Preliminary Global Value Chain Analysis for Turkey

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PROSPECTS FOR UPGRADING THE TEXTILE INDUSTRY AS THE DRIVING FORCE OF THE TURKISH ECONOMY

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PRELIMINARY GLOBAL VALUE CHAIN ANALYSIS FOR TURKEY

PROSPECTS FOR UPGRADING THE TEXTILE INDUSTRY AS THE DRIVING FORCE OF THE TURKISH ECONOMY

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Executive Summary

The Islamic Development Bank's (IsDB) new business model with Global Value Chain (GVC) based Member Country Partnership Strategy (MCPS) aims to identify the bottlenecks, opportunities and challenges in Member Countries' (MCs) integration and upgrading within certain GVCs. The GVC Selection Analysis based on IsDB's GVC methodology and consultations with stakeholders have shown that the textile industry is one of the industries whereby Turkey has natural, dynamic, spillover and surplus potential to increase its international competitiveness, engage in more value-added activities and create employment opportunities. Accordingly, this Preliminary GVC Analysis on the textile industry provides a brief GVC-based analysis in identifying the opportunities and challenges in upgrading within the GVCs. Pending the confirmation from the Turkish Government, this brief analysis will be the basis of a more detailed, full GVC analysis on the ground for the selected industries.

In the last thirty years, Turkey has achieved considerable success with its integration to the textile GVC. Nevertheless, technological developments, demographic shifts, transformations in the global economy, global trends and international competition necessitate going further and upgrading of Turkish textile industry in the GVCs. The upgrading of Turkish textile industry at the global level would not only address the gaps in Turkey's domestic economic transformation in terms of creating employment opportunities, increasing value added, and catching up with latest technological developments for the 4th Industrial Revolution but also provide the basis for international competitiveness, attracting high quality foreign investment and achieving environment friendly sustainable economic development.

This report builds a bridge between global and domestic level value chain analysis for the Turkish textile industry.

In doing so, the global level analysis identifies the lead firms in the textile GVC, emerging trends and technologies whereas the domestic level analysis finds the Turkey-based leading textile companies. Moreover, several upgrading trajectories in the GVC are explained and suggestions are made. Covering both apparel, home and technical textile aspects of the Textile Industry, this report makes three key contributions for the Turkish textile industry's upgrading in the GVCs:

- In the apparel and home textile markets, the highest value-added activities include design, marketing and branding activities. Although Turkey has achieved considerable success in the production and design activities, more emphasis should be placed on marketing and branding. This report explains how a GVC analysis can guide the strategic interventions for this purpose.

- In the component segments of the chain, with the advances in the linkages between textile and other industries such as automotive, medical devices, and other manufacturing industries, Turkey can take advantage of the emerging technical textile sector in the country by finding niche areas to be more competitive at the international level. The emerging carbon fiber and medical textiles sectors are examined in the report to illustrate the opportunities to upgrade in textile GVC.

- Along the entire value chain, the textile industry can pursue environmentally friendly sustainable economic development, can take advantage of new technologies for reducing energy, water consumption and waste management for creating a circular economy for the sector. This would not only reduce production costs but also increase value added for textile production and position Turkey as a niche market for the textile GVC.

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1. Introduction

From the 1930s to 1980s, the focus of the textile and clothing industry in Turkey was to meet domestic demand. Cotton, silk, and traditional manufacturing skills in wool and growing natural raw materials, as well as large-scale public investments in both natural fiber and synthetic fiber production have been the important initial advantages for Turkey. The development of the textile and clothing industry in Turkey has differentiated from similar economies. In relatively late industrialized, developing countries, there are examples where "downstream" production, i.e., contract textile production, developed and the progress is made at various levels in vertical integration towards "upstream" production over time. In Turkey, the industry has created an important capacity through upstream investments based both on natural and synthetic fibers since the 1930s, and the structure based on contract production in apparel has become widespread in the 1980s along with export-based production. While the establishment of capital-intensive yarn and fabric facilities in the 1930s and 1960s played an important role in this development, the establishment of facilities such as Petkim as an input provider in synthetic fibers as well as Aksa and Sasa as fiber producers also had a key role in the aforementioned positive differentiation.

In the 1990s, both weaving and knitting fabric and yarn production capacity increased significantly with new investments. New producers were added to the major textile producing groups of the previous period. While companies such as Altınyıldız, Akkök Group, Sabancı Group and Söktaş represent the first group, Sanko, Çalık, Orta Anadolu represent the second group. Two important institutional milestones for Turkey are the Customs Union treaty signed between Turkey and the European Union (EU) in 1996 which eliminated customs duties between the countries, and the end of the Multi-Fibre Arrangement (MFA) in 2005, which eliminated the quota regime.

Particularly since the 2000s, some of the production capacity was cut off in product groups where competitiveness was low compared to East Asian countries, especially China. There has been a structural transformation in the industry in line with the supply policies of major procurement groups. Major yarn and fabric manufacturers have largely quit manufacturing standard products where competition was high. Some groups have invested in these product groups in countries with lower production costs (Söktaş' raw cloth investment in India, Çalık Group's investments in Uzbekistan can be cited as examples). The industry started to concentrate on specialty fabrics in woven fabric production, resulting in an increased production of value-added products, which are used as inputs to global brands. Despite the increase in apparel exports and increased demand, the industry turned to imports rather than developing the production capacity especially in synthetic yarns and fabrics, in part because of the high value of Turkish Lira (TL).

After 2011, partial improvements have been observed in production and exports with the support of additional import taxes, branding, promotion and design incentives. After the impact of the global financial crisis since 2008, EU countries started to source their production from nearby countries in order to reduce inventory costs. Their choice of Turkey in mid-segment products have also contributed to the rise in exports and production. These developments paved the way for Turkey's integration to the textile GVC.

By 2008, Turkey became the fifth largest global apparel supplier and the second largest supplier to the European Union, which accounted for 80% of exports [1].

[1] Fernandez-Stark, K., Stacey Frederick, and Gary Gereffi. (2011). "The apparel global value chain: Economic upgrading and workforce development. Durham, USA: Duke Global Value Chains Center (Duke GVCC).

Turkey integrated the textile GVC as a full-package supplier to global brands, in contrast to the many other emerging economies which entered the textile GVC with cut, make, trim (CMT) assembly operations [2]. By 2008, Turkish textile and apparel manufacturers started to export to over 170 countries, reaching $23 billion, equivalent of 17.5% of Turkey's total exports and 11% of total employment in 2010 [3].

The capacity utilization rate (CUR) in textile-clothing-leather industry followed a fluctuating course in the 2007-2018 period. The CUR decreased in 2008-2009 due to the decline in exports as a result of contraction in global demand. Since 2010, CUR increased both due to the global demand that has started to recover and due to increased protection measures, particularly with additional taxation on imports. The sharp decline in exports to Russia has been critical in the decline in capacity utilization in the 2015-2016 period. It has been noted that exports and hence production increased, and consequently, CUR increased in 2017 and 2018, in part because of the competitive advantage provided by the depreciation of TL. Turkey's total textile-related exports were approximately US$29 billion in 2017 [4].

In this report, the textile industry is broken into the following categories:

- Textile components: knit and woven fabric, yarn (staple, filament, unprocessed) and fiber.
- Technical components: nonwoven fabrics, coated fabrics, industrial fabrics and yarn, narrow fabrics, specialty yarn and thread.
- Industrial products: Misc. Final Products, Bags, Rope/Cord, Outdoor Canvas Products, Nonwoven Products, Used Industrial Products
- Home textiles: Linens, Floor Coverings, Curtains/Drapes, Wall Coverings/Tapestries;
- Apparel

In terms of product categories, apparel exports reached US$17.7 billion, apparel component exports (apparel fabric, yarn and fiber) reached US$6.2 billion, non-apparel final product exports such as home furnishings (floor coverings, linens) and industrial products reached US$4 billion, and non-apparel component exports of different kinds of fabrics and yarn reached US$0.9 billion.

Some of key findings are:

- Turkey's exports value of apparel was ranked 6th in 2017 with a 3.3% global market share and 7th in 2018 with a 3.2% global market share.
- Turkey's exports value of home furnishings (primarily floor coverings and linens) increased by 40% between 2012 and 2017; above the world average of 13%.
- Turkey's export value of industrial products (mainly bags and miscellaneous final products) increased by 9% between 2012 and 2017; below the world average of 20%.
- Turkey's export value of non-apparel textile components (primarily nonwoven fabrics) increased by 38% between 2012 and 2017.
- As of 2017, Turkey's top nonwoven fabric export destinations are EU-15 (29%), USA (11%), Iran (7%), Israel (6%, for 2016) and Egypt (6%)

The next section describes IsDB's GVC methodology that shows Turkey's natural, dynamic, spillover and surplus potential in the textile GVC with identification of product champions.

[2] Ibid.

[3] Ibid.

[4] Export data is based on partner imports; the values may differ from Turkey's reported exports.

2. Quantitative Analysis of Industry in Turkey (IsDB methodology)

The Islamic Development Bank Global Value Chains Methodology

To align markets with development programs, it is important to focus on areas that are both promising and competitive and that offer inclusive development solutions. This concept, which can be described as inclusive competitiveness, would allow markets or the private sector to participate actively in a development program that can boost market competitiveness and foster development by creating more inclusive development goals such as the creation of high-quality jobs and the promotion of sustainable export competitiveness.

