

Threads of Progress: A Comprehensive Landscape Study of the Apparel Industry and the Future for Women Workers

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About Oporajita

The textile and Ready-made Garment (RMG) industry, which is a vital driver of Bangladesh's economy, plays a significant role in terms of employment and foreign exchange. In the fiscal year 2022-23, the RMG sector alone contributed a substantial USD 46.99 billion, representing 84.58% of foreign exchange earnings and 10.35% of the Gross Domestic Product, (BGMEA, 2023).

With over **4 million workers**, a majority of which are women, engaged in this sector, the developments that impact the apparel industry has the capacity to profoundly impact the lives and economic prospects of women workers across the country.

With this context in place, '**Oporajita: Collective Impact on Future of Work in Bangladesh**' initiative, funded by the **H&M Foundation** with **The Asia Foundation** operating as the **backbone organization** brings together eleven implementation partners, and three co-funders, with a common goal of future-proofing the women garment workers in Bangladesh.

Oporajita project aims to equip women apparel workers in Bangladesh for a future where the apparel industry is defined by automation and digitalization, circularity, geopolitics, and the impending LDC graduation in order to safeguard their livelihoods and wellbeing.



About Bunon 2030

As a part of the 2-year long program Oporajita, **LightCastle Partners** in collaboration with **Policy Exchange of Bangladesh**, has proudly introduced **Bunon 2030**, a dedicated initiative to empower Bangladeshi women garment workers in the face of increasing automation, geopolitics, circularity, among others. The project intends to improve sector competitiveness, skills development and employment opportunities for women apparel workers based on an improved understanding of the impact of technology and automation on the apparel industry. In addition, **Bunon 2030** aims to strengthen the apparel industry for the next decade— adapting to the emergence of the **4th Industrial Revolution, changing Geopolitics, Circularit**y and the upcoming LDC graduation.

With the Bunon 2030 initiative, our goal is to foster collaboration and knowledge sharing as we collectively

navigate the path ahead for the apparel sector of Bangladesh. Through this effort, we encourage stakeholders to unite with us in driving systemic change in collaboration with apparel ecosystem stakeholders.

A **landscaping study** was conducted in prior to gauge the future of work, where a scenario mapping framework was followed to foresee the impact of different global shifts, including circularity, automation, worker wellbeing aspects, and overall **policy imperatives**. This will effectively help to drive systems change and guide the actors to comprehend the stance they will have to take under different uncertainties in the future. The scenario analysis along with the policy brief will help the industry leaders and policymakers to proactively plan and adapt to changes over time.



Background

Bangladesh's apparel sector has performed commendably over the last three decades, securing the **second most prominent position** in the global apparel market. Currently, with 3,500 operational clothing factories and a total investment of USD 20 billion, this industry makes up 11% of the GDP and directly sustains over 4 million jobs. (BGMEA, Aug 2023). However, despite growing in value and volume, the industry has primarily languished in the low-value segment attaining slim profit margins.

The changes in the fashion industry with the emerging concepts of **fast and ultra-fast fashion**, Bangladesh has been slowly losing out on its edge of cost competitiveness as cost-efficiency is not the only requirement anymore. Faster production and reduced lead time are needed to stay on top of the industry.

With the global fashion industry demanding **ultra-fast fashion products**, there has been an emerging need for faster production resulting in apparel giants moving their production hubs from **offshore cost-efficient countries to onshore locations** with much lower lead time. In order to regain their competitiveness, global apparel

manufacturing hubs like Bangladesh are gradually transitioning towards adopting automation into its production process and increasing efficiency to shorten the sector's **export lead time**. In a world with a fragmented Ready-made Garment (RMG) industry using manual production, adoption of automation in the apparel manufacturing process of Bangladesh is still limited.

According to a report published by Foundation Strategy Group (FSG) as a part of the Collective Impact initiative on Future of Work for Women Garment workers in Bangladesh, less than 15% of garment manufacturing activities in Bangladesh are automated, and production is largely manual and labor-intensive. The report further highlighted that the apparel market structure is dominated by smaller factories, with at least 50% of factories being small or medium-sized.¹

However, the pace of automation is gradually growing in the apparel sector, jeopardizing jobs, particularly for women in low-wage positions hindered by socio-cultural barriers. The proportion of women in the workforce dropped from 90% in 1980 to 59% in 2020.²

They often lack training to adapt to evolving factory technologies and face gender biases hindering their progress. Women also experience skill and education gaps compared to male counterparts; 29% lack primary education versus 18% of men. Men operate a wider range of machinery. Gender perceptions limit women's representation in supervisory (below 15%) and managerial roles (below 5%) due to stereotypes about productivity.²

Furthermore, **LDC graduation in 2026** will end preferential treatment from the European Union, impacting cost competitiveness and increasing the demand for efficient and automated production.

