the costs of relocation. Third, growth of the sector has depended upon multi-national automotive suppliers;

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[26] HS-02, 854430, Insulated electric conductors; ignition wiring sets and other wiring sets of a kind used in vehicles, aircraft, or ships.

these firms tend to favor countries with strong political stability combined with marked commitment to developing the automotive industry. National and state policies and incentives have played a major role in attracting and embedding GVC investment (Sturgeon et al., 2016).

D. OPPORTUNITIES AND THREATS FOR CENTRAL AMERICAN COUNTRIES IN TEXTILES & APPAREL GVC

There are strengths and opportunities associated with the industry, including the region's duty-free access to the US, proximity to this market and established Export Processing Zones. The expansion of the textiles sector also offers potential for future upgrading. Balanced against the reasons for optimism are a number of challenges, both related directly to the industry as well as at the country level. Table 13 summarizes both the strengths and weaknesses. The most prominent advantages and constraints are then outlined in the section that follows.

Table 13. *SWOT Analysis*

STRENGTHS	WEAKNESSES
▪ Duty-free access to US market for yarn-forward products. ▪ Proximity to the US market, i.e. speed to market advantage, leading to lower transportation costs and emissions. ▪ Established Export Processing Zones and relevant benefits for foreign investors. ▪ Expanding textiles sector, particularly in knit fabric and yarn production. ▪ Notable renewable energy resource potential.	▪ High cost and time to trade goods (amongst the highest in the world). ▪ Elevated electricity prices and poor energy reliability. ▪ Limited labor pool with low levels of education. ▪ High minimum wages and unpredictable labor costs. ▪ Limited access to duty-free non-cotton textiles. ▪ Shortages in regional cohesiveness at the government level. ▪ Institutional weaknesses and limited sustained national industrial policies. ▪ Private investment and innovation efforts mostly reactive rather than proactive. ▪ Overdependent on the US market

OPPORTUNITIES	THREATS
▪ Supply chain risk diversification by buyers. ▪ Increasing search for flexibility from buyers and Tier 1 suppliers. ▪ Sustainable and ethical awareness on the rise. ▪ Textile investments for yarn-forward inputs. ▪ Rapid growth of e-commerce. ▪ Support from regionalization advocates in US policy circles.	▪ Duty-free e-commerce. ▪ Shortage of key inputs. ▪ Competition from scale suppliers in South and South-East Asia. ▪ Competition from suppliers from AGOA and Europe for rebalancing opportunities. ▪ Natural disasters. High risk and uncertainty due to the ongoing pandemic and logistics crisis.

Source: Authors.

Advantages

Central America's main competitive advantages in the industry include duty-free access to the US under the CAFTA-DR agreement, proximity to the US market, established export processing zones and a developing renewable energy sector. The following subsection expounds on these strengths in further detail.

1. **Duty-free access to US market for yarn-forward products.** The CAFTA-DR agreement has been instrumental in supporting ongoing apparel exports from Central America and the inflow of US investment to the region, promoting regional integration (Bamber & Frederick, 2018; Frederick et al., 2015; Frederick et al., 2014; Johnson, 2019; Mathews & Castro, 2014; Paganini & Steenbergen, 2021; UN, 2019). As an industry that is highly sensitive to cost changes, the tariff reduction for apparel products has helped the region remain competitive in the face of increased competition from cheaper locations in Asia (Bamber & Frederick, 2018). Most apparel products from the region enter the US market under CAFTA-DR provisions: in 2019, 90% of US apparel imports from all CAFTA-DR countries qualified for duty-free entry and met the rules of origin (OTEXA, 2021).

2. **Proximity to the US and speed to market,** which is particularly important for fashion-oriented items (Bamber & Frederick, 2018). Average fright time from the region to Miami ranges between three to five days by ocean and two hours by air (Field Research, 2021), while shipments from Asia can take at least three weeks by ocean (IDB, 2021a). This competitive advantage enabled the region to integrate its production processes with the US (Campoamor, Flores, Pozo, & Nekhay, 2018) and it is now becoming increasingly important both to meet the fast fashion requirements and leverage the industry interest to address supply chain risk. The short distance eliminates potential supply chain disruptions in shipping and logistics. Further, geographic proximity leads to lower transportation costs and emissions, thus favoring sustainability efforts by the fashion industry.

3. **Established Export Processing Zones (EPZ).** In Central America, GVC participation in the industry has been driven by large-scale investments by foreign firms in EPZs. With dedicated infrastructure, streamlined public administration, generous fiscal incentives and insulating effects from the instability and bureaucracy within the countries (Farole & Akinci, 2011;

Paganini & Steenbergen, 2021), these 'free zones' have played a key role in encouraging trade and foreign direct investment in the industry (Bamber & Frederick, 2018; Paganini & Steenbergen, 2021) and still account for the majority of T&A exports. Nicaragua (52 EPZs) and Honduras (39) have the second and third highest number of special economic zones among the countries in LAC (UNCTAD, 2019). Benefits granted to exporting firms (including apparel and textile, as well as other strategic sectors) are similar across the CAFTA-DR countries and include exemption from corporate income tax for 8-20 years with additional exemptions of other taxes for an indefinite time frame (municipal, export, sales, imports), 100% national treatment for foreign investors, and full repatriation of profits (Bamber & Frederick, 2018).

4. **Expanding textiles sector, particularly in knit fabric and yarn production.** Although the region initially had little capacity to commercially produce fiber or spin yarn, during the last decade it has attracted investments in the textile industry (Mathews & Castro, 2014). Today, several mills are owned and operated by regional investors, leading to higher value added in exports (Field Research, 2021). In Guatemala, textiles produced in the country account for 30% of the domestic apparel production (Field Research, 2021). Investments in the textiles sector grew further in 2021, with companies including Nextil Group and Parkdale Mills setting up textile mills in Guatemala and Honduras, respectively (Fibre2Fashion, 2021a; Just Style, 2021a).

5. **Notable renewable energy resource potential,** rooted in Central America's abundant hydroelectricity, geothermal and solar resources. By 2021, installed renewable capacity accounted for 69% of generation in Guatemala, 66% in El Salvador, 62% in Honduras, and 45% in Nicaragua; Vietnam, which leads capacity growth in ASEAN, has a current capacity of 65% (CEPAL, 2021; IEA, 2021). During the last decade, the region's renewable installed capacity grew at much higher rates than that of non-renewable: 87% vs. 10% in El Salvador, 129% vs. 6% in Guatemala, 185% vs. 27% in Honduras, and 106% vs. 42% in Nicaragua (CEPAL, 2021). Globally, renewable electricity capacity is forecast to increase by around 60% between 2020 and 2026 (IEA, 2021). Sustained progress in renewable energies can create adequate conditions to support the fashion industry' sustainability efforts. Industrial parks in the region are well aware of this strength and opportunity; in fact, in recent years, several of these have transitioned to renewable energy, including Green Valley and Zip Zan José in Honduras, and the American Industrial Park in El Salvador, which in 2020 obtained an US$8M

loan from IDB to support the installation of a self-generating electricity photovoltaic park to provide 20% of the park's energy capacity and reduce dependency on the grid (IDB, 2020b). Honduras has also made impressive progress in environmental issues, including efficient water treatment (80% reduction) and salt elimination in textile plants (Field Research, 2021).

Constraints

Despite these advantages, Central America faces multiple challenges in the T&A industry. Some are sector-specific while others are at country-level; most have been entrenched for a long period of time. The most pronounced are discussed below.