To identify and subsequently develop the sectors with the most potential that Turkey needs to focus on to achieve its high value-add increase and job creation targets, an analytical model of "Making Markets Work for Development through Global Value Chains[5]" was utilized. This instrument is a GVC methodology and a filtering tool to identify sector and product champions of a country. It is based on three criteria (Figure 1). The first criterion is the "natural potential" of a country, which takes into account the existing comparative advantage of a country at the industry level. The second criterion concerns the "dynamic potential", included in a prospective approach that identifies and quantifies the competitive advantage of products or goods according to future market conditions. The third criterion measures the potential in terms of the effects on value add and hence job potential. This "surplus and spillover potential" indicates upstream and downstream linkages, the induced effects that may result from interconnections between industries and optimizes the value added in a specific industry. Through this approach, countries can focus on the GVC of products for which it has a revealed comparative advantage.

After this identification and in-depth analysis, GVCs will be analyzed to identify bottlenecks, capacity gaps and product potential across the value chain from the initial phase of production up to export and distribution. The interventions derived from this process will seek to address the gaps and bottlenecks in the GVCs of Turkey's leading products / industries.
The promotion of global value chains in Turkey would allow markets to mobilize resources for development. For markets to work in GVCs, globalization and industrialization need to be rethought in a rapidly changing world, due to the changing global economy and the pace and magnitude of technological advances.

[5] M. F. S. Hamid, K. I. W. Kane, A. E. Demirhan and A. Khodary, Making Markets Work for Development through Global Value Chains, Islamic Development Bank, 2019.

The Turkish Textile Industry in the Lenses of the IsDB Quantitative Tool

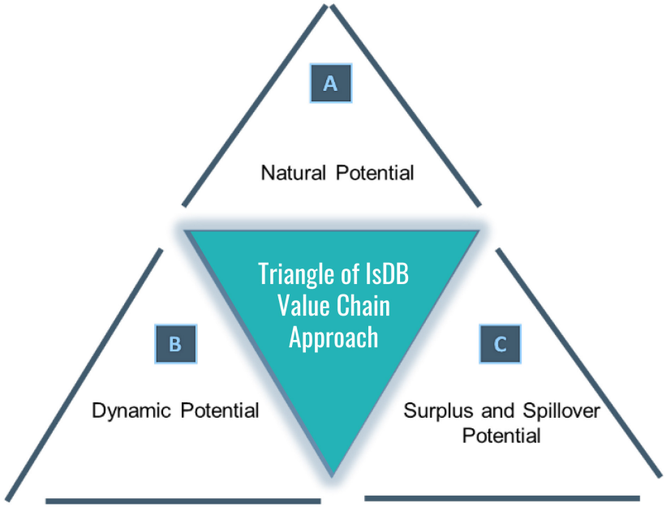

Figure 1: Global value chains' selection toolkit

Source: Hamid, M Faiz Shaul, Kane, K, Demirhan, AE, Khodary, A. 2019. Making Markets Work for Development through Global Value Chains: Methodology and tools to identify and measure the highest-potential value chains.

The revealed comparative advantage (RCA) index, is used to determine the products at HS2 level in which Turkey has comparative advantage. A product or an industry with an RCA>1 indicates that a country has revealed comparative advantage in this product or industry. As shown in Figure 2, Turkey has very high revealed comparative advantage for Manufacture of Textiles (HS50-59), wearing apparel and footwear (HS60-67), leather, luggage and related products (HS41-43) for the whole period from 2003 to 2018. However, it could also be observed that the RCA for the Manufacture of leather, luggage and related products has rapidly declined over the past 16 years despite the fact that all three industries have remained above the 1 threshold. This demonstrates the importance of these industries despite their historic status in the Turkish economic landscape.

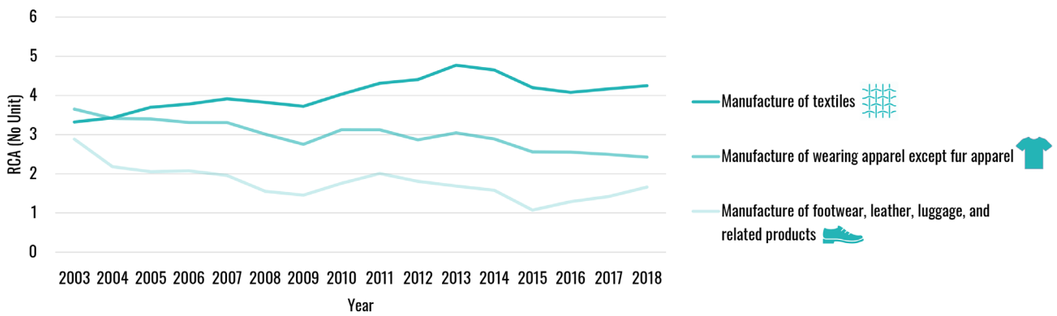

Figure 2: RCA calculation for manufacturing industries with natural potential for the past 16 years

In Figure 3, the export growth, over the past five years, of the 20 highest products exported by Turkey in the Manufacture of Textiles; wearing apparel and footwear; leather, luggage and related products industries are compared with the average growth of world demand for all products and the average growth of Turkey's export over the same period. This allowed to gauge the pace at which the exports of Turkish textile products have grown compared to all Turkish and all world goods exports. At first glance, no product with these top 20 products being traded by Turkey belongs to the leather, luggage and related products. As it could be seen, most of the products exported are located in the lower quadrants (declining sectors), and mostly on the left lower quadrant (red quadrant – losers in declining sectors) that is their demand is lower than the world average demand for goods, and that their export values are growing slower than the average Turkish goods' export. In other terms, they have low dynamic potential according to the Product Champion Index (PCI) as shown in Table 1, especially the PCI that emphasizes access to markets. The PCI combines demand, supply, trade and resilience indicators into a single index that indicates the HS4 products with the highest potential for trade.

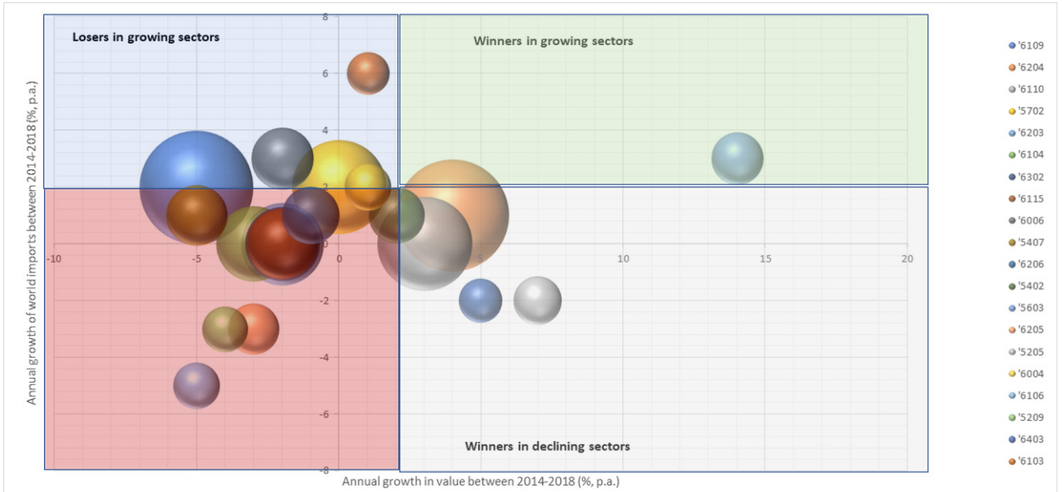

Figure 3: Relative capabilities of production at HS4 levels

Source: Authors using UN Comtrade data

The PCI for the main HS4 product within 'Manufacture of textile and apparel' is computed and summarized in Table 1. There are two products (formal wear: Women's or girls' blouses, shirts and shirt-blouses; Men suits) on the top left quadrant (losers in growing sectors), which means that despite the fact their export value is not growing rapidly in Turkey, their world demand has been steadily growing over the past five years, indicating these products are relevant products in the GVC and can move to the blue quadrant if exports grow. Nonwoven materials (HS5603) are in the top right quadrant, meaning it is growing faster than average compared with world demand and average Turkish products.

Among the top 20 export products, Men's or boys' suits, ensembles, jackets, blazers, trousers, bib and brace overalls, breeches (HS6103) is the fastest growing product, which further confirmed by its high PCI (Static, Dynamic and Market Access). As a result, the expansion and upgrading opportunity lies further in the Manufacture of Textiles; wearing apparel and footwear industries than in the Manufacture of leather, luggage and related products. Therefore, this study focuses more on the former, and less so in the latter.