While automation and digitalization will help enhance **sector competitiveness** but will also pose a risk of substantial job losses, potentially affecting over 60% of the RMG workforce by 2041.² Women workers, who are the majority in the sector, face the greatest vulnerability as they are overrepresented in low-paid, low-skilled positions. With these ongoing shifts in the apparel sector,

it is imperative to equip the women garment workers in Bangladesh for a future where the textile industry is defined by automation and digitalization in order to safeguard their livelihoods.

To drive systemic change, LightCastle Partners in collaboration with Policy Exchange of Bangladesh has introduced **Bunon 2030** and devised a comprehensive approach that includes conducting a landscaping study and engaging in policy advocacy through dialogue series and a national level dissemination session.

The landscaping study can act as a guide to assess the future of work. It used a scenario mapping framework to predict the effects of various global shifts, such as **automation, circularity, worker well-being, and policy priorities**. This analysis will facilitate systemic change and provide guidance for stakeholders to comprehend how to navigate different future uncertainties. The scenario analysis, along with the policy brief, will aid industry leaders and policymakers in proactive planning and adapting to evolving circumstances.



Objective of the Initiative

- ◆ Sketch a global snapshot of upcoming RMG trends and possible changes
- ◆ Assess the upcoming technological shift in the apparel industry
- ◆ Explore the effect circularity can have on the apparel sector
- ◆ Evaluate the impact on the apparel workers – future of work
- ◆ Provide the steps to be undertaken by stakeholders as per mapped scenarios



Apparel Sector in Bangladesh

The Future of Apparel Sector at
Crossroads



Drivers Spearheading Growth in the Apparel Sector

The Ready-made Garment (RMG) industry in Bangladesh has served as a fundamental pillar of the nation's economic expansion in recent decades. As the **world's second-largest supplier of clothing**, Bangladesh has solidified its position as a crucial contributor to the worldwide fashion production network.

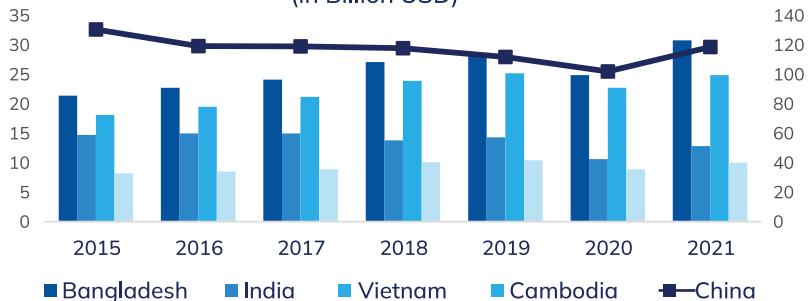
- ▶ Long history of textile production
- ▶ Cost Competitive Labor Wage
- ▶ Export Facilities (includes duty-free import of equipment and raw materials, bonded warehouse facilities)
- ▶ Cash incentives for certain types of garments source
- ▶ Preferential Trade benefits (such as GSP)
- ▶ FDI (due to its competitive advantages)
- ▶ Women Participation in the sector



The apparel industry has shown remarkable ability to adapt to changes in the global market. This includes shifting from a quota-based system to a free-market system and adapting to changes in fashion trends and consumer preferences. Over the years, Bangladesh has invested in developing the necessary infrastructure for the growth of the apparel industry. The entrepreneurial and risk-taking mindset of the Bangladeshi businessman is a key component behind this success.

Total Apparel Export

(in Billion USD)



Source: BGMEA, 2022

During the fiscal year 2022-23, Bangladesh's apparel exports reached a total of **USD 46.99 billion**, marking a **10.27%** increase from the previous year. The performance of Bangladesh's apparel exports in FY2022-23 surpassed the set target for the fiscal year by 0.41%. (BGMEA, 2023)

10.35%

Contribution to GDP, 2022-23

Source: Bangladesh Bank

2nd

Largest RMG Exporter, FY 2023

Source: BGMEA

150+

Export Destinations

Source: BGMEA

200+

LEED Certified Factories, Aug'23

Source: BGMEA

84.6%

Of Total Export Share, Aug'23

Source: Export Promotion Bureau

4Mn

Workers Employed in the Sector

Source: ILO, 2022

In comparison, the sector generated USD 42.61 billion in the preceding fiscal year of 2021-22. Woven and Knit have both been growing steadily, with Knit taking the larger share.

However, at present, the sector stands at a pivotal juncture, confronting both notable obstacles and prospects that will determine its forthcoming course.