1. **Cost and time to trade goods regionally and intra-regionally are among the highest in the world** (USAID, 2021). The region's logistics costs are three or four times higher than those in the US and Europe, with an average cost to transport 1t of cargo per kilometer of US$0.17 (vs. US$ 0.02 in the US) (Bnamericas, 2020). Compared to China, where the cost of shipping a synthetic fiber fabric (HS-580632) to the US in 2016 was US$0.32 per 10,000 km by air and US$0.01 by sea, the shipping cost for Honduras was US$5.18 by air and US$0.25 by sea, while Guatemala's cost was double that of Honduras (IDB, 2021c). Also, on average, the time it takes to trade goods in Central America is five times greater than in OECD countries (IDB, 2020a).

   High costs and time to trade are rooted in deficits in co-modal transport infrastructure, quality of secondary roads and logistics infrastructure (port and highways), as well as in inefficiencies in customs clearance and limited border management (Field Research, 2021; IDB, 2020a; Paganini & Steenbergen, 2021; World Bank, 2018, 2019). Slow customs clearance is due to the lack of physically integrated controls and procedural constraints such as outdated regulations, duplicate documents (on both sides of the borders), paper-based manual procedures and discretionary inspections (IDB, 2021c; Paganini & Steenbergen, 2021; World Bank, 2018). Where digital processes have been introduced to improve this, paper-based documentation must still also be submitted simultaneously. These inefficiencies undermine speed-to-market advantage that the region enjoys with the US, as well as the potential to leverage e-commerce opportunities and search for flexible providers.

According to the 2018 Logistics Performance Index (LPI), Guatemala, El Salvador and Honduras ranked 125, 101, and 93 of 160 economies, respectively. On a scale of 5.0, Guatemala, El Salvador, and Honduras's score is 2.41, 2.48, and 2.60, respectively, similar to the average of their income group (lower-middle, 2.60) yet well below Mexico (3.05) and top Asian apparel exporters such as China (3.61, #29), Vietnam (3.27, #39), India (3.18, #44) and Turkey (3.15, #47) (World Bank, 2019) (Table 14).

Table 14. *Logistics Performance Index, Top 10 Apparel Exporters and the Region (2018)*

COUNTRIES	OVERALL (CHANGE VS. 2012)	CUSTOMS	INFRASTRUCTURE	INT. SHIPMENTS	LOGISTICS QUALITY AND COMPETENCE	TIMELINESS	TRACKING AND TRACING
China	26 (0)	31	20	18	27	27	27
Vietnam	39 (+14)	41	47	49	33	40	34
India	44 (+2)	40	52	44	42	52	38
Turkey	47 (-20)	58	33	53	51	44	42
Mexico	51 (+4)	53	57	51	52	49	62
Honduras	**93 (+12)**	**125**	**88**	**93**	**75**	**118**	**93**
Cambodia	98 (+3)	109	130	71	111	84	111
Bangladesh	100 (ND)	121	100	104	102	107	79
El Salvador	**101 (-8)**	**120**	**114**	**86**	**91**	**90**	**117**
Nicaragua [a]	**102 (ND)**	**90**	**83**	**107**	**96**	**107**	**134**
Pakistan	122 (-51)	139	121	97	89	136	136
Guatemala	**125 (-51)**	**132**	**122**	**130**	**136**	**88**	**122**
Myanmar	137 (-8)	131	143	144	128	108	143

Source: Authors based on World Bank (2019). Notes: (a) Data from 2016 LPI (Nicaragua was not included in the 2018 LPI)

Guatemala is the poorest performer of the four countries analyzed. This weak positioning is rooted in its poor port infrastructure (e.g., insufficient depth of draft), low road density (below Latin America's average) and poor quality of secondary roads (average speed at which a product travels on the main highways is 37 km/h, 36% slower than in 2000) (BCIE, 2021; Field Research, 2021). Honduras also ranks below most Asian apparel exporters, although it has made some progress over the past decade. Since 2012, the country has improved 23 positions in the infrastructure category: Honduras' port is modern and compliant with global accreditation programs; as such, it has the capacity to provide efficient and competitive services and handle three times its current volume (Field Research, 2021; Marca Honduras,

2019). However, the country's road and highway network has not evolved in accordance: this suffers from poor coverage (lowest road density in the region: 0.34km/km2; 24% of national road system paved), quality (especially in secondary corridors) and maintenance management system, leading to port access bottlenecks (Almeida, Prat, Vargas-Moreno, & Acevedo, 2019; Field Research, 2021; Logistics Cluster, 2020; Paganini & Steenbergen, 2021). Furthermore, Honduras' border infrastructure is deficient and lacks specialized logistics areas, restricting the fluid movement of cargo and generating delays and cost overruns for exporters (Field Research, 2021; Logistics Cluster, 2020; Paganini & Steenbergen, 2021).

El Salvador's most pressing challenges include customs efficiency, tracking and tracing, and infrastructure. Delays in customs clearance when exporting to Guatemala and Nicaragua can be as high as 6 days (Field Research, 2021). In terms of infrastructure, El Salvador has no port in the Atlantic, which constrains shipping to the US: T&A companies based in El Salvador must send production to Guatemala or Honduras and ship to the US from these countries (Field Research, 2021). Nicaragua shares most weaknesses with its Central American peers, including slow inefficient customs due to paper-based processes, and arbitrary delays from customs agents (Field Research, 2021; USDA, 2019). Also, like El Salvador, Nicaragua does not have a port in the Atlantic, which forces businesses to export to the US through ports in Honduras and Costa Rica or via the Panama Canal (USDA, 2019). In addition, there is limited (and therefore expensive) infrastructure for large-scale air shipping.

To address some of these challenges, in 2018, Honduras and Guatemala integrated their trade procedures at three common land borders (World Bank, 2018). As a result of this initiative ("Customs Union", supported by the Secretariat of Economic Integration in Central America, SIECA), customs procedures for 80% of binational cargo were reduced from an average of 11 hours to less than 6 minutes (SIECA, 2019).

2. **Elevated electricity prices and poor energy reliability.** The textile sector is sensitive to the cost and supply of electricity which accounts for about 70% of the cost structure and most plants operate in a 24 hour scheme required for supply continuity (Field Research, 2021; Olivares, 2017), (Field Research, 2021). While Honduras and Nicaragua provide special tariffs for the sector, in El Salvador the sector is not prioritized and faces high and often fluctuating costs. By law, the country must adjust them every 6 months, which limits predictability in

cost structures (Field Research, 2021). In 2020, the average industrial electricity tariff was 135.52 USD/MWh in Honduras, 155 USD/MWh in El Salvador, and 204.72 USD/MWh in Nicaragua, this last one being the highest in Latin America (BloombergNEF, 2021). This is considerably higher than amongst several Asian competitors, including Bangladesh (101.54 USD/MWh), China (83.51 USD/MWh), Turkey (81.32 USD/MWh), and Vietnam (77.34 USD/MWh) (BloombergNEF, 2021).

In addition to high and, at times, volatile electricity costs, Central America's T&A industry is constrained by the quality of services. In 2019, the share of firms experiencing electrical outages ranged from 48% to 70% (Honduras holds the highest and El Salvador the lowest) (World Bank, 2021a). In top Asian apparel exporters such as Vietnam and Turkey, this share was much lower at 26% and 29%, respectively (World Bank, 2021a). Furthermore, while most countries in the region have almost complete electricity access, Honduras is also constrained by low electricity coverage, being the second lowest in Latin America (85.02%) (Energy Hub, 2021). This further affects the quality of service (electricity losses are among the highest in Central America) and frequency of power interruptions (BCIE, 2021; Finnfund, 2018). For the textile and apparel sectors, this has created the need for own supplemental energy and backup generators, increasing their costs and operating inefficiencies (Finnfund, 2018).