Product	PCI STATIC	PCI DYNAMIC	PCI MARKET ACCESS
T-shirts, singlets and other vests, knitted or crocheted	0.240	0.142	-0.077
Women's or girls' suits, ensembles, jackets, blazers, dresses, skirts, divided skirts, trousers, ...	0.292	0.242	-0.027
Jerseys, pullovers, cardigans, waistcoats and similar articles, knitted or crocheted (excluding ...	0.171	0.125	-0.085
Carpets and other textile floor coverings, woven, not tufted or flocked, whether or not made ...	0.158	0.125	-0.181
Men's or boys' suits, ensembles, jackets, blazers, trousers, bib and brace overalls, breeches ...	0.072	0.008	-0.152
Women's or girls' suits, ensembles, jackets, blazers, dresses, skirts, divided skirts, trousers, ...	0.039	-0.024	-0.169
Bedlinen, table linen, toilet linen and kitchen linen of all types of textile materials (excluding ...	0.025	-0.029	-0.219
Pantyhose, tights, stockings, socks and other hosiery, incl. graduated compression hosiery ...	0.029	-0.021	-0.178
Fabrics, knitted or crocheted, of a width of > 30 cm (excluding warp knit fabrics "incl. those ...	0.120	0.126	-0.018
Woven fabrics of synthetic filament yarn, incl. monofilament of >= 67 decitex and with a cross ...	0.003	-0.043	-0.175
Women's or girls' blouses, shirts and shirt-blouses (excluding knitted or crocheted and vests)	0.034	0.019	-0.143
Synthetic filament yarn, incl. synthetic monofilaments of < 67 decitex (excluding sewing thread ...	0.134	0.109	-0.110
Nonwovens, whether or not impregnated, coated, covered or laminated, n.e.s.	0.230	0.353	0.049
Men's or boys' shirts (excluding knitted or crocheted, nightshirts, singlets and other vests)	-0.130	-0.217	-0.300
Cotton yarn other than sewing thread, containing >= 85% cotton by weight (excluding that put ...	0.003	0.002	-0.152
Knitted or crocheted fabrics, of a width > 30 cm, containing by weight >= 5% of elastomeric ...	0.083	0.106	-0.032
Women's or girls' blouses, shirts and shirt-blouses, knitted or crocheted (excluding T-shirts ...	-0.215	-0.345	-0.364
Woven fabrics of cotton, containing >= 85% cotton by weight and weighing > 200 g/m²	-0.166	-0.256	-0.352
Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of ...	-0.027	-0.038	-0.173
Men's or boys' suits, ensembles, jackets, blazers, trousers, bib and brace overalls, breeches ...	0.191	0.280	0.059

Table 1: Product Champion Indices of top 20 exported products within textile and apparel industries with natural potential for the past 16
Source: Authors using UN Comtrade data

Utilizing Eora Input-Output database for Turkey, the value-add of the overall Turkish export were broken down into all the industries, then further broken into the domestic value-add, foreign value-add and indirect value-add contributions of each industry. The results of which is summarized in Figure 4. The textile and clothing industry have a total gross output of US$86.9 billion, approximately 36% of which is exported. The gross export amounts to US$31.2 billion. Almost US$21.1 billion of this export revenue is collected from final good exports. The value of intermediate good exports is around US$10.1 billion. In terms of value-add, US$21.1 billion value added were generated. In other terms, the share of domestic and foreign value-add is around 67.7% and 32.2% respectively. The indirect value-add, i.e., domestic value added included in the third country's exports is around US$4 billion or 12.7% of total exports. In other words, 12.7% of export of textile and clothing industry is included in the exports of other countries. In terms of GVC position, textile and clothing industry is well connected to GVC, but more with the downstream portion of the GVC. In addition, the domestic value-add has increased over the years as Turkey increased its sets of activities in the value chain.

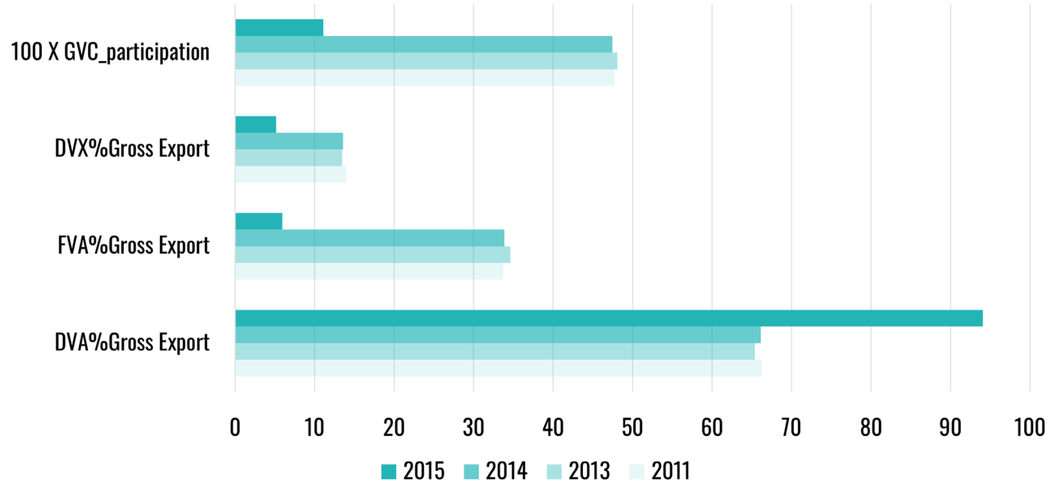

Figure 4: Value-added decomposition of Turkey's textile and apparel export
Source: Authors using Eora database

3. The Global Textile Industry

The Global Textile Industry

In 2017, world textile and clothing exports were US$660 billion. Correspondingly, apparel trade was US$391 billion, textile components $153 billion, home furnishings $44.5 billion, industrial products $27.2 billion and technical textile components $44.9 billion. China is the largest apparel exporting country, with a 33% global share. Whereas Turkey is the world's 5th largest exporting country, with a share of 4.5%.

Frederick and Daly (2019)[6] underline **the key dynamics in the global apparel industry:**

- China is still the world's largest apparel producer and exporter.
- For sourcing decisions of lead firms, pricing is not the sole criteria and lead firms increasingly consider quality, lead time and compliance to social standards for sourcing decisions.
- The largest and the fastest growing apparel consumer market is in Asia with countries such as China, Japan, South Korea, and Russia.
- Tariffs influence global apparel industry considerably.
- In apparel, the importance of knitted garments (over woven) and products made from synthetic materials (compared to cotton) is steadily increasing. This is related to fashion trends towards more form-fitting clothing and shorter fashion cycles.

Beyond apparel, the following tables (Table 2, Table 3, and Table 4) illustrate the key countries in the global home furnishings, non-apparel textile components and industrial products markets.

Exporter	Value, US$ Billions				(%) World Share				Growth
	2002	2008	2012	2017	2002	2008	2012	2017	2012-17
World	20.3	39.0	39.5	44.5					13%
China	3.6	11.2	13.3	14.9	18%	29%	34%	33%	12%
EU15	6.3	9.5	7.7	7.9	31%	24%	19%	18%	2%
India	2.1	4.3	4.6	5.7	10%	11%	12%	13%	23%
Pakistan	1.6	3.3	3.2	4.1	8%	8%	8%	9%	30%
Turkey	1.2	2.4	2.4	3.4	6%	6%	6%	8%	40%
Belgium	1.8	2.6	1.9	1.8	9%	7%	5%	4%	-9%
Netherlands	0.9	1.6	1.5	1.6	4%	4%	4%	3%	3%
Germany	0.8	1.5	1.4	1.4	4%	4%	4%	3%	-1%
USA	1.0	1.4	1.4	1.2	5%	4%	4%	3%	-19%
Bangladesh	0.1	0.5	0.6	0.7	1%	1%	1%	2%	18%
Poland	0.2	0.4	0.5	0.7	1%	1%	1%	2%	37%
Portugal	0.7	0.8	0.6	0.7	4%	2%	1%	1%	12%
Vietnam	0.1	0.2	0.4	0.6	0%	1%	1%	1%	52%

Table 2: Top Home Furnishings Exporters, 2002-17

Source: Frederick (2019). UNComtrade; exports represented by imports (HS codes will be sent). Subsectors: Linens, Floor Coverings, Curtains/Drapes, Wall Coverings/Tapestries.

[6] Frederick, Stacey, Jack Daly. "Pakistan in the Apparel Global Value Chain." (2019).

Exporter	Value, US$ Billions				World Share (%)				Growth
	2002	2008	2012	2017	2002	2008	2012	2017	12-17
World	20.5	37.9	41.5	44.9					8%
EU15	9.6	16.1	13.9	14.3	47%	42%	33%	32%	3%
China	1.1	5.0	7.9	10.0	5%	13%	19%	22%	28%
USA	3.0	3.9	4.3	4.3	15%	10%	10%	10%	0%
Other Asia	1.6	1.8	2.2	2.1	8%	5%	5%	5%	-4%
Rep. of Korea	1.1	1.6	2.1	2.0	5%	4%	5%	4%	-7%
Japan	1.0	1.8	2.1	2.0	5%	5%	5%	4%	-8%
Turkey	0.2	0.6	0.7	1.0	1%	2%	2%	2%	38%
Czechia				0.8				2%	
Canada	0.5	0.7	0.7	0.7	3%	2%	2%	2%	-2%
Vietnam	0.0	0.1	0.4	0.6	0.0%	0.2%	1%	1%	41%

Table 3: Top Non-Apparel Textile Component Exporters, 2002-17

Source: Frederick (2019). UNComtrade; exports represented by imports.

Subsectors: Fabric (Coated, Industrial, Narrow, Nonwoven) & Yarn (Industrial, Specialty, Thread).