Bangladesh's Manufacturing Landscape vs. Emerging Global Trends

Bangladesh's significant competitive edge lies in its lower production costs compared to India and other countries. For instance, producing a cotton shirt in the US costs around USD 7, while in India, it's approximately 50 cents. In Bangladesh, the cost is just **22 cents**, providing a substantial advantage.³

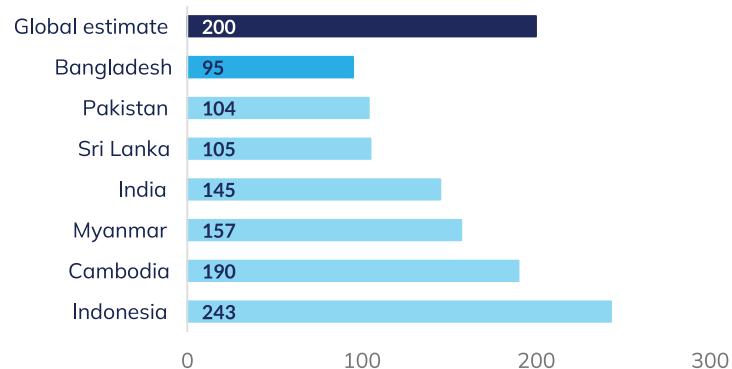
Similarly, according to McKinsey Apparel CPO Survey 2021, Chief Purchasing Officers were asked to rank countries for sourcing potential, based on ongoing trade-off between cost and stability versus speed and flexibility. Bangladesh and Vietnam remain the top choices, with **Bangladesh preferred by 25%** and Vietnam by 13%.⁴

In addition, global apparel sourcing has shifted towards '**fast fashion**' due to changing consumer behavior driven by social media. Brands respond to the desire for instant style gratification by rapidly introducing new collections, enabled by efficient supply chains and a focus on market trends.

Consumers, swayed by social media and influencers, constantly seek new styles, resulting in more frequent purchases of lower-cost items. McKinsey reports that **consumers now anticipate new collections every two weeks**.⁵

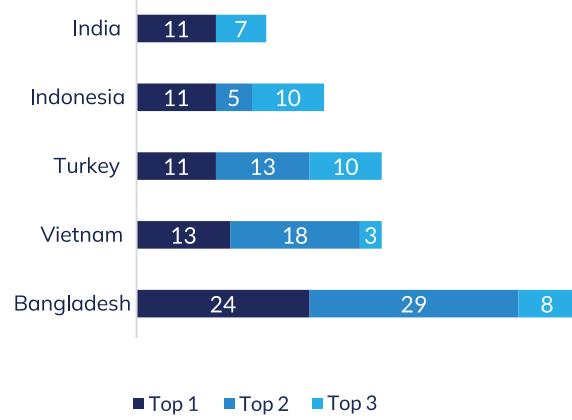
Thus, fast fashion relies heavily on efficient logistics and supply chains, with **nearshoring reducing lead times**.

Cost Competitive Basic Wage of Apparel Workers
(in USD)



Source: Statista, 2021

Future View of Apparel Sourcing Destinations



Source: McKinsey Apparel CPO Survey 2021



Figure: Transition of Global Fashion Trends in the last five decades

Emerging Global Trends - Continued

Nearshoring and climate-resilient production often align. Moving production closer to consumers **reduces transportation distances, lowering carbon footprints**. Side by side, it also aids in minimizing uncertainties within the supply chain when working in close proximity.

Recently it is gaining traction, which involves relocating operations closer to consumers, deviating from traditional offshoring practices. This shift is driven by the need for **faster delivery, reduced shipping times, cost concerns including tariffs, and improved control and quality oversight**. Kearney's Reshoring Index shows increased US nearshoring from Mexico and Latin America, enhancing lead times and responsiveness.⁶

Additionally, nearshoring may involve stricter environmental regulations in developed countries, promoting sustainability. Environmentally conscious consumers favor brands emphasizing sustainability and reduced transportation, making nearshoring a selling point.

In addition, reducing lead time is essential to meet customer expectations and stay in sync with rapidly evolving fast fashion trends.

These strategies offer cost optimization and responsible sustainability, essential in an era of immediate demand and climate change threats. Companies effectively integrating them can realize financial benefits and establish a resilient, sustainable business model. Furthermore, Green Deal initiatives in Europe also require a pivot towards more sustainable production practices.



Photos: Unsplash/ Ahmed Carter, Priscilla Du Preez



The World Economic Forum defines **Friendshoring** as a strategic response to supply chain challenges amid rising global tensions. It aims to enhance supply chain resilience by shifting operations to countries with shared values and similar economic and political systems. In the apparel industry, **Friendshoring is gaining traction, particularly among U.S fashion companies aiming for a more dependable and efficient supply chain, crucial in a fast-paced industry**.