3. **Limited labor pool with low levels of education.** Central America's competitiveness in the T&A GVC is evidently constrained by the limited size of its labor pool. According to ILO modelled estimates, in 2020, the labor force in these countries ranged from 2.79M (El Salvador) to 7.28M (Guatemala). Whilst, in Asian competitors such as Vietnam and Bangladesh, the labor pool was as high as 57.31M (3 times more than the sum of Central American countries) and 70.16M (4 times more than the region's), respectively (ILO, 2021b). The labor pool also suffers from low levels of primary completion and high school desertion rates. This constraints enrollment at the secondary level, which in turn negatively affects the availability of human capital for semi-skilled and skilled jobs. Furthermore, the completion rate in primary education is 76.5% in Guatemala,26F[27] 76.7% in Honduras and 83.3% in El

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[27] Approximately 77 out of the 100 primary aged children who enroll in grade one today will make it to the end of primary school and only 67 out of those 77 children will move from primary to lower secondary. Of those 77 students who enrol in lower secondary, only 38 will graduate from lower secondary school and move on to enroll in upper secondary school. Of those 40 who make it to upper secondary, only 19 will graduate upper secondary school (USAID, 2019)

Salvador, all below the average for lower middle-income countries (85.54%) and South Asian competitors (89.24%) (UNESCO, 2021).

This weak human capital supply further constrains Central America's upgrading opportunities to more sophisticated textile products. This is rooted in the limited supply of T&A-specific education and training and inadequate workforce development initiatives (Field Research, 2021; Paganini & Steenbergen, 2021). Depending on the country, technical/vocational education institutes are either insufficient or unaligned with the sector needs. In Guatemala, for example, there are 340 municipalities and 28 technical/vocational training centers, i.e. less than 0.1 centers per municipality (INTECAP, 2021); whilst, in El Salvador, a great share of schools are focused on administration and commerce instead on T&A or other productive sectors (MINEDUCYT/INSAFORP, 2019). Also, in contrast to competitors in South Asia, where government and industry associations set up industry-specific technical training institutions, there are no such specialized centers in Central America nor other relevant government support for workforce development (Field Research, 2021).

While demand-driven training is offered by industry associations (e.g., PROCINCO by AHM, Textile Industry Academy by VESTEX) these have not been sufficient to upgrade skills and productivity of workers and management personnel (Field Research, 2021; Paganini & Steenbergen, 2021). This is evident in the high proportion of foreign managers and supervisors within the industry (Field Research, 2021). Industrial organization remains focused on traditional production models, without significant flexibility of workers to operate in a range of functions which allow for shorter and smaller runs (Bamber & Frederick, 2018). In addition, there has been limited focus placed on new emerging roles required for the industries, including those in the area of e-commerce, logistics, and sustainability.

4. **High minimum wages and unpredictability.** The minimum wage in the Central American apparel industry is considerably higher than in its competitor countries in Asia (Box 4). In El Salvador and Guatemala, this challenge is magnified by unpredictable and arbitrary increases in minimum wages. For instance, while El Salvador's Labor Code establishes that minimum wages must be revised every three years (art. 159) (MTPS & ILO, 2010), in practice, adjustments take place more frequently (El Mundo, 2017; Field Research, 2021). Except for Nicaragua, where collective bargaining enables wage predictability (Field Research, 2021),

countries in the region lack policies or institutions that guarantee the fulfilment of multi-year commitments to a cost structure that is stable and attractive for investors (El Mundo, 2017; Field Research, 2021).

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Box 5. Wages in the Central American Apparel Industry

After textiles inputs, labor is the second most important cost component in apparel production (Fernandez-Stark et al., 2011b; Lopez-Acevedo & Robertson, 2016). As a result, investors and buyers seek out global sourcing locations with the lowest labor costs, an industry practice that is often criticized as 'the race to the bottom' (Appelbaum, Bonacich, & Quan, 2005; ASEAN, 2020; Nayak et al., 2020). The countries which have seen greatest gains in apparel exports in recent years are those with amongst the lowest labor costs – Vietnam and Bangladesh. Despite the low costs offered in these countries, the apparel industry has demonstrated willingness to seek out even lower labor costs in new locations, such as Ethiopia (WRC, 2018). Labor costs in the rising Ethiopian cluster are between one quarter and one half of those of Bangladesh. Indeed, which global apparel buyers increasingly see Sub-Saharan Africa the last frontier region for low-cost apparel production (Whitfield et al., 2020).

The focus on labor costs due to labor intensity in apparel production presents a general challenge for Central American countries' competitiveness in the industry. A region comprised of small countries with comparatively limited labor pools and higher minimum wages contribute to a more expensive workforce. With between 300-400,000 apparel workers, available labor is just a fraction (<10%) of that in suppliers such as Bangladesh which 5 million strong (ILO, 2020). Overall, salaries in Central American apparel industry are considerably higher than those in their competitor countries in Asia, with the exception of China.27F[28] Figure 19 provides a comparison of minimum monthly wages in the industry. Guatemala has the highest wages in the region at US$372 (2018) per month. As labor costs have risen, the Guatemalan industry has seen employment decline and exports growth plateau (elPeriodico, 2019; Field Research, 2021; UN Comtrade, 2021). Employment in Guatemala's T&A sector has contracted approximately 35% since 2006 from 82,000 to 53,000 (elPeriodico, 2019). In 2021, the monthly minimum wage for the maquila sector increased further to US$382 (Bolañas, Gándara, & Gamarro, 2021). While El Salvador and Honduras are slightly less expensive, labor costs are still double or more of those of Viet Nam, Cambodia, and Bangladesh. Only Nicaragua offers comparable labor costs. With high labor costs, Central American countries must improve competitiveness in overall total factor productivity.

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[28] Chinese apparel wages are higher than all countries in the region. In 2019, the bottom ten percentile in China's Guangdong manufacturing province earned approximately US$450 per month, while the median monthly wage was US$790 (Guangdong Provincial Department for Human Resources and Social Security, 2020).