Exporter	Value, US$ Billions				World Share (%)				Growth
	2002	2008	2012	2017	2002	2008	2012	2017	2012-17
World	9.2	19.9	22.6	27.2					20%
China	2.5	7.2	9.3	11.4	27%	36%	41%	42%	22%
EU15	2.4	4.7	4.0	4.2	26%	24%	18%	15%	6%
India	0.2	0.6	0.9	1.4	2%	3%	4%	5%	49%
Germany	0.6	1.2	1.0	1.2	6%	6%	5%	4%	13%
USA	0.7	0.9	1.1	1.1	7%	5%	5%	4%	4%
Vietnam	0.1	0.3	0.6	1.1	1%	2%	3%	4%	70%
Mexico	0.6	0.5	0.6	0.7	6%	3%	3%	3%	20%
Turkey	0.2	0.5	0.5	0.5	2%	2%	2%	2%	9%
Netherlands	0.2	0.5	0.5	0.5	3%	3%	2%	2%	15%
Bangladesh	0.1	0.2	0.4	0.5	1%	1%	2%	2%	15%

Table 4: Top Industrial Products Exporters, 2002-17

Source: Frederick (2019). UNComtrade; exports represented by imports. Subsectors: Misc. Final Products, Bags, Rope/Cord, Outdoor Canvas Products, Nonwoven Products, Used Industrial Products.

Mapping the Textile Global Value Chain

In contrast to a supply chain analysis, GVC analysis includes all value addition activities in production of goods or services. Thus, value adding activities such as research and development, design, marketing, branding are critical aspects of GVCs, this is also true for textile GVC. The mapping of textile GVC can be depicted as in Figure 5. One of the critical features of the textile GVC is that design, sales and branding activities bring the most value added compared to production, logistics and sourcing stages of the GVC. This puts the lead firms in an advantageous position so that they can outsource manufacturing activities to other countries.

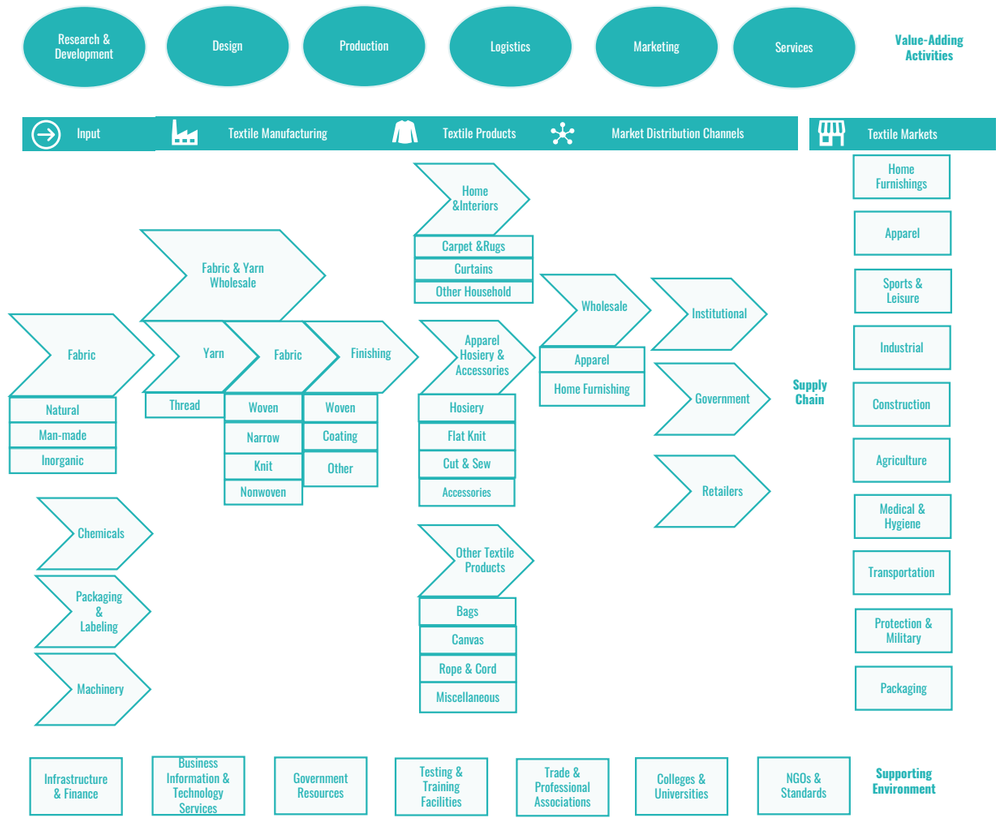

Figure 5: Textile Value Chain

Source: Frederick, S. Available at http://www.nctextileconnect.com/value_chain.cfm

Figure 5 illustrates that textile products can find end-users in different markets such as industrial, construction, agriculture, medical, transportation, military and packaging. Furthermore, textile GVC is also influenced by the supporting environment or the enabling conditions such as infrastructure and finance, information and technology services, government resources, business associations, universities, NGOs and global standards. Therefore, GVC Analysis should take into account not only the successive supply chain stages, but also other value addition activities, enabling environment and the end markets. With the consideration of these dynamics, bottlenecks, opportunities and challenges in integration and upgrading in GVCs can be analyzed.

Global Supply and Demand in the Textile GVC

New apparel demand is increasingly from Asia. The Asia Pacific region (and particularly China) are the largest, fastest growing consumer market. Asia Pacific accounts for 57% based on retail volume and 38% by RSP; this was 46 and 25% in 2008 (Euromonitor/Passport; category'apparel').

Lead Firms and Governance Structures in the Textile GVC

The apparel and home textile industries can be categorized as a buyer-driven production chain which underlines the power asymmetries between the producers and global buyers of final apparel products [7]. In other words, apparel and home textile industries are characterized as business to consumer (B2C) transactions. Nevertheless, technical textile industry is characterized with business to business transactions (B2B). These dynamics and governance structures are critical to understand textile GVC in different product groups.

With the advance of the new technologies, lead firms identify the key dynamics of apparel industry as changing nature of the industry, need to go digital and speed to market to meet consumer demands[8]. Relatedly, mobile technologies, the prevalence of social media helps small brands to reach the consumers much more easily and grow rapidly. One example is that Chinese apparel companies took advantage of e-commerce in reducing barriers to entry and enabling smaller firms to move up the value chain with functional upgrading as well as end-market upgrading [9].

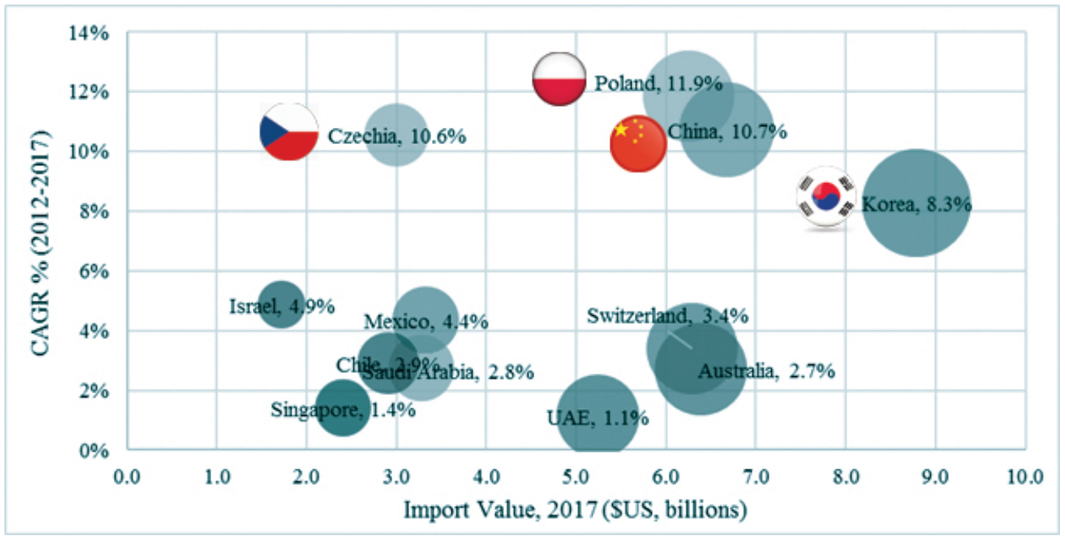

Figure 6: Fastest Growing Apparel Import Markets, by Value, 2012-17

Source: Frederick & Daly. (2019). Pakistan in the Apparel GVC. Duke GVCC. UNComtrade, HO2, 61+62, Reported Imports from the World from Reporters. Countries included had imports greater than $1.7 billion in 2017 (which coincided with at least 0.5% of global apparel imports) and a change in import value greater than the world average (0.9 percent) between 2012 and 2017. Top five importers excluded from figure: US, EU15, Japan, Hong Kong, Canada.

[7] Gereffi, Gary, and Stacey Frederick. The global apparel value chain, trade and the crisis: challenges and opportunities for developing countries. The World Bank, 2010.

[8] The State of Fashion 2019, McKinsey Report, https://www.mckinsey.com/industries/retail/our-insights/the-state-of-fashion-2019-a-year-of-awakening.

[9] Li, Fuyi, Stacey Frederick, and Gary Gereffi. "E-commerce and industrial upgrading in the Chinese apparel value chain." Journal of Contemporary Asia 49, no. 1 (2019): 24-53.

Also, lead firms identify sustainability and transparency issues as critical to meet consumer demands and company expectations. As the "A New Textiles Economy Report" by the Ellen MacArthur Foundation and Circular Fibres Initiative indicates, the textile industry relies on non-renewable resources with 98 million tons in total per year and less than 1% of material used to produce clothing is recycled into new clothing [10]. Relatedly, recycling mechanisms and waste management are the new trends to a switch to a circular textile GVC, rather than a linear one. Thus, Turkey can play a niche role in the textile industry by focusing on the circular economy, sustainability and environmentally friendly production and marketing of the textile and apparel products.