Friendshoring also offers hope for Bangladesh, leveraging its strong global reputation for increased resilience amid changing global trends.

Due to global financial crisis and prolonged slowdown in the pace of trade leading to '**Slowbalization**' and protectionism, apparel companies are seeking diversification, looking for cost advantages and trade facilitations.

Nearshoring gains traction, with Southeast Asian countries like Vietnam and Cambodia emerging as alternatives due to **US sanctions, COVID restrictions, and currency fluctuations**.

Bangladesh faces a crossroads in a shifting global political climate, with trade tensions opening opportunities to expand its market share. **To seize the gap left by the US-China trade war, Bangladesh must invest in higher value-added products and product design**. However, it also confronts challenges, such as scrutiny of preferential trade agreements like the EU's Generalized Scheme of Preferences (GSP), contingent on labor and human rights standards. Thus, navigating these changes requires adept trade diplomacy.

Steps towards Sustainability & Circularity

According to Ellen MacArthur Foundation, textile waste is staggering, costing the global economy around **USD 500 billion** annually and causing significant environmental harm, emitting **1.2 billion tonnes** of CO₂ equivalent yearly, surpassing international flights and maritime shipping combined.⁷

In Bangladesh, wet treatment and dyeing section are highly water intensive. In a study conducted in 2016, it was found that 217 million cubic meters of wastewater was generated in the production of **1.80 million metric tonnes of fabric.**⁸

Side by side, according to IFC Partnership of Cleaner Textile (PaCT) wet processing consumes **300L of water** to manufacture each kg of fabric every year annually. The huge consumption of water has already begun causing depletion of groundwater. In a study on groundwater level data between 1980-2012, it showed that in Dhaka and Gazipur, groundwater level saw a steep decline in 2003 (with the mushrooming growth of textile industries in these areas).⁹

The PaCT study also estimates that the textile industry's water demand will grow three times that of domestic demand by 2030.

Thus, circular practices will offer hope for Bangladesh, focusing on regenerative product design and consumption to reduce waste and pollution in the apparel sector through recycling, upcycling, extended product lifespans, and resource efficiency.

Bangladesh, often referred to as the 'Garment Factory of the World', holds a unique position as the second-largest exporter of garments. The competitive dynamics between these global hubs and Bangladesh will be shaped by various factors including **labor costs, workforce size, trade policies, circularity, and innovation.**

The apparel sector in Bangladesh is grappling with a range of challenges. These include rising **labor costs, increasing competition from other low-cost countries, and the need to improve working conditions and environmental sustainability.**

The industry is also confronting the implications of **technological advancements and automation, which are reshaping the global apparel industry.**

The apparel sector must heed consumer trends with respect to lead time, along with the growing demand for ethical and sustainable products.

Transparency in production processes is also crucial. Consumers are increasingly willing to pay more for ethically made and environmentally sustainable items, as Forbes notes.

The forthcoming chapters will delve deeper into the pivotal factors shaping Bangladesh's apparel future.



Photo: The Asia Foundation/Fahad Kaizer



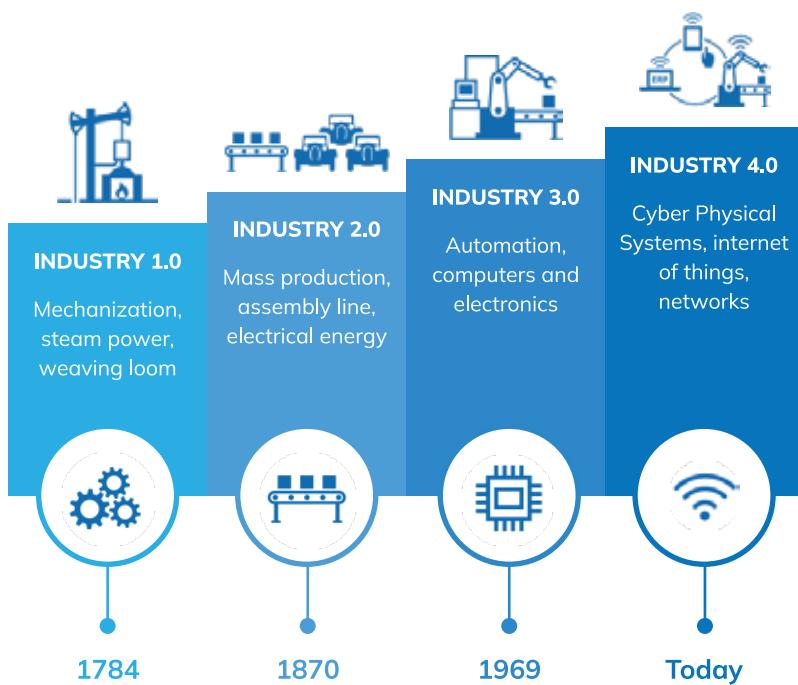
Significance of Automation

Exploring Automation in the
Manufacturing Process



Industry Shifts: (4IR)

Significance of the Industrial Revolutions in the Apparel Industry



Apparel production has evolved through industrial revolutions, from machinery in the 1700s to electricity-driven mass production. In the 20th century, Industry 3.0 introduced digital technology and automation, enhancing productivity and precision with Computer-aided design (CAD) and Computer-Aided Manufacturing (CAM) systems.