Figure 19. *Minimum Monthly Wages in Apparel in Asia and Central America (US$), 2012 & 2018*
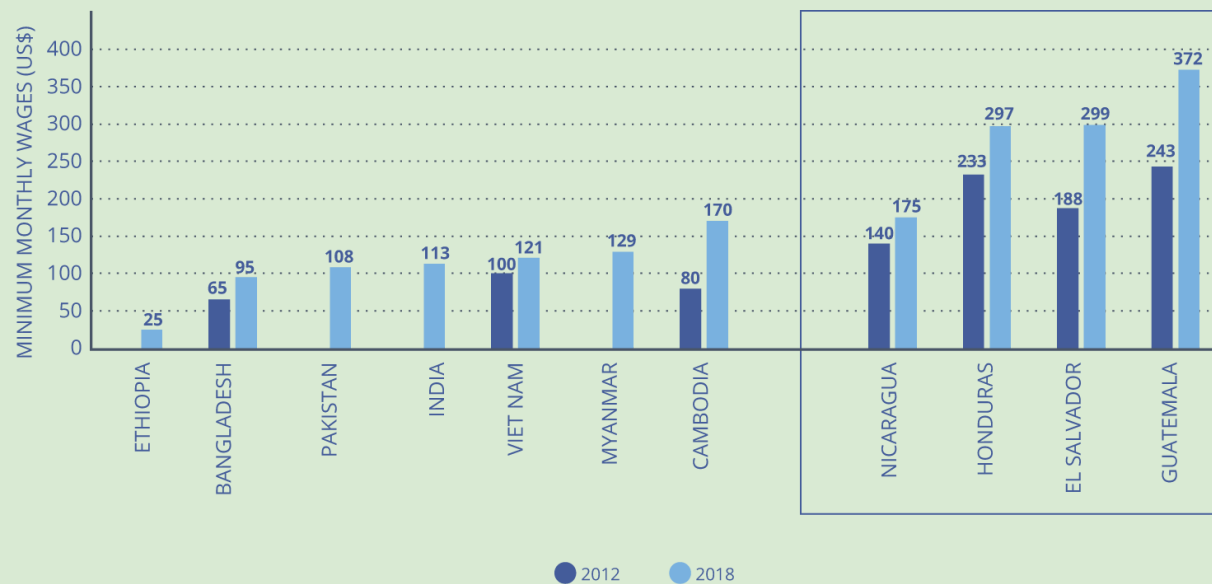
Source: Authors based on EIL/RSM (2018); ILO (2016; 2018, p. 1); WRC (2018).

5. **Limited access to duty-free non-cotton textiles.** The availability of domestic input materials such as yarn, weaving and knitting, and dying and printing plays an important role in enhancing export performance in the apparel industry (Alam, Selvanathan, Selvanathan, & Hossain, 2018). Yet, due to yarn-forward requirements within CAFTA, the region only has duty-free access for apparel based on inputs available in the region. This is primarily cotton-based sourced from the US; US cotton benefits from strong government subsidies which improves its competitiveness for Central American apparel producers (CATO Institute, 2020) and has resulted in a strong focus on cotton based products.

Nonetheless, global demand has favored MMF textiles in recent years, with cotton losing market share. US MMF textiles are considerably more expensive than their Asian competitors, as much as 30% more expensive (Field Research, 2021). This places the region at a disadvantage; there is limited regional supply of quality, cost competitive MMF textiles. Apparel produced with textiles originating in Asia do not qualify for duty free access to the US market. While textile development is expanding in the region, it continues to be closely linked to the cotton supply chains of US firms. There are very few regional investments in

synthetics; and materials such as elastane or lycra are not available in the region (Field Research, 2021).

Limited access to textiles constrains the region's potential to upgrade into a wider range of products, or to take advantage of the renewed interest in flexible sourcing. Apparel companies need as much flexibility as possible to use fabrics from third countries to cater to a wide range of buyers looking for short, smaller runs of a larger number of styles. The narrow access to duty free textiles heavily restricts apparel production investments and reinforces the perception that Central America can only manufacture basic products (Field Research, 2021).

6. **Institutional weaknesses and limited sustained national industrial policies.** Like in other industries, the T&A sector in Central America has been and continues to be weakened by economic and political unrest. In 2020, the Worldwide Governance Political Stability and Absence of Violence indicator ranks Guatemala, Honduras and Nicaragua fall below the average percentile rank of lower middle-income countries; El Salvador also ranked below the group average in 2017 and 2018 (World Bank, 2021d). Institutional instability discourages foreign investment and reduces the possibility of sustaining long-term industrial development policies. Indeed, Central America's T&A industry is weakened by the lack of effective political leadership, industrial development strategies, and the absence of a long-term vision capable of exploiting the countries' competitive advantages and addressing the challenges (Field Research, 2021). Depending on the country, Central America either completely lacks a formal national policy/strategy for the T&A sector development or has not been able to sustain it over time (Field Research, 2021). For instance, by 2017-18, Honduras became the most proactive country in the region in terms of strategy development through the 2020 initiative aimed at increasing employment and exports, investing in infrastructure, expanding backward linkages to textiles, and expanding product focus to sportswear (Bamber & Frederick, 2018). No new strategy has been elaborated for the coming years. In addition, investment promotion efforts had been generally limited or unsuccessful (Field Research, 2021; Paganini & Steenbergen, 2021).

7. **Shortages in regional cohesiveness at the government level.** Despite the existence of the Central American Economic Integration Secretary (SIECA by its Spanish acronym) cooperation

between governments and industry associations across the region has been mostly absent and each country largely operates in isolation of its neighbors (Field Research, 2021). For example, this is evident in the inefficiency of border customs management across the region (see constraint #1). The lack of cooperation between governments constrains the possibility to promote a regional production platform that could potentially offer scale-economies to compete with large Asian countries. It also discourages the development of further textiles production within the region (Paganini & Steenbergen, 2021). Rather than operate as a cohesive, collaborative unit, the region tends to compete internally for a limited global market share (Field Research, 2021).

8. **Reactive private sector and limited investment / innovation.** The T&A private sector in the region has remained relatively reactive to industry development opportunities, and relies more heavily on its advantages in proximity and duty-free access to the US than on innovation and productivity improvements (Field Research, 2021). Weak investment in innovation or expansion is an economy-wide problem and partly due to limited access to finance and difficulties to obtain loans from multilateral organizations (amounts are generally too high for the investment size typically required by factories). Data from recent years shows that the share of firms that spend on R&D (national-wide) in Central America ranges from 7.4% (Honduras) to 17.9% (Nicaragua), well below Latin America and the Caribbean's average (24.6%) (World Bank, 2021b). Low investment and innovation rates are also the result of a generalized perception that the region is a low mix/high volume basics producer (Field Research, 2021). This perception is rooted in Central America's historical role as a low-cost location constrained to the cutting and sewing stages of apparel production.

9. **Overdependency on the US market.** With 80% of apparel exports to the US (UN Comtrade, 2021), Central American' countries have a high level of dependency on the North American market. This increases the region's vulnerability as it directly competes with leading global apparel exporters in the same product categories (i.e. knit t-shirts, sweaters). Global regionalization of apparel production would see an increase of this dependency.

Opportunities

The opportunities for Central America's T&A industry can be grouped in five categories: (1) supply chain risk diversification following pandemic; (2) flexibility; (3) sustainability and ethical awareness; (4) e-commerce; (5) textile investments; (6) regionalization advocacy.

1. **Supply chain risk diversification.** Buyers have been seeking alternatives to concentrated production in China since 2011, accelerating this further in 2019 in the face of rising US tariffs, favoring other Asian producers such as Bangladesh, Vietnam and Cambodia. Yet, the vulnerability of these long supply chains from Asia to logistics disruptions were amplified during the pandemic, causing buyers to reassess their risk exposure in any one location (IDB, 2021a; ILO, 2020, 2021b). This, coupled with actual global supply shortages due to the recent logistics crisis, have revived talk of regionalization of some US-bound garment production to Central America.

2. **Increasing search for flexibility.** The rise of the fast fashion business model requires flexible production to meet shorter retail cycles. In turn, locations that can provide low lead times and high mix/low volume productions are likely to be favored. While Central American' exports reach the US in less than 5 days, the region is still focused on typically long run, low-mix/high volume commodity items.