The European Technology Platform for the Future of Textiles and Clothing[11] highlights **four strategic innovation themes that will play a much more critical role in textile GVC:**

- Smart, high-performance materials
- Advanced digitized manufacturing and business models
- Circular economy and resource efficiency
- High value-added solutions for attractive growth markets.

The Turkish textile industry can take advantage of these developments to increase its value added in GVC, position itself as a niche market for marketing and branding purposes and increase employment, exports and economic growth with these strategies. In this respect, it is critical to examine various upgrading trajectories in the textile GVC.

[10] "A New Textiles Economy: Redesigning Fashion's Future", https://www.ellenmacarthurfoundation.org/publications/a-new-textiles-economy-redesigning-fashions-future.

[11] "Towards a 4th Industrial Revolution of Textiles and Clothing", European Technology Platform for the Future of Textiles and Clothing, http://www.technofashionworld.com/files/2016/11/TextileETP_SIRA_public-version.pdf.

Upgrading in the Textile GVC

In analyzing Turkey's upgrading trajectories for the textile GVC, it is critical to consider country capabilities. With respect to their capabilities, countries can be categorized as Cut-Make-Trim (CMT) producers, Original Equipment Manufacturers (OEM), Original Design Manufacturers (ODM), Original Brand Manufacturers (OBM), and service providers [12].

CMT countries can undertake low value-added activities in the GVC with their low labor cost; OEM countries as package contractors can invest in machinery, logistics technology and can become a preferred or niche supplier for global lead firms; ODM countries as full-package providers can be categorized as strategic suppliers; OBM countries are similar to ODM but are more advanced in terms of branding and service providers can play the roles of coordinators and investors in the textile GVC. Within these categories, Turkey can be classified as having ODM capabilities, with its strategic role as a supplier to lead firms. Turkish firms can play an increasing role as regional or global lead firms within their product groups. This would require upgrading within the Textile GVC. In the Textile GVC, five types of upgrading can be identified (Table 5). Turkish Textile industry can take advantage of each upgrading trajectory based on the natural and dynamic potentials in the product groups.

Type of Upgrading	Definition	Example
Product upgrading	Shift to more sophisticated products	From basic production to high fashion products
Process upgrading	Reduce cost, increase efficiency by reorganizing the manufacturing system	Investing in new machinery or logistics technology
Functional upgrading	Shift from manufacturer to service provider producer	From CMT to OEM; from OEM to ODM; ODM to OBM
End market upgrading	Diversifying to new buyers or new geographic or product market	Entering a new emerging market such as East Asia, Southeast Asia
Chain upgrading	Diversifying to other industries	Can take part in a different industry such as automotive and medical devices

Table 5: Five Types of Upgrading in the Textile GVC
Source: Frederick, S., and Gary Gereffi. 2011.
"Upgrading and Restructuring in the Global Apparel Value Chain: Why China and Asia Are Outperforming Mexico and Central America." International Journal of Technological Learning, Innovation and Development 4 (1/2/3): 67–95.

[12] Gereffi, Gary, and Stacey Frederick. The global apparel value chain, trade and the crisis: challenges and opportunities for developing countries. The World Bank, 2010.

4. Turkey and the Textile Global Value Chain

Initial Mapping and Current Participation of Turkey in the Textile GVC

Figure 7 shows a visual representation of Turkey's level of activity in the textile and apparel GVC and Figure 8 lists key players in the domestic value chain especially for technical textile manufacturing. Wherever export data is available through UN Comtrade, it is superimposed on the different activities. Turkey was the 5th largest home furnishings exporter in 2017 (US$3.4 billion). Export value increased by 40% between 2012 and 2017; above the world average of 13%. Turkey was the 7th non-apparel textile component exporter with US$1 billion in exports in 2017. This accounted for 2% of world trade with export growth of 38% between 2012 and 2017.
Boxes in blue are where the country has the highest shares of the global market, with the color intensity increasing with the share. Sweatshirts, woven and knit shirts, carpets and rugs are the final product categories where Turkey exceeds 3% of the global market. Dresses/skirts, trousers, coats, underwear, formalwear, bras and baby apparel are areas where Turkey holds 1-3% global market share. Turkey has over 3% global market share in both yarn and synthetic fiber production, and 1-3% global market share of natural fibers and fabric production. The main destinations of Turkish exports are the European Union, United States of America and the Middle East. More detailed activities of the domestic value chain are summarized below.

Research and Development

Based on data from the Ministry of Industry and Technology, as of the end of June 2019, 75 of 1,178 R&D centers benefiting from exemptions within the scope of Law No. 5746 on Support of the Research, Development, and Design Activities operate in the textile (including technical textiles), clothing and leather industries, and 70 of 344 Design Centers are from the textile and clothing industries. Indicators such as number of R&D centers (6.3% share in manufacturing), share of R&D spending in turnover (1.1%) and R&D employment (3.4% share in manufacturing) points to medium capability in terms of R&D in textiles. Besides R&D indicators, technical standards and regulations requested by buyers dominate processes of product improvement.

A recent article [13] finds **the following trends in the Turkish manufacturing sector since 2012:**

- Average employment growth has slowed; the unemployment rate has increased.
- Market concentration has increased.
- The price markups and profit share of market leaders have increased.
- The average productivity of market leaders has not increased.
- There is an increasing persistence among incumbent frontier firms.
- Firm growth rate dispersion has declined.
- Job reallocation rate among incumbents has declined.
- Increase in market concentration is associated with lower labor shares.
- Firm entry rate has decreased and the exit rate has increased.
- Economic activity among young firms has decreased.

[13] Akcigit, Ufuk, Yusuf Emre Akgunduz, Seyit Mümin Cilasun, Elif Özcan Tok, Fatih Yilmaz, "Facts on Business Dynamism in Turkey", September 2019, TCMB Working Paper No: 19/30.

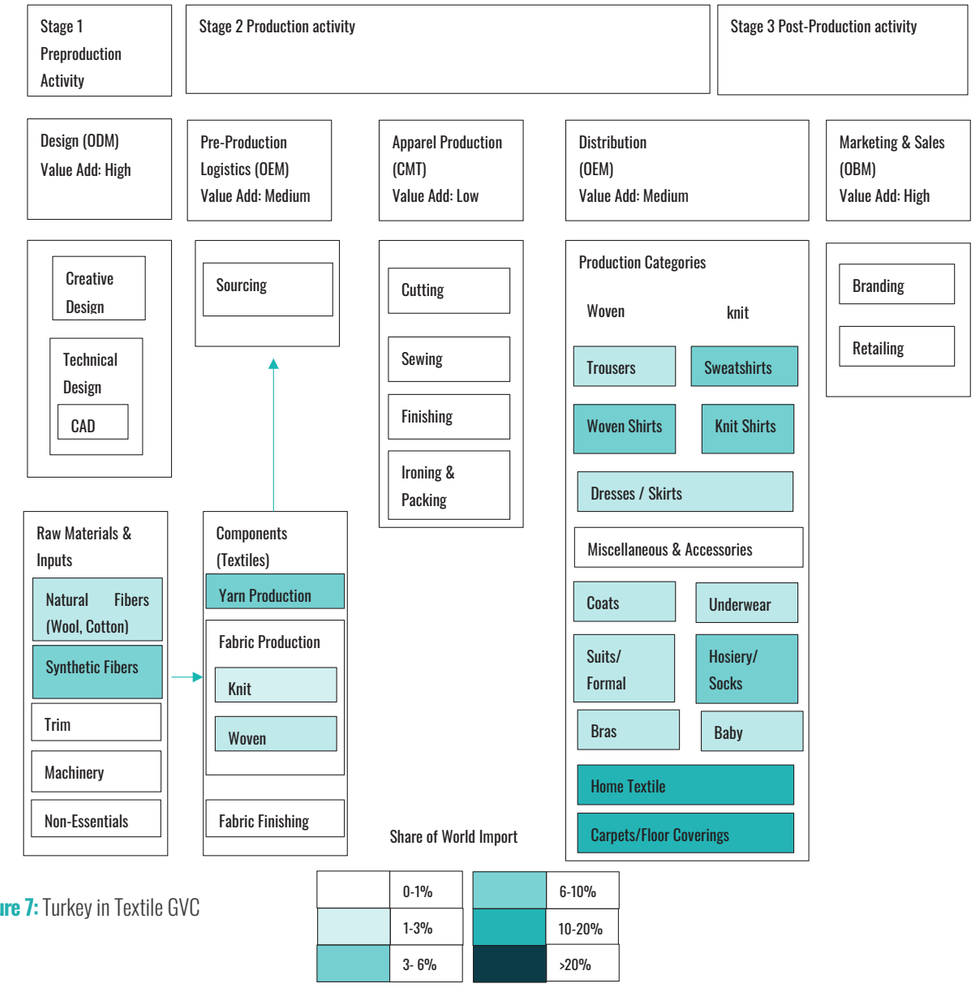

Figure 7: Turkey in Textile GVC

Figure 8: Some Key Players in Technical Textile Value Chain in Turkey

Thus, it can be deduced from this analysis that industrial support in terms of R&D subsidy to the market could improve competition and encourage innovation. Since Turkey's foreign trade strategy emphasizes diversifying export markets, increasing productivity and value-added in the Turkish economy, R&D subsidies, innovation-driven financing schemes and incentives can lead to upgrading in the textile GVC [14].