Automation drives 4th Industrial Revolution (4IR) tech adoption, reshaping the apparel industry. Robotics, IoT, AI, big data analytics, and 3D printing promise efficiency, sustainability, and competitiveness. 4IR in apparel can tackle industry challenges, streamline operations, and meet digital-age customer demands.

Mapping of Global Level of Automation Trends within the production Process¹⁰

Automation Level Across the Production Process		China	Vietnam	Bangladesh	India
Spinning		✓	✓	✓	✓
Weaving and Knitting		✓	✓	✓	✓
Dyeing and Printing		✓	✓	✓	✓
Textile Finishing		✓	✓	✓	✓
Fabric Inspection		✓	✓	✓	✓
Spreading and Cutting		✓	✓	✓	✓
Sewing		✓	✗	✗	✗
Spot Cleaning and Washing		✓	✓	✗	✓
Ironing		✗	✗		
Folding and Packing		✓	✓		

Legend: ✓ Automated & 4IR Integrated ✓ Automated ✗ Semi-Automated ■ Manual

4IR Revolutionizes Apparel

The Fourth Industrial Revolution (4IR) has brought about significant changes in the apparel industry, transforming traditional operational methods through the adoption of various applications such as **smart clothing, robotics, simulation, industrial Internet of Things (IoT), augmented reality, Machine-to-Machine (M2M) communication in knitting machines, smart factories, 3D printing, smart fabrics, and AI-infused Industrial ERP (enterprise resource planning)**. These innovations have enabled fashion companies to optimize manufacturing processes and enhance their efficiency significantly.

Impediments to efficient Apparel Production in Bangladesh

On the other side apparel manufacturing in Bangladesh faces challenges, primarily in transportation infrastructure and power supply. The Dhaka-Chittagong highway suffers from traffic congestion, leading to extended transport times in Chittagong port. The port handling most of the country's trade, operates beyond capacity and faces inefficiencies. Delays in sea freight handling resulting from the lack of a deep-sea port. Alternative transportation options offer limited facilities. Additionally, inadequate power supply and frequent interruptions disrupt operations, leading to increased production costs as factories rely on generators and independent power plants.¹¹

Since automation increases to encompass sewing, it is going to make less sense to carry the freight cost from Bangladesh and China, for countries like USA and EU. As Bangladesh's ports cannot accommodate a mother vessel, as a result, the country must route goods to and from Europe or the US via intermediary ports in Singapore, Colombo, or Malaysia.

Adoption of Industry-wide Technical Shift in Bangladesh

Based on primary research conducted by LCP and insights from industry experts, keeping a portion of the total production dedicated towards **high value** products will help factories transition towards new initiatives that will give them better value for their products. This will eventually allow them to invest in new automated equipment that will increase their competitiveness in the sector.

Sewing Machinery in Different Industrial Revolutions

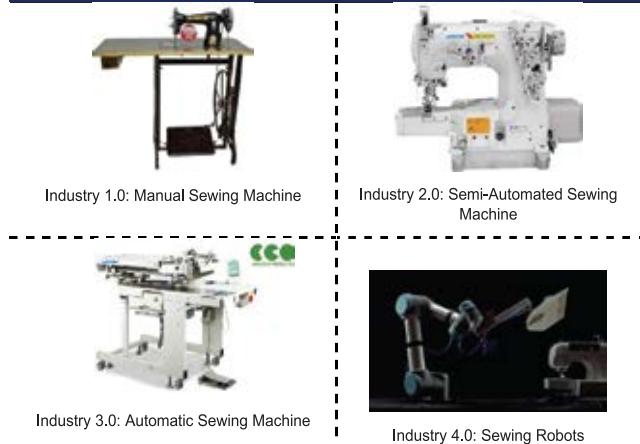


Figure: Sewing Machine from different Industrial Revolutions

Adding to the loading-unloading work and lead time. Shipping a product from Bangladesh to the US takes approximately **45 days**, and to Europe, **it takes around 35 days**.¹² A recent addition in 2022 that saw the beginning of direct shipment to Europe, Italy, Barcelona, and Rotterdam. The feeder vessels are directly carrying goods to Europe resulting in a reduction of shipping time by 20 days and reduce the cost over 30-40%. However, here the Matarbari deep seaport, expected to be launched by 2027 might be an even more vital addition.¹³

The upcoming Matarbari deep seaport in Cox's Bazar is expected to reduce shipping time by 23 days, significantly lowering export and import costs for Bangladesh's apparel industry.