3. **Sustainable and ethical awareness on the rise.** The global distribution of the industry is being impacted by a growing awareness of ethical, social and environmental issues. These trends favor a shift of production in locations with competitive advantages such as proximity to lower transport emissions and renewable energy potential to reduce production impacts. This creates a sizeable opportunity for Central America, which has made impressive progress in renewable energy and large investments in green industrial parks.

4. **E-commerce needs speed to market.** A growing share of customers buy online and expect their products to arrive as soon as possible. While Central America holds a unique competitive advantage due to its geographical location to leverage this opportunity, several challenges hurting this positioning remain unaddressed, including low quality logistics infrastructure and inefficient customs procedures.

5. **Textile investments for yarn-forward.** The yarn-forward agreement, combined with local apparel capabilities, can incentivize the development of backward linkages in the region. While it has taken a long time for Central America to begin to see investments in MMF textiles, the recent announcements suggest the convergence of new opportunities has improved investors' outlook on the region.

6. **Regionalization advocacy.** Growth in the apparel industry has been identified as an important potential tool for addressing challenges related to illegal immigration from Central America to the US, and there are a growing number of high-profile initiatives in the US to support regionalization. This is yet to materialize in many sizeable investments in Central America, except for the Parkdale Mills' plant set up in Honduras, which is relocating 1 million pounds of yarn per week away from supply chains in Asia and China to enhance U.S. and CAFTA-DR co-production (Just Style, 2021a). Possible reasons behind limited relocations in Central America include relatively high landed costs (i.e. the expense to have the product in a company's stock, including freight and transportation) versus Bangladesh and China (Robinson, Zhou, & Maulia, 2019) and Central America's challenges in terms of perceived capabilities and labor costs (Field Research, 2021).

Threats

While these opportunities exist, and Central American countries are well-positioned to take advantage of them, it should be noted that there are multiple factors that might undermine their potential success. The T&A is highly competitive, and other existing suppliers are anxious not to lose their hard-won market shares.

1. **Duty-free e-commerce.** The rise of cross-border e-commerce in the context of an historically high *de minimis* value threatens to undermine the duty-free access advantages of Central American countries (IDB, 2021a). The section 321 *de minimis* provision is a US statute that allows a consumer to import each day as much as US$800 of duty/tax-free merchandise, up from US$200 before 2015 (CBP, 2016). This means that individual consumers can shop foreign apparel duty-free online provided they remain within this limit. These products can increasingly be sourced from highly competitive Asian operations, which have focused significantly on investing in innovation, capacity expansion and skills development (IDB,

2021a). Chinese exporters such as Shein have taken advantage of this method to avoid the high US tariffs (Euromonitor International, 2021). In Central America, private or public initiatives to boost e-commerce, innovate and create a digital highly-skilled workforce are significantly limited (Field Research, 2021).

2. **Shortage of inputs.** Central America's T&A industry is threatened by the global scarcity of raw materials, which is temporal in the case of Asian inputs, but systemic from the US side. In 2020, massive contagions and lockdowns in China and India resulted in a textiles and accessories shortage and a rise in material costs: acrylic prices increased by 60-70%, polyester by 50-80%, and cotton by 35% (in 5 months) (UIT, 2021). Cotton supply is not only being disrupted by the temporary logistics crisis, but also (and more permanently) by the plunge in output levels due to extreme weather, pest and water problems in Asia and the US (Bloomberg, 2021; CNBC, 2021a; OECD-FAO, 2019)..

3. **Competition from scale suppliers in South and South-East Asia.** Over the past year, top Asian suppliers such as Bangladesh (#3) and Vietnam (#4) have doubled their apparel exports both in absolute terms and in market share, solidifying their positions as global industry leaders. These two were followed by Cambodia and Myanmar, both of which grew rapidly during the past decade, with CAGR for 2011-20109 of 8.8% and 38% respectively (UN Comtrade, 2021). In comparison with Central America, Asian countries benefit from significantly lower labor costs, proximity to China and regional input production, strong influx of FDI and supportive government policies (Robertson, 2021).

4. **Competition from suppliers from AGOA and Europe for rebalancing opportunities.** The trend towards rebalancing production out of China and Asia does not automatically favor Central America. Cheaper countries in Sub-Saharan Africa, or more efficient operations in low-cost EU countries are also keen to tap into the potential trend and, like Ethiopia in 2017 (Mihretu & Llobet, 2017; Whitfield et al., 2020), governments will increasingly look to establish favorable conditions for the industry.

5. **Natural disasters.** Tropical storms and hurricanes have caused huge disruptions in the T&A production activity from Central America. In 2020, the region suffered the worst hurricane season of all time, with 30 storms (more than twice the annual average), of which 13 were

hurricanes and 6 were high degree hurricanes (IDB, 2021b). Honduras saw several major apparel operations temporarily shut down as a result of these storms (Field Research, 2021).

6. **High risk and uncertainty.** The ongoing COVID-19 pandemic and logistics crisis create high uncertainty about how the T&A GVC is going to (finally) reshape. In December 2021, just as the world thought that things were slowly moving back to normal, the omicron variant of COVID-19 raised concerns, with a number of governments increasing restrictions and leading apparel sourcing country China placing up to 13 million people into lockdown in the city of Xi'an due to a recent outbreak (Just Style, 2021b). An increase in the already existing uncertainty is once again disincentivizing investment at a global scale (Just Style, 2021b; Lu, 2021a).

E. STRATEGIES FOR CENTRAL AMERICAN COUNTRIES UPGRADING IN THE TEXTILES & APPAREL GVC

Central America has seen little change to its apparel production profile over the past 15 years since CAFTA was signed. The region's market share has remained stagnant, and it remains overly dependent on the US market. While it is likely that the advantages afforded the region as a result of proximity to the US and CAFTA-DR will continue to support this status quo, real growth in the sector requires proactive efforts and the development of an upgrading strategy. The convergence of COVID-19 pandemic and geopolitical factors have led buyers to reassess their mature sourcing patterns and currently offers an important opportunity for the region to upgrade. Five potential upgrading strategies are detailed below.

Yarn and Textiles Production

1. **Encourage development of backward linkages to deepen vertical integration.** One of the most important factors necessary to compete in the apparel sector is easy access to raw materials, fibers and fabrics. With supply chain logistics crises, locally sourced textiles make apparel producing countries increasingly attractive for buyers. In the case of Central America, the CAFTA-DR agreement heightens the incentives to produce textiles within the region (either by local or foreign firms) to ensure tariff-free access to the lucrative US market. While there is existing cotton textiles capability thanks to the US supply, given global tendencies towards

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apparel based on MMF fibers, the region needs to be able to competitively produce more of these inputs in addition to cotton ones. In order to future proof these MMF investments, they could focus on sustainable MMF, such as fibers produced from recycled plastic pellets and not only on those dependent on primary petroleum supplies.

2. **Focus on niche areas such as sustainable fibers in textile production:** The UN Charter for Sustainable Fashion has committed the industry to reducing the use of synthetics that are based on primary fossil fuels, as well as less sustainable natural based fibers, including those with high water consumption. While pressure to shift towards more sustainable fibers is relatively new, with most initiatives emerging since the 2015 Paris Agreement, momentum is rapidly growing. As capital-intensive operations, textile factories typically are in operation for extended periods (+20 years). Central American countries should anticipate this future demand by ensuring that the textile investments being targeted are focused on producing sustainable fibers, including recycled fibers.