Production

In terms of product categories, apparel exports reached US$17.7 billion, apparel component exports (apparel fabric, yarn and fiber) reached US$6.2 billion, non-apparel final product exports such as home furnishings (floor coverings, linens) and industrial products reached US$4 billion, and non-apparel component exports of different kinds of fabrics and yarn reached US$0.9 billion (Table 6).

As attested by the production and export profile of Turkey, the production capability of yarn, fabric and home textile can be assessed as high in terms of production capacity, however exports of yarn and fabric have stagnated since 2012. An emphasis on developing branded Turkish products, increasing technology levels and increasing technical textile production could provide opportunities to increase value added and exports.

Textile Product Categories	Total Export Value (SUSD)	Main Products	Top Export Destinations	Global Rank
Apparel Final Products	17.7 billion	Trousers (26%) Knit Shirts (21%) Sweaters (13%)	EU-15 (68%) USA (3%) Switzerland (3%)	5th
Textile Components	6.2 billion	Knit/Woven Fabric (63%) Yarn (27%) Fiber (10%)		Knit/Woven Fabric (5th) Yarn (7th) Fiber (11th)
Home Textiles	3.4 billion	Floor Coverings (50%) Linens (6%)	EU-15 (42%) USA (21%) Saudi Arabia (7%)	5th
Industrial Products	0.5 billion	Bags (52%) Misc. Final Products (25%)		8th
Technical Components	0.9 billion	Nonwoven fabrics (50%) Industrial fabrics (17%) Coated fabrics (14%)	For Nonwovens: EU-15 (29%) US (11%) Iran (7%)	7th

Table 6: Turkey's Textile Exports by Product Categories, 2017
Source: Frederick, S. (2019) based on UNComtrade data. Global rank uses the EU-15 as one location.

[14] Ministry of Trade, https://ticaret.gov.tr data/5d67a97a13b87799c4cc1fef/Ticaret_Sunum_29.08.19.pdf.

In synthetic raw materials, import dependency is higher than for cotton. However, access to high quality raw materials at a competitive price is not as challenging as it is for cotton because of increasing production capacity of the petrochemical industry in the MENA region over the past 10-15 years. In addition, Turkey has its own synthetic fiber champions such as Aksa and Sasa supported by the Turkish petrochemical giant Petkim. Turkey has also increased its production capacity of glass fiber with recent investments from Cam Elyaf A.Ş. (Şişecam) in Balıkesir.

Marketing

There is strong connection with global and domestic retail channels. However, more emphasis can be put on developing brands and retail, especially in the apparel industry. In the sections on opportunities, the strategies for marketing and branding are explained.

Employment & Human Capital

In 2016, the textile component, home and industrial textile and apparel industries employed 912,556 people accounting for 25% of Turkey' s manufacturing employment (INDSTAT, based on data from Turkstat). Average annual wages for textile and apparel workers are lower than the average of all manufacturing industries, agriculture processing and the automotive industries (T&A was US$6,966/year compared to $9,427/year for manufacturing, $8,217/year for agriculture processing and $16,990/year for automotive in 2015). Within the two industries of textile and apparel, workers earn the highest wages in textile components.

An important characteristic of the apparel industry is its comparatively high share of female employment (Table 7). In 2013, the female share of employment in the textile and apparel industries was 39.2%; higher than all other manufacturing industries and second overall, only behind education (57.8%).

Sector	Total Registered Employees	Female (%)	Female Employment
Build	1,849,942	5.1	93,697
Textiles & Clothing	918,496	39.2	359,743
Textile	441,357	29.1	128,251
Clothing	477,139	48.5	231,492
Road Transport and Pipeline Transport	634,354	10.0	63,430
Retail Trade	1,169,771	35.3	412,958
Education	502,169	57.8	290,056
Food and Beverage Services Activities	477,749	26.8	128,114
Food Production	417,671	26.6	111,110
Building and Landscaping Activities	365,916	32.0	117,140
Automotive	350,002	13.0	45,524
Other Sectors	4,879,547	24.7	1,205,389

Table 7: Sectoral Female Employment and Total Employment Shares (2013)
Source: Frederick, S. (2019) based on UNComtrade data. Global rank uses the EU-15 as one location.

Key Firms

Among Turkey's Top 1000 Industrial Enterprises (ISO 1000), a list published by Istanbul Chamber of Industry, there were 178 textile companies in the Top 1000 in 2004 and 124 in 2018. However, the combined export share of the 10 biggest exporters has sharply declined from 54% in 2004 to 13% in 2018 (Table 8). One reason for this decline could be the fact that Turkish textile companies are mostly family owned businesses, and the succession from one generation to the next usually results in the fragmentation of the business. This is a clear threat to the competitiveness of the textile industry. Another reason for this shift is that as labor costs naturally increased, Turkish textile giants have attempted to move to higher value-added production, especially in clothing, where the gross added value/turnover ratio increased with the shift to more value-added products. Similar trends were observed for the clothing firms with a reduction in the number of firms in the ISO 1000 from 76 companies in 2004 to 39 in 2018 (Table 9).

2004	US$ mn	Products	2018	US$ mn	Products
Exsa Export	321	Foreign Trade Company of Sabancı Group	Ak-Pa Tekstil	334	Foreign Trade Company of Akkök Group (Mainly synthetic fiber and yarn produced by Aksa, Ak-Al, Aksu etc.)
Yeşim Tekstil	286	Home Textile	Kordsa Tekstil	227	Industrial Yarn / Technical Textiles
Ege Dış Ticaret	249	Foreign Trade Company	Sanko Dış Ticaret	162	Foreign Trade Company of Sanko Group (Mainly yarn and woven fabrics)
Gaat Dış Ticaret	229	Foreign Trade Company	Boyteks Tekstil	125	Upholstery Fabrics and Carpets
Ak-Pa Tekstil	229	Foreign Trade Company of Akkök Group (Mainly synthetic fiber and yarn produced by Aksa, Ak-Al, Aksu etc.)	Gülsan Dokuma	122	Nonwoven / Technical Textiles
Zorlu Linen	215	Home Textile	Akınal Tekstil	111	Synthetic Yarns for Carpet
Bilkont	183	Fabrics	Kipaş	77	Yarn / Woven Fabrics / Denim / Technical Textiles
Zorlu Dış Ticaret	177	Foreign Trade Company of Zorlu Group	Anonymous	70	
LGS Dış Ticaret	166	Foreign Trade Company	Orta Anadolu	62	Denim
DTS Denizli Tekstil	162	Foreign Trade Company of Denizli Home Textile Manufacturers	İskur	61	Yarn / Woven and Knitted Fabrics / Denim / Clothing
Total (mn USD)	2,217			1,351	
Share in Total Textile Exports	54%			13%	

Table 8: Top Ten Textiles Exporters, 2004 and 2018

However, the decline in market share of the 10 biggest exporters was much lower than what was observed for textiles. The change in clothing is thought to be due to the increase in the number of players with higher value-added and niche products. The Turkish clothing industry is an important European Union supplier, especially for the German market. Some of the largest European apparel buyers from Turkey include Zara (Inditex), Marks & Spencer, H&M, Gant and Verner.
There are more than 150 companies manufacturing technical textiles and nonwovens in Turkey. More than 20 large companies produce nonwoven roll goods. Most large-scale Turkish nonwoven and technical textile companies are members of the European Disposables and Nonwovens Association-EDANA. Three of the largest global nonwoven roll goods producers are headquartered in Turkey (Technical Textiles Market, 2019).

The businesses in the textile and clothing industry mostly have regional production facilities. While yarn production is concentrated in provinces such as Kahramanmaraş, Istanbul, Gaziantep and Bursa, towels, bathrobes, and home textiles are produced in Denizli; Uşak stands out with yarn and blanket production as well as recycling, Çorlu and Çerkezköy with finishing, Adana with cotton weaving and finishing, Gaziantep with nonwovens and machine-made carpets, and Istanbul with apparel and knitting production. Considering only circular knitting production capacity, Istanbul is followed by Tekirdağ, Maraş and Bursa respectively. Şanlıurfa is at the forefront of cotton production. Leather processing companies are concentrated in Istanbul-Tuzla, İzmir-Menemen, Tekirdağ-Çorlu, Uşak, Bolu-Gerede, Balıkesir-Gönen, Manisa-Kula, shoe companies in Istanbul, Izmir, Konya and Gaziantep, fur goods manufacturers in Istanbul, and saddlery firms in Istanbul and Ankara. Leather apparel companies are mostly located in Istanbul and Izmir.