Challenges to Automation Adoption and its Underlying Impact

Bangladesh's apparel industry competes globally with affordable and quality products, primarily due to competitive labor cost. However, it faces challenges in fast fashion due to longer lead times, forcing manufacturers to offer lower prices. Small and medium factories operate on slim margins, while larger ones can invest in new technology. Intense competition among manufacturers of small and medium factories have also eroded profit margins, transforming the industry into a fierce battle for survival. Key barriers to adoption in the industry value chain are as follows:

Financing & Importing of Equipments

The government's "SREUP" program aims to enhance RMG industry sustainability, but information gaps hinder financing. Transparency gaps in accounting practices of a few family-owned, small-scale factories creates challenges. Credit assessments rely on relationships, cash flow, and collateral. Complex documentation and limited bank capacity further complicate access to financing for automation and eco-friendly equipment. Additionally, tax incentives for bonded machinery reduce upfront costs, but bureaucratic hurdles hinder upgrades for factory owners with existing equipment.



Infrastructure & After-sales Support

Factory infrastructure, designed for older machinery, poses a challenge when adopting new automation and eco-friendly equipment that may require more space. Restructuring factories to accommodate these equipment can be a barrier to adoption.

Relying solely on automated machinery increases the risk of production delays due to breakdowns. Additionally, challenges in receiving after-sales service and importing necessary parts create time constraints. To ensure uninterrupted production in tight lead times, factories require standby operators.

Skills Development in Managerial Roles and Skills Migration

The industry is adopting automation, and workers are acquiring new skills for improved productivity. However, mid-level management roles are often filled by foreign workers due to their communication and adaptability skills. In Bangladesh, graduates lack these skills due to the disconnect between educational institutions and the industry.

In addition, workers receive training from external sources or factories, with factory training considered the most effective. However, the sector experiences significant worker migration during festival holidays, with turnover rates reaching 10%. This high turnover rate makes management hesitant to invest in skills development training, as they perceive limited impact due to frequent migration.



Photo: The Asia Foundation/Fahad Kaizer

State of Automation & Future Prospects

Bangladesh has adopted automation in its apparel industry but lags behind Vietnam and India. Textile production in Bangladesh is highly mechanized, from yarn production to fabric manufacturing (using machines like weft knitting, warp knitting, and electric handloom machines). Dyeing and finishing processes are also automated, enhancing the industry's backward linkage.

Automation in apparel production is evident in spreading, cutting, and sewing, with significant efficiency gains. Insights from Key Informant Interviews reveal that large factories have reduced manpower needs by 90% in spreading and cutting departments, utilizing automatic spreaders and laser cutters. Shape Shifter's AI in CAD machines further enhances efficiency, cutting fabric usage by 1.5% to 3% annually. However, smaller factories may lack the budget for such technology, and complexity varies by product. RFID and barcode tags improve transparency and prevent losses, with widespread adoption due to affordability and efficiency gains.

New overlock, flatlock, and lockstitch machinery, which require minimal investment, are now widely integrated across factories, reducing labor intensity in the sewing department. These machines can operate with just one operator, as they can automatically cut fabric and threads. Fully automated sewing machines are not yet widely adopted globally, making their use in Bangladesh unlikely. Advanced sewing mechanisms for collar, cuff, and flap making can reduce Standard Minute Value (SMV) by 1.57, saving on labor costs and reducing worker requirements.

Automation remains limited in Bangladesh's RMG manufacturing finishing department, where conventional steam irons and manual packaging are still prevalent. Automation in other departments has boosted productivity and turnover, leading to increased demand for workers in finishing, mostly from cutting, spreading, and sewing processes. Automation has not

displaced workers from the apparel industry but shifted them to labor-intensive production processes.

Aspirational Sweater & Denim industry

Bangladesh is the global denim export leader, with 40 mills generating USD 7 billion in exports in FY 2020-21, growing at a 15% annual rate.¹⁴ Denim production involves a woven twill process with indigo dyed and grey yarn interlacement, mainly using air jet loom machines. The process is similar to that of other fabric and garment production however, the dyeing of yarns and the chemical washing process of apparel plays a crucial role in the process. The sector is adopting water-efficient machineries to meet rapid global demand.