Apparel Production

3. **Product Upgrading.** Central American producers should move towards the manufacture of higher value products, including those with a focus on high mix/low volume. The region needs to shift away from the current strategy of supplying large runs of basic products with low unit values (i.e. t-shirts). This approach places them in direct competition for highly cost sensitive products with very large-scale Asian producers with sophisticated and cheap logistics operations. A move towards high mix/low volume is essential to provide buyers with the flexibility they are seeking from regional suppliers as they seek to lower inventory stocks and move towards a more just in time supply.

4. **Functional upgrading into direct-to-consumer distribution.** Central American producers should take advantage of geographic proximity to the US market to upgrade into cross-border e-commerce direct to consumer production. The pandemic has rapidly accelerated the shift to online purchasing, and customers increasingly expect their products to arrive within a very short period of time. Central America can capitalize on its proximity to the US to capture a greater market share in these products. This competitive advantage is unique to the region. Products

entering the US below the threshold of US$800/day are not subject to duties and extra-regional textiles can thus be used. Thus, in the short term, this can help suppliers in the region to upgrade into higher value products requiring MMF textiles until sufficient local production is established.

Process Upgrading:

a. **Reduce lead time:** Lead time is the most important competitive advantage that proximity provides the region. However, currently, producers are operating with long lead times and there are numerous obstacles to smooth flowing exports – this erodes the advantage of proximity. It is essential to improving traceability within the supply chain to provide visibility where the product is flowing quickly and easily. In doing so, major bottlenecks can be identified and removed.

b. **Focus on sustainable and ethical production operations:** There is growing pressure to reduce the environmental footprint of apparel production, while also ensuring ethical labor conditions are met. While proximity to the US affords the region lower carbon emissions than exports from other parts of the world, a rapid shift towards sustainable production in Central America is required to significantly differentiate the region from Asian competitors. This includes a shift to renewable energy use, enhanced water efficiency and treatment, and the elimination of harmful chemicals. At the same time, social upgrading must remain a critical factor to continue sourcing for US and should be prioritized in the region.

F.   POLICY RECOMMENDATIONS FOR CENTRAL AMERICAN COUNTRIES

Numerous policies and programs must be put in place for countries in the region to effectively take advantage of the opportunities afforded in the post-pandemic period. These are detailed below.

1. **Intensify Investment Attraction Efforts**
   a. Strengthen investment promotion agencies significantly. Create an investment strategy for the textile and apparel with specific goals.

b. Create a single window or "one-stop-shop" for all investors seeking to establish operations in the country. This service should concentrate all operations relevant to the investments, including permits and clearances.

c. Target **Asian investors in MMF textiles** (yarn and fabrics) in addition to **Tier 1 apparel** suppliers which are seeking to improve their global footprints. These firms are global leaders with deep networks amongst buyers.

d. Target **"green" investors** seeking to focus on environment upgrading their production and/or also in sustainable fabrics that can be recycled or fibers with low environment impact.

e. Identify **key inputs** that are not yet adequately and competitively supplied in CAFTA-DR and target firms for investment to build out the supply chain regionally. Work with the private sector to identify these products and services.

f. Offer extensive after-care services to foreign investors to help them navigate complex local bureaucracy once their operations are established.

2. **Develop Human Capital for the Sector**

a. Establish set mechanisms for negotiation and implementation of minimum wages to ensure predictability for the sector (e.g. Nicaragua).

b. Establish in-house training programs for workers to ensure they can carry out the multiple production functions required for high mix/low volume orders. Implement systems to improve productivity.

c. Create training schools for technical workers and engineers for the textiles sector, qualified high-tech maintenance and repair workers, middle managers, and workers with digital skills.

d. Establish regional training programs focused on skills required to cater to emerging trends: e-commerce, logistics, sustainable production etc. In addition, skills development should focus on inventory and warehousing management, and forecasting and planning functions. These programs could be divided amongst the countries, with each country specializing in a different area.

e. Offer scholarships to train highly specialized workers abroad.

3. **Investment in Infrastructure (hard and soft)**

a. Improve and develop infrastructure throughout the region, especially internal roads and those that link the EPZs in the 4 countries and relevant ports.

b. Build distribution hubs to streamline exports shipped by air to United States.

c. Strengthen green energy infrastructure for EPZs and establish mechanisms to ensure stability in the price of energy. This is critical for the textile sector that is highly energy use.

d. Modernize and digitalize customs procedures to improve the efficiency of operations and reduce lead time. Implement initiatives to minimize bureaucracy, particularly for intra-regional product flow. The latter is essential to support the regionalization of the T&A GVC in Central America.

e. Evaluate establishment of new EPZs in less developed parts of the country.

Recommendations for the Private Sector

1. Develop strategy and an action plan for industry associations in each country. This should include the identification of goals, key steps for achieving them, and measurable outcomes.

2. Create a regional working group comprised of representatives from each of the country associations to align upgrading goals across the region, coordinate capabilities development and streamline logistics operations.

3. Establish a collaborative regional industry strategy through this private sector working group to leverage the diverse T&A capabilities across the four countries, driving increasing vertical integration of the regional value chain.

4. Market the region in the US as a strong, flexible, and sustainable production site. The regional working group should develop a joint marketing campaign to change perceptions amongst US buyers regarding the industry's capabilities.

5. Develop innovative pilot projects focused on enhancing capabilities and productivity across the industry, such as traceability, sustainable textiles, e-commerce, etc.

4. APPENDIX

Table 15. *World Textile Exports by Category, Value (US$, billion), Shares (%) and CAGR (%), 2011 - 2019*

CATEGORY	VALUE (US$, BILLION)					SHARE (%)					CAGR (%)	
	2011	2013	2015	2017	2019	2011	2013	2015	2017	2019	2011-19	2015-19
Cotton	69	63	51	44	42	28%	26%	23%	20%	19%	-6.1%	-4.7%
Man-made filaments	42	41	40	41	41	9%	9%	9%	10%	10%	0.5%	2.1%
Man-made staple fibers	41	39	37	36	36	9%	11%	12%	12%	13%	2.3%	1.9%
Knitted or crocheted fabrics	23	25	26	27	28	17%	17%	18%	19%	19%	-0.2%	0.7%
Wadding, felt & nonwovens; special yarns, twine, cordage, ropes cables & articles thereof	21	22	22	23	25	17%	16%	17%	17%	16%	-1.9%	-1.2%
Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use	22	22	21	22	23	2%	1%	2%	2%	2%	3.2%	6.1%
Wool, fine or coarse animal hair; horsehair yarn and woven fabric	15	14	13	13	12	1%	1%	1%	1%	1%	-6.9%	-5.4%
Special woven fabrics; tufted textile fabrics; lace, tapestries; trimmings; embroidery	10	10	10	10	10	4%	4%	5%	5%	5%	-0.2%	0.5%
Other vegetable textile fibers; paper yarn and woven fabric of paper yarn	4	3	4	4	5	9%	9%	10%	11%	11%	1.9%	3.4%
Silk	3	2	2	2	2	6%	6%	6%	6%	6%	-2.8%	-0.6%
Total	251	243	225	222	223	100%	100%	100%	100%	100%	-1.5%	-0.3%

Source: UN Comtrade (2021).