2004	US$ mn	Products	2018	US$ mn	Products
GİSAD	1,741	Foreign Trade Company	TGS Dış Ticaret	862	Foreign Trade Company
GSD	791	Foreign Trade Company	Pergamon Status	626	Foreign Trade Company
Hedef Konfeksiyon	617	Swimwear	Taha Pazarlama ve Dış Ticaret	482	Fabrics and Garment
Trisad Dış Ticaret	103	Foreign Trade Company of Knitting Wear Manufacturers	Birgi Birleşik Giyim	371	Foreign Trade Company
Şık Makas (Vakko)	101	Women and Men Suits and Apparels	LC Waikiki Mağazacılık	318	Outerwear and Retailer
Erak Giyim	101	Denim Wears	Üniteks	251	Knitted Apparel
Trakya Tekstil	86	T-shirt	Yeşim Tekstil	161	Woven and Knitted Apparel / Home Textile
Sertler Örme	73	Knitted Apparel	Menderes Tekstil	142	Home Textile
Üniteks	73	Knitted Apparel	Fore	136	Sportwear
BGS Boğaziçi Giyim Sanayicileri	72	Foreign Trade Company	Cross Tekstil	135	Denim Wear
Total (mn USD)	3,758			3,484	
Share in Total Clothing Exports	32%			20%	

Table 9: Top Ten Clothing Exporters, 2004 and 2018

Investment Regimes (Industry-specific programs/economic development strategies)

In the 11th Development Plan, which entered into force in July 2019, the textile-clothing-leather industry is among the priority manufacturing industries. The plan emphasizes the goal of being a country that drives the value chain, the development of new business models in production and services, and the role of technical textiles in the transformation into a high value-added structure:

- The main objective of Turkey is to be one of the leading countries that drives the value chain with a focus on fashion design and branding in the textile, clothing and leather industry.
- Fast and flexible production, innovation, customer focus, integrated production structure, social responsibility and environmental awareness, retailing and organizational skills will be improved in the industry.
- Regarding technical textiles, which is one of the most important areas in the transformation into high value-added structure in the industry, company activities toward optimum technology selection, compliance with the legislation to protect the environment, energy efficiency and the circular economy as well as their cooperation with other stakeholders in the value chain (especially machinery, fiber and technical end-use manufacturers) will be supported.

The Incentive System

Between the years of 1980 and 2008 half of the incentive investments were made towards manufacturing. The strongest sectors in the Turkish manufacturing industry are textiles and apparel. Therefore, many incentive policies were implemented to strengthen these industries between the years of 1990-1995. An incentive scheme, Turquality Scheme, was implemented from 2012 to 2019, which aimed to sell the image of Turkish products as good quality. The project was initiated by the Turkish Government, Ministry of Economy, Turkish Exporters' Assembly, and Istanbul Textile and Apparel Exporters' Association. However, Turquality experience underlines that more emphasis needs to be put in marketing and branding activities.

5. Opportunities

Turkish companies can take advantage of several upgrading strategies. These strategies are highlighted with examples below.

Process Upgrading - New Technologies

There are opportunities provided by the technological developments and some Turkish Textile companies are taking advantage of these developments. For instance, Kordsa as a manufacturer of industrial nylon and polyester yarn, tyre cord fabric and single-end cord, that is predominantly used in the making of tyres, is implementing new technologies to better manage its factory floor and workflows [15]. Kordsa has developed an app for its employees to make its operations as transparent as possible and as a result its operational efficiency increased by 5%; timely and accurate decision making with real-time data analytics has led to a 15% decrease in response time; a 6% increase in staff productivity; and a saving of 70 mins/day, which are now focused on value-added activities.

Kordsa has also invested in intelligent robotics. Prior to this investment a Kordsa employee could handle between 6-7 tons every day (as a fiber roll can weigh up to a ton) but this has been eliminated with the installation of cobots (robots which physically interact with humans in a shared workspace). One of the main lessons from Kordsa's implementation of new technology is that the new technology needs to be aligned with corporate strategy[16].

Another example to Turkey-based textile company investing in new technologies is Hugo Boss Solutions, the manufacturing segment of Hugo Boss, which produces over 4 million pieces of apparel a year[17]. With a consumer-based digital roadmap, Hugo Boss Solutions has invested in robotics and automation of processes, in its Izmir facility has 100 data collecting points to monitor temperature, vibrations and currents, identify problems, it has a robot using free-mapping technology and the company uses smart data management to monitor and update data in real time. One of the key lessons from this experience is that proper soft and hard infrastructure is needed before implementing the digital transformation.

UNDP White Paper on Total Factor Productivity also highlights that accelerating digitalization by increasing digital skills of companies, improving digital infrastructure, improvement of e-commerce capacity, extending cloud computing would increase productivity levels in Turkish manufacturing sector[18].

According to data provided by the General Directorate of Energy Affairs of the Ministry of Energy and Natural Resources, a total of 247,169 Gigawatt hours (GWh) of electricity was consumed in Turkey in 2017, of which 114,629 GWh (46.4%) were for industrial consumption and 109,505 GWh for manufacturing industry.

[15] "WTiN Report: Inaugural Textile 4.0 Conference provides digital vision"https://www.whichplm.com/wtin-report-inaugural-textile-4-0-conference-provides-digital-vision/

[16] Ibid

[17] Ibid

[18] Support to Development of a Policy Framework on Total Factor Productivity Project, http://tfvp.org/wp-content/uploads/2018/11/White-Paper-Final.pdf.

At 17,022 GWh, the textile, clothing and leather industry consumes the most electricity among the manufacturing industry sectors second only to the basic metal industry. This is largely due to the finishing industry and the large production network of the industry. The main inputs of the textile finishing industry which is concentrated in the Marmara Region are natural gas, other thermal energy, steam and electricity. In textile finishing, 1.5 kilowatt/hour power and 1.10 cubic centimeters of natural gas are consumed to produce 1 kg of textile.

Several governments are implementing incentive schemes to reduce energy consumption in the production process. For instance, Indonesian government regulation (No. 70/2009) provides incentives for improved energy management, including tax deductions, import duty assistance, low-interest funds for investing in energy efficient machinery, and energy audit support (International Energy Agency, 2015).

Another aspect of process upgrading is engaging in recycling and waste management to create a sustainable, circular economy in textiles. There are several opportunities in recycled content amidst rising global concerns of the environmental impact of manufacturing particularly in the European market. This offers opportunities for Turkey, which already has a competitive advantage in meeting the demands of the European market. In this respect, performance and athletic apparel can be considered as key markets to address. Developing products that address environmental and sustainability concerns can be angles for marketing and branding Turkish products. Furthermore, Turkey could expand textile component exports to nearby countries as an alternative to China for brands concerned with reducing the environmental footprint of their goods by reducing the distance component products must travel to reach the destination of final assembly.

Functional and End Market Upgrading –Branding, Marketing and Retail

Even though Turkey is still one of the largest apparel producers in the world, it will increasingly face challenges competing in OEM production as there are many countries with lower labor costs and preferential market access to key end markets that are also developing sourcing and textile production capabilities. Nevertheless, this can be turned into advantages given Turkey's capabilities in design and to a lesser extent branding (Table 10 provides a brief overview of functional upgrading in Turkey). While industry-specific experience is important, the skills needed are more cross-cutting and generally revolve around business development, marketing and creativity.

Firms need employees with advertising, social media, networking, product development and consumer market research capabilities. Another important element is developing a network of buyers in new markets; it is critical to develop connections and know-how on brand promotion in new markets. Moving more of Turkey's production from contract manufacturing on behalf of foreign brands to products produced, owned and branded by Turkish firms would lead to higher-skilled jobs and increased exports to new markets. A few Turkish companies such as LC Waikiki[19] and Mavi have been successful in these areas, which has enabled them to access new markets with their own brands [20].

Stage 1 OEM: Full Package: 1980s–2000s	Stage 2 ODM: Design 2000s–Present	Stage 3 OBM: Branding	Stage 4 Retail/Distribution
Turkey has had full-package capabilities since entering the global apparel industry. Many firms are vertically integrated or can source most raw materials locally. Turkey became a prime apparel supplier to European buyers because of its tariff preferences via the Customs Union, skilled low-cost workers, and proximity.	Deep relationships of Turkish manufacturers with European apparel retailers and strong OEM capabilities allowed Turkey to move into the design segment of the chain. Turkish firms sent employees to Europe to train with European designers and hired consultants to come to Turkey to work on design and branding skills locally.	Turkey aimed to leverage its capabilities to penetrate new end markets by developing Turkish apparel brands. In the mid-2000s the Turkish Government provided incentives to firms to upgrade and increase competitiveness in global markets[21].	Moving forward, Turkish firms can expand into branding and direct sales channels in Turkey and abroad.

Table 10: Turkey: Functional Upgrading in the Apparel GVC

[19] In 2013, the company had $2.4 billion in sales and 22,000 employees.
[20] Other examples include Modanisa, Bilsar (retail stores in Italy, France) and for suits Sarar, Ramsey, Damat, Kigili.
[21] These incentives included reimbursements of up to 60% of the cost for a maximum of three years for personnel expenses (including training and recruiting highly qualified personnel), machinery, equipment and software, consultancy, and R&D related materials (Dimireva, Ina. (2009). Turkey Investment Climate 2009).

Related to this, performance/technical apparel (athleticwear, uniforms) and fabrics are potential product areas of focus to develop Turkish brands. This is a growing market globally for both casual 'athleisure' and sports enthusiasts and an area in which consumers still value quality and performance capabilities and are more willing to pay a price premium. Brand development opportunities are not limited to just final products; there are also opportunities for upstream branding by fabric, yarn and fiber companies. Upstream branding is a way to enhance consumer awareness of the capabilities and technical benefits of the textile components in a product, increase the value of products and increase the likelihood of buyers' specifying textile suppliers. Examples of company's using this strategy include US brands such as Polartex, Goretex, Invista and Nano-Tex and European firms such as Scholler and Lenzing. In some cases, upstream brands become the name known by consumers (for example, spandex is often called Lycra, however this is the brand of spandex developed by DuPont).