The global denim market is expected to reach USD 76 billion by 2026. Bangladesh is scaling up its production to meet the growing demand, currently at over 80 million yards annually, with increased investments in dyeing and washing facilities.¹⁵

On the other hand, Bangladesh's sweater industry, comprising 400 factories with automated knitting machines, achieved a USD 5.6 billion export value in FY 2021-22, marking 9.7% growth in six years. This growth is driven by China's declining presence in the market due to high labor costs and increased demand for sweaters due to climate extremities. Over the past decade, the industry shifted to automation to cope with changing demands, transitioning from piece-rate pay to salaried workers and achieving 100% (high) capacity utilization with a 4:1 machine-to-labor ratio.¹⁶ While Bangladesh primarily produces heavy-gauge sweaters using flat knitting machines, industry experts suggest that jacquard sweaters have a higher FOB due to their premium pricing, making Bangladesh well-positioned to capitalize on this category due to the fall in demand of sweaters from China.





Circularity and Sustainability

From Linear to Circular: Embracing Circularity for a Sustainable Future





According to United Nations, it is projected that the global population will reach 8.5 billion by 2030, and is forecasted to increase to 9.7 billion by 2050. Currently, an average person consumes approximately 68 garments annually (The Wall Street Journal, 2019), resulting in a staggering global consumption of 80 billion items. With this population growth, global garment production is estimated to increase by 63% by the year 2030. (Ellen MacArthur Foundation). This significant surge in production places immense strain on finite resources such as **fossil fuels used for polyester fibers, contributes to greenhouse gas emissions, demands substantial water for cotton production, and results in products taking up to 200 years to biodegrade**. Consequently, it is imperative to closely examine these issues and address their environmental impact.

The USD 2.4 billion fashion industry brings with it a significant carbon footprint, which if left unaddressed, will be disastrous for the future. Globally, the fashion industry carries a significant environmental burden, contributing to 2-8% of greenhouse gas emissions, generating 20% of global wastewater, and releasing 35% of microplastics into the ocean. A major proportion of these emissions occurs during raw material sourcing, production, and processing. Furthermore, the industry annually consumes over **98 million tonnes of non-renewable resources**. This number is expected to rise, given the increasing preference for manmade fibers, particularly polyester polymers, which now make up 72% of global textile production. (Ellen MacArthur Foundation)¹⁷

Material Usage in Garment Industry

113 Million Tonnes
of fibers produced in 2021

98 Million Tonnes
of non renewables used

8.9%
from recycled fibers, mostly polyester from plastic

Industry Responsible for

~ 2 Billion Tonnes
of GHG Emissions

20%
of global industrial water pollution

35%
of microplastics in Oceans

Figure: Materials used globally and the impact¹⁷

Carbon Footprint in the Apparel Sector

According to the Ellen MacArthur Foundation, the fashion industry consumes 93 billion cubic meters of water annually during production, which could meet the water needs of over five million people. Unfortunately, inefficiencies persist in post-production use as well. A staggering 87% of the fibers used end up either incinerated or in landfills, resulting in a loss of USD 500 billion worth of potential value that could have been reused or recycled.¹⁸

While recycled yarns are gaining popularity, they still account for only 8.9% of all raw materials used. This indicates that virgin raw materials continue to dominate, intensifying the pressure on finite resources and exacerbating the industry's environmental impact.¹⁸

Beyond these alarming statistics, it's crucial to highlight the rapid acceleration of textile consumption worldwide. In just two decades, global garment production has nearly doubled, surging from 50 billion to meet the

demands of consumers, who are now purchasing 60% more clothing than before. This surge in consumption is driven by increasing economic prosperity, higher purchasing power, and a growing trend toward shorter-use cycles for new clothing.

If this consumption trend persists, global apparel consumption is projected to reach a staggering **102 billion items by 2030**, which would result in a 50% increase in greenhouse gas emissions according to the Ellen MacArthur Foundation. To effectively address the climate impact of the fashion industry, it is imperative to focus on reducing waste and enhancing efficiency throughout the entire value chain. Efforts to make the industry leaner and more sustainable at every stage is essential in mitigating its environmental footprint. Given the sheer size of the textile industry in the country, the industry's impact on environment have rippling affects future of resource availability and livelihoods.