Table 16. *Leading Cotton Exporters, Value (US$, billion), Shares (%) and CAGR (%), 2011 - 2019*

EXPORTER	VALUE (US$, BILLION)					SHARE (%)					CAGR (%)	
	2011	2013	2015	2017	2019	2011	2013	2015	2017	2019	2011 - 2019	2015-19
USA	12.4	8.2	6.4	7.8	7.6	18%	13%	13%	18%	18%	-5.9%	4.5%
China	11.4	11.7	10.4	7.4	6.5	16%	19%	21%	17%	16%	-6.7%	-11.1%
India	8.9	9.4	7.0	4.7	4.0	13%	15%	14%	11%	10%	-9.5%	-13.1%
Vietnam	—	1.2	1.8	2.7	3.1	—	2%	4%	6%	7%	18.2%	14.2%
Brazil	2.0	1.5	1.4	1.2	2.4	3%	2%	3%	3%	6%	2.6%	15.3%
Pakistan	5.0	4.9	3.9	2.7	2.0	7%	8%	8%	6%	5%	-10.7%	-15.3%
Turkey	2.0	2.1	1.9	1.8	1.6	3%	3%	4%	4%	4%	-2.7%	-3.3%
Italy	2.5	2.1	1.6	1.5	1.3	4%	3%	3%	3%	3%	-7.4%	-4.5%
Uzbekistan	1.3	1.4	1.1	0.9	1.2	2%	2%	2%	2%	3%	-1.9%	0.4%
Australia	2.6	2.6	—	1.4	1.1	4%	4%	—	3%	3%	-10.5%	7.9%
Thailand	2.0	—	—	—	—	3%	—	—	—	—	—	—
China, Hong Kong SAR	—	—	10.9	—	—	—	—	2%	—	—	—	—
World	**69.2**	**63.4**	**50.8**	**43.7**	**41.9**	**100%**	**100%**	**100%**	**100%**	**100%**	**-6.1%**	**-4.7%**

Source: UN Comtrade (2021).

Table 17. *Leading Man-made Filaments Exporters, Value (US$, billion), Shares (%) and CAGR (%), 2011 - 2019*

EXPORTER	VALUE (US$, BILLION)					SHARE (%)					CAGR (%)	
	2011	2013	2015	2017	2019	2011	2013	2015	2017	2019	2011 - 2019	2015-19
China	9.4	10.8	11.6	12.8	14.0	22%	26%	29%	31%	35%	5.1%	4.8%
Rep. of Korea	3.1	3.1	2.9	2.8	2.8	7%	7%	7%	7%	7%	-4.1%	-3.8%
Other Asia, nes [a]	3.6	3.3	3.0	2.6	2.5	9%	8%	7%	6%	6%	-1.5%	-1.0%
Japan	2.4	2.4	2.0	2.1	2.1	6%	6%	5%	5%	5%	-1.9%	0.5%

Italy	2.4	2.3	2.0	2.1	2.0	6%	6%	5%	5%	5%	-2.0%	0.7%
India	1.7	1.8	2.0	1.9	1.7	4%	4%	5%	5%	4%	-4.0%	-1.7%
Germany	2.3	2.0	1.8	1.8	1.6	5%	5%	4%	4%	4%	-2.2%	-4.9%
USA	1.9	2.0	2.0	1.8	1.6	5%	5%	5%	4%	4%	0.4%	-2.9%
Turkey	—	1.3	1.3	1.4	1.4	—	3%	3%	3%	4%	3.0%	1.8%
Netherlands	—	—	—	1.2	1.1	—	—	—	3%	3%	-0.8%	2.5%
Indonesia	1.3	1.1	1.1	—	—	3%	3%	3%	—	—	—	—
Thailand	1.2	—	—	—	—	3%	—	—	—	—	—	—
World	**41.8**	**41.4**	**39.8**	**40.8**	**41.0**	**100%**	**100%**	**100%**	**100%**	**100%**	**-0.2%**	**0.7%**

Source: UN Comtrade (2021). Note: (a) "Other Asia, nes" is Taiwan.

Table 18. *Leading Man-made Staple Fibers Exporters, Value (US$, billion), Shares (%) and CAGR (%), 2011 - 2019*

EXPORTER	VALUE (US$, BILLION)					SHARE (%)					CAGR (%)	
	2011	2013	2015	2017	2019	2011	2013	2015	2017	2019	2011 - 2019	2015-19
China	9.1	9.3	10.1	10.3	10.5	22%	24%	27%	28%	29%	1.8%	0.9%
USA	2.7	2.8	2.6	2.2	2.3	7%	7%	7%	6%	6%	-2.3%	-3.1%
Indonesia	2.5	2.3	2.3	2.0	2.1	6%	6%	6%	6%	6%	-2.1%	-2.1%
Rep. of Korea	2.5	2.7	2.3	2.3	2.1	6%	7%	6%	6%	6%	-2.4%	-2.2%
Japan	2.3	2.2	2.1	1.9	1.8	6%	5%	6%	5%	5%	-2.7%	-3.7%
Germany	2.5	2.3	2.0	1.9	1.6	6%	6%	5%	5%	4%	-5.6%	-6.0%
India	1.9	1.7	1.7	1.7	1.4	5%	4%	5%	5%	4%	-3.9%	-4.7%
Austria	—	—	—	1.3	1.3	—	—	—	3%	4%	0.1%	2.4%
Turkey	—	1.5	1.4	1.4	1.3	—	4%	4%	4%	4%	-0.7%	-1.2%
Italy	1.6	1.4	1.2	—	1.2	4%	4%	3%	—	3%	-3.1%	-0.2%
Other Asia, nes (a)	2.1	2.0	1.8	1.5	—	5%	5%	5%	4%	—	-7.0%	-9.9%
Thailand	2.0	—	—	—	—	5%	—	—	—	—	-6.6%	-0.8%
World	**41.3**	**39.4**	**37.2**	**36.4**	**35.5**	**100%**	**100%**	**100%**	**100%**	**100%**	-1.9%	-1.2%

Source: UN Comtrade (2021).Note: (a) "Other Asia, nes" is Taiwan.

Table 19. *Leading Knitted-crocheted Exporters, Value (US$, billion), Shares (%) and CAGR (%), 2011 - 2019*

EXPORTER	VALUE (US$, BILLION)					SHARE (%)					CAGR (%)	
	2011	2013	2015	2017	2019	2011	2013	2015	2017	2019	2011 - 2019	2015-19
China	7.8	9.5	10.9	12.1	12.8	33%	37%	42%	44%	46%	6.5%	4.1%
Other Asia, nes (a)	2.3	2.7	3.0	2.7	2.4	10%	11%	11%	10%	9%	0.5%	-5.0%
Rep. of Korea	2.8	2.9	2.6	2.4	2.4	12%	11%	10%	9%	8%	-2.2%	-2.8%
Turkey	1.1	1.3	1.1	1.3	1.3	5%	5%	4%	5%	5%	1.8%	4.2%

Vietnam	—	—	0.4	0.7	1.1	—	—	2%	3%	4%	—	26.4%
Italy	1.3	1.2	1.0	1.0	1.0	6%	5%	4%	4%	4%	-3.5%	0.0%
Germany	1.0	0.9	0.7	0.8	0.7	4%	4%	3%	3%	2%	-4.0%	-1.7%
China, Hong Kong SAR	1.0	1.1	1.0	0.7	0.7	4%	4%	4%	3%	2%	-5.4%	-9.9%
USA	1.2	1.2	0.9	0.7	0.6	5%	5%	4%	3%	2%	-7.3%	-9.1%
Japan	0.7	0.6	0.5	0.5	0.5	3%	2%	2%	2%	2%	-3.8%	0.4%
France	0.7	0.6	—	—	—	2%	1%	—	—	—	—	—
World	**23.4**	**25.5**	**26.1**	**27.1**	**28.1**	**100%**	**100%**	**100%**	**100%**	**100%**	**2.3%**	**1.9%**

Source: UN Comtrade (2021). Note: (a) "Other Asia, nes" is Taiwan. Note: (a) "Other Asia, nes" is Taiwan.