Chain Upgrading – Interlinkages with Different Industries and Technical Textiles

Technical textiles are textile materials and products manufactured primarily for their technical and performance properties in addition to their aesthetic or decorative characteristics. Overall these sectors are more capital-and scale-intensive and there are fewer countries and companies globally with capabilities in these areas. Turkey appears to be strong in automotive fabrics and can capitalize on existing strengths to expand market share in other transportation markets including aerospace, rail and ships for commercial and defense sectors. Beyond transportation, opportunities exist in medical textiles and sustainable construction materials.

Related to technical textiles, carbon fibers and carbon fiber composites are key components for future high-tech applications and relatedly their share in world trade is expected to increase significantly [22]. Demand for carbon fiber is expected to increase by 11.3% on average per annum between 2018 and 2022. In 2018, global demand for carbon fiber was US$2.88 billion; demand is driven by North America (33%), Europe (27%), and Japan (11%). In 2018, demand for carbon fiber in Asia Pacific (excluding Japan) accounted for 24%, most of which came from China.

Thus, there are opportunities to reach both developed and emerging markets. Another potential opportunity for Turkey is in medical textiles. The medical textiles sector is expected to grow by 4.9% per annum through 2025 to reach a global value of US$23.3 billion[23]. The Box Article at the end of this report provides further support into opportunities in the areas of medical textiles and carbon fibers.

[22] Statistics: trends in demand for carbon fibre and carbon fibre composites, Technical Textile Markets, No 113, August 2019

[23] Tomic-Reisel, Tjasa. Medical Textiles: Markets, Applications, Developments and Regulations, Technical Textile Markets, No 114, August 2019.

6. Challenges

The import dependency in the textile industry increases costs and lowers Turkey's value addition in the production process. The high cost of energy, water, and labor necessitate Turkey to upgrade in the Textile GVC by producing more value-added products and services.

Reliability is critical to address global demands in textile GVC. Turkish companies can use their comparative advantages in production and design capabilities to remain reliable producers. Adoption of new technologies in the production process for process upgrading requires a labor force with digital skills. The textile industry is represented by numerous business associations and their coordination is critical for successful marketing, branding and end-market upgrading strategies.

7. Potential Upgrading Trajectories

Upgrading Area	Value-Addition	Increase Exports	Employment (Quality or Volume)
Functional upgrading (branding, marketing, retailing, design) and end market	Yes	Yes	Quality
Chain upgrading; expand capabilities in technical fabrics, yarns and fibers	Yes	Yes	Quality
Process and product upgrading via environmental sustainability	Yes	Yes	Quality

Table 11: Potential upgrading trajectories for Turkish Textile and Apparel industries

8. Recommendations to the Government of Turkey

This preliminary study shows that a stage by stage analysis of value addition from raw materials to sales can help identify specific interventions for Turkey's upgrading in the textile GVC. This initial analysis identifies that in textiles, Turkey can add more value to the production process by focusing on branding, process upgrading, considering interlinkages with other industries such as automotive and medical products, and can create a sustainable eco-system by reducing energy and water consumption, recycling waste in textile production and forming a circular value chain.

These recommendations can be substantiated with a detailed on the ground GVC analysis by meeting industry stakeholders from the public and private sectors.

9. Box Article: Medical Textile and Carbon Fiber Opportunities for Turkey

With Turkey's increasing appeal for medical tourism, medical textiles offer an avenue to upgrade in the textile GVC. Medical textiles are used in non-implantable products such as adhesive tapes, compression garments/socks, surgical gowns, bedding, wound care dressings and even and extra-corporeal organs such as artificial kidneys, livers, lungs, etc. For example, prosthetics and orthotics (body part braces) make up a $2.8 billion global market. There are also implantable applications in areas such as surgical meshes and tissue engineering scaffolds. Because of factors such as ageing populations in developed countries, growing middle classes and rising disposable incomes in several developing countries, and increasing awareness among patients of new wound care applications, medical textiles is expected to be one of the fastest growing technical textiles category. In 2018, the largest exporters of medical textiles were China, followed by India, Germany and USA.

Medical textile applications exist for all types of fabric, however nonwoven fabrics account for the largest share of demand by volume (64.3%), followed by woven fabrics with a 15.4% share. Global demand for nonwoven fabrics in medical textiles is expected to grow by 5% per year until 2025. Applications of nonwoven fabrics include diapers, drapes, feminine hygiene, incontinence products, medical gauze, surgical gowns and masks, wadding, wound care, and wipes. Applications of woven fabrics include hospital garments, surgical hosiery, fabrics for use in contact with wounds and other bandage types, and artificial tendons. Knitted fabric applications include bandages, devices for hernia repair, medical dressings, prolapse devices, and surgical, reconstructive and cosmetic surgery meshes. Furthermore, technological developments will continue to create new medical textile applications. Two key areas are materials whose properties can change in response to stimuli and nanocomposites.

Carbon Fiber Trends

Carbon fiber is a type of inorganic fiber. Polyacrylonitrile (PAN), a textile-based polymer, cellulose (rayon) and pitch are used as raw materials for medical applications among many other industries. Bitumen fibers are obtained from purified oil or coal tar. PAN-based fibers are mostly used (~ 90%) in the production of carbon fibers. Pitch-based fibers have a more resistant and brittle character. With their superior combination of high strength, low density, low friction and low weight properties, carbon composites are preferred materials in aerospace, defense, automotive industries, sports equipment, construction, and energy storage. Carbon fiber provides more energy storage and return (known as dynamic response) than any other material. Although carbon fiber is 4.5 times lighter and stronger than steel, it is mainly used in the aviation industry due to the lack of mass production and high prices. However, major producers, which account for 87% of the world market, continue to work towards improving the process, and prices are expected to decline in the coming years. Key manufacturers such as DowAksa, Hyosung, Teijin Carbon and Toray have substantial expansion plans. Many other carbon fiber producers are diversifying their product portfolio to supply a wider variety of carbon fiber composites manufacturers.

The Carbon Fiber Value Chain in Turkey

Globally, there are three types of carbon fiber manufacturers. The first type produces carbon fiber into yarn-shaped bobbins. The second type utilize carbon fibers as an input to manufacture goods. The third type combines the capabilities of the first two and performs all activities along the value chain under one roof. Turkey does not have any companies in the third category. Turkey has one company in the first category--DowAksa, which is joint venture of one of the biggest chemical company in the world,

Dow Chemical, and Aksa, the top producer of acrylic fiber in Turkey. All the other Turkish players in the carbon fiber value chain are in the second category.

Turkish carbon fiber players serve mostly three industries: aerospace, defense, and the automotive, railway and marine industries. In terms of geographic distribution, the production is divided around three main clusters. The players around the Ankara area cater mostly toward the dominant market for carbon fibers in Turkey: the aerospace and defense industries. Turkey aims to leverage this supply chain position to become in the short term a tier 1 aerospace supplier. The players around Istanbul-Bursa primarily supply the automotive sector. This carbon fiber automotive subsector developed around the lead automotive firms present in the Bursa area. They supply the main auto manufacturers such as Ford, Daimler, Mercedes-Benz and BYD. The players around Izmir and Bursa mainly supply the construction industry. However, very few medical carbon fiber players were found in Turkey.

There are strict standards for medical textiles used with living substances such as tissues and blood. They need to be biocompatible, chemically inert, hypoallergenic, non-carcinogenic, non-toxic and sterile. Core physical properties include air permeability, durability, elasticity, moisture absorption and strength. Not all textile exporting countries can adhere to these standards, however, Turkey's experience serving other demanding technical textile markets is an advantage. This fact, combined with Turkey's capacity to produce carbon fiber, in addition to Turkey being a strong destination for medical tourism can help the country tap into medical textile markets.

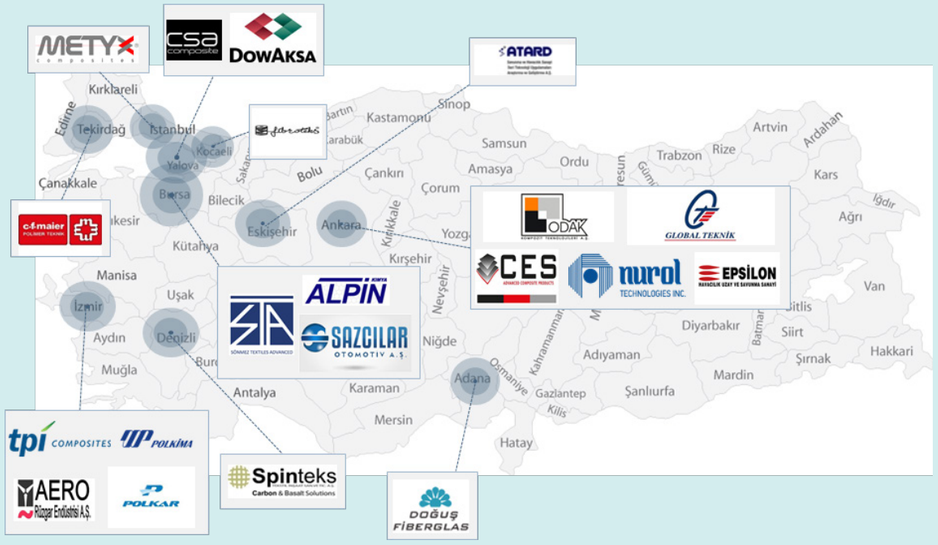

Figure 9: Carbon fiber clusters in Turkey – Source: DowAksa


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