Table 20. *Leading Wadding, Felt & Nonwovens Exporters, Value (US$, billion), Shares (%) and CAGR (%), 2011 - 2019*

EXPORTER	VALUE (US$, BILLION)					SHARE (%)					CAGR (%)	
	2011	2013	2015	2017	2019	2011	2013	2015	2017	2019	2011 - 2019	2015-19
China	2.8	3.3	3.9	4.3	4.9	13%	15%	18%	19%	20%	7.0%	6.0%
Germany	2.6	2.5	2.2	2.4	2.5	12%	12%	10%	10%	10%	-0.2%	2.9%
USA	2.2	2.3	2.2	2.1	2.1	10%	11%	10%	9%	8%	-0.6%	-1.8%
Italy	1.8	1.7	1.5	1.6	1.6	9%	8%	7%	7%	6%	-1.8%	0.9%
Japan	1.0	1.0	0.9	1.1	1.2	5%	5%	4%	5%	5%	1.8%	6.4%
France	1.0	0.9	0.8	0.8	0.8	4%	4%	3%	3%	3%	-2.5%	0.9%
Rep. of Korea	0.7	0.7	0.7	0.7	0.8	3%	3%	3%	3%	3%	2.1%	3.4%
Turkey	—	—	0.5	0.6	0.7	—	—	2%	3%	3%	10.2%	9.9%
Netherlands	0.6	0.6	0.5	0.6	0.6	3%	3%	3%	3%	2%	-0.5%	2.5%
Other Asia, nes	0.5	0.5	0.6	0.6	0.5	2%	2%	3%	3%	2%	1.6%	-0.5%
Spain	0.5	0.5	—	—	—	2%	2%	—	—	—	0.6%	3.0%
World	**21.3**	**21.6**	**21.7**	**23.3**	**24.8**	**100%**	**100%**	**100%**	**100%**	**100%**	**1.9%**	**3.4%**

Source: UN Comtrade (2021). Note: (a) "Other Asia, nes" is Taiwan.

Table 21. *Leading Impregnated, Coated or Laminated Textile Fabrics Exporters, Value (US$, billion), Shares (%) and CAGR (%), 2011 - 2019*

Exporter	Value (US$, billion)					Share (%)					CAGR (%)	
	2011	2013	2015	2017	2019	2011	2013	2015	2017	2019	2011 - 2019	2015-19
China	4.1	4.6	4.8	5.3	5.6	19%	21%	23%	24%	25%	4.1%	4.4%
Germany	2.4	2.4	2.2	2.5	2.4	11%	11%	10%	11%	11%	0.2%	2.8%
USA	1.8	1.9	1.8	1.8	1.7	8%	9%	9%	8%	7%	-1.2%	-2.6%
Rep. of Korea	1.5	1.5	1.3	1.3	1.4	7%	7%	6%	6%	6%	-1.2%	0.3%
Italy	1.1	1.1	1.1	1.2	1.2	5%	5%	5%	5%	5%	0.6%	2.6%
Japan	1.0	1.0	0.9	1.0	1.0	5%	4%	4%	4%	5%	-0.6%	4.3%
Other Asia, nes	1.2	1.2	1.0	1.0	0.9	6%	5%	5%	4%	4%	-3.2%	-2.9%
Vietnam	—	—	—	0.6	0.7	—	—	—	3%	3%	7.9%	8.4%
United Kingdom	0.7	0.6	0.6	0.6	0.6	3%	3%	3%	3%	2%	-3.7%	-3.9%
Netherlands	0.5	—	—	—	0.6	3%	—	—	—	2%	-1.4%	1.6%
Canada	—	0.5	0.5	0.5	—	—	2%	2%	2%	—	-2.7%	-3.8%
France	0.6	0.5	0.5	—	—	3%	2%	2%	—	—	-3.6%	-0.2%
World	**21.7**	**21.9**	**20.8**	**22.3**	**22.6**	**100 %**	**100 %**	**100 %**	**100 %**	**100%**	**0.5%**	**2.1%**

Source: UN Comtrade (2021).

Table 22. *Latin America and the Caribbean Textile Exporters, Value (US$ million), Share of Global and Share of Latin America and the Caribbean (%) and CAGR (%), 2011 & 2019*

EXPORTER	VALUE (US$, MILLION)		SHARE OF LATAM TOTAL EXPORTS (%)		SHARE OF WORLD TOTAL EXPORTS (%)		CAGR (%, 2011 – 19)
	2011	2019	2011	2019	2011	2019	
World	**251,175**	**222,882**	**—**	**—**	**100%**	**100%**	**-1.4%**
LATAM	**7,791**	**7,307**	**100%**	**100%**	**3.12%**	**3.38%**	**-0.4%**
Brazil	2,935	3,012	38%	41%	1.17%	1.35%	0.3%
Mexico	1,644	1,583	21%	22%	0.65%	0.71%	0.2%
Argentina	857	507	11%	7%	0.34%	0.23%	-6.4%
El Salvador	477	398	6%	5%	0.19%	0.18%	7.0%
Peru	241	395	3%	5%	0.10%	0.18%	-2.2%
Guatemala	178	310	2%	4%	0.07%	0.14%	9.4%
Colombia	438	239	6%	3%	0.17%	0.11%	-7.3%
Uruguay	304	236	4%	3%	0.12%	0.11%	-3.1%
Honduras	129	176	2%	2%	0.05%	0.08%	7.2%
Costa Rica	40	102	1%	1%	0.02%	0.05%	12.4%
Chile	116	101	1%	1%	0.05%	0.05%	-1.7%
Ecuador	131	65	2%	1%	0.05%	0.03%	-8.4%
Paraguay	64	56	1%	1%	0.03%	0.03%	-1.7%
Dominican Rep.	49	36	1%	0%	0.02%	0.02%	-3.7%
Panama	108	19	1%	0%	0.04%	0.01%	-19.2%
Bolivia	23	18	0%	0%	0.01%	0.01%	-2.9%
Nicaragua	15	16	0%	0%	0.01%	0.01%	0.7%
Others	42	40	1%	1%	0.02%	0.02%	-0.7%

Source: UN Comtrade (2021).

Table 23. *PPE Exports as a Percentage of T&A Exports to the US by Select Central American Countries, 2020*

2020	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2020
ELS	0.4%	0.3%	0.3%	11.7%	86.9%	49.5%	7.7%	5.8%	5.4%	3.5%	2.1%	1.3%	4.2%
GUA	1.4%	1.7%	2.0%	6.4%	20.2%	18.4%	10.0%	6.6%	5.2%	5.1%	5.7%	2.7%	6.4%
HON	0.3%	0.2%	0.3%	19.1%	38.9%	28.8%	12.0%	8.5%	3.9%	2.1%	1.3%	0.5%	5.2%
NIC	0.1%	0.1%	0.2%	0.3%	8.7%	15.9%	10.9%	8.3%	2.6%	2.3%	1.4%	1.8%	3.9%
CA-4	0.5%	0.5%	0.6%	6.4%	23.5%	22.8%	10.3%	7.5%	4.2%	3.0%	2.2%	1.4%	4.9%

Source: USITC (2021).

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