Global Material Usage & Climate Impact

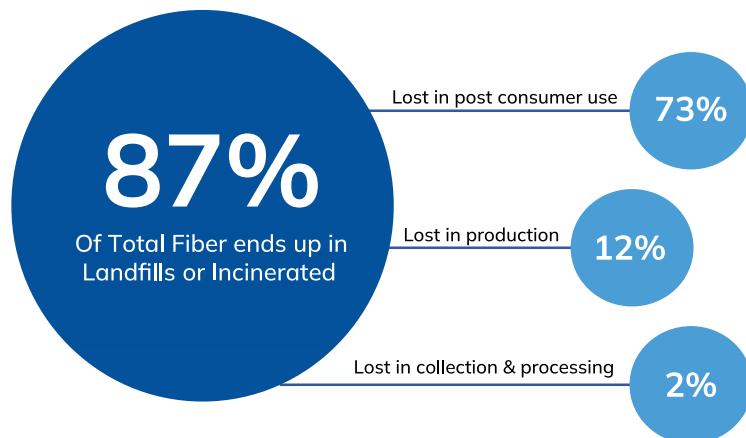


Figure: Environmental impact and wastage incurred, Ellen MacArthur Foundation



Waste in the Value Chain

Before looking at possible ways to become more efficient and sustainable across the value chain, it is important to dissect the kind and type of wastage occurring throughout the chain. Textile wastes are generally of two major kinds: pre-consumer/post industrial waste and post-consumer waste.

Pre-consumer Textile Waste:

Pre-consumer waste, also known as production or post-industrial waste, arises during the manufacturing process. It includes scraps, leftover fabrics, garments, and various other materials. Despite recent technological advancements, the adoption of waste reduction measures remains uneven.

- ▶ Globally, approximately 15% of fabrics are cut and discarded, but Industry 4.0 technologies are reducing this figure.
- ▶ In Bangladesh, it's estimated that around 9.5% of waste occurs during the cotton-to-yarn-to-fabric process.
- ▶ Leftover waste varies in form, from yarns and scraps to roll ends and rejected pieces, constituting up to 47% in some cases, totalling at least 500,000 tonnes annually.¹⁹
- ▶ Bangladesh's import calculations use wastage percentages of 27% for basic items, 30% for specialized items, and 4% for sweaters and socks.²⁰
- ▶ The manufacturing process, particularly dyeing, contributes to pollution, necessitating wastewater treatment.
- ▶ Experts advocate for a focus on reducing human errors in various stages, such as design sampling, cutting, and sewing, emphasizing the "Reduce" aspect of the 3Rs (Reduce, Reuse, Recycle).

Post-consumer Textile Waste:

Post-consumer waste originates from consumers discarding worn-out, damaged, or outdated clothing. Approximately 66% of post-consumer textile waste ends up in landfills, while the rest is incinerated or recycled.

- ▶ Brands are implementing re-commerce programs, accepting used clothes for store credits and recycling them into new collections.
- ▶ Consumer surveys indicate a growing interest in recycling, eco-friendly packaging, and spending on sustainable products.
- ▶ Consumer choices include donating to charity, discarding in landfills, participating in resell or swap programs, or joining take-back programs by specific brands.
- ▶ In Africa, imported second-hand clothing significantly contributes to the clothing market, with local importers reselling bales in second-hand clothing markets.
- ▶ Efforts to ban second-hand clothing imports have faced challenges due to employment opportunities provided by the industry.
- ▶ Recycling industries have grown alongside imports of second-hand clothing in countries like Pakistan.



Addressing textile waste in the fashion industry is essential to reduce its environmental impact. To combat this issue effectively, the industry must prioritize waste reduction and innovative recycling methods while fostering consumer participation in recycling initiatives. The challenge also lies in combating fast fashion trends that contribute to the problem of textile waste.

Towards Circularity: A Climate Imperative Business Case

As an antidote to fast fashion, circular economy is being popularized as a mechanism for sustainable production. This model prioritizes recycling, reusing, and recovering materials across the production and consumption process, operating at multiple levels.

Circular systems create a chain of extended life-cycle of apparel products, allowing raw materials to be reintegrated and reused in production, thus extending their useful lifespan. While this may not achieve a 100% elimination of waste, it substantially reduces the premature disposal of materials in landfills. The adoption of circular principles can span the entire fashion industry value chain, from design to production, consumer use, end-of-life, and material recycling. According to the Ellen MacArthur Foundation, a leading advocate for circularity, this approach addresses global challenges like climate change, biodiversity loss, waste, and pollution. Its core principles are to eliminate waste and pollution, circulate products and materials, and regenerate nature.

- ▶ Circularity promotes designing materials and methods that promote prolonged use, reusability, recyclability, and biodegradability is essential.
- ▶ Circular production processes aim for a low carbon footprint, high efficiency, low energy intensity, and minimal toxic material release.
- ▶ Solutions must enhance transparency in the supply chain is crucial, prompting new regulations emphasizing product traceability.
- ▶ However, the challenge is to find solutions that are not resource-intensive, do not require heavy infrastructural investments, are scalable, and produce products that are both comfortable and quickly biodegradable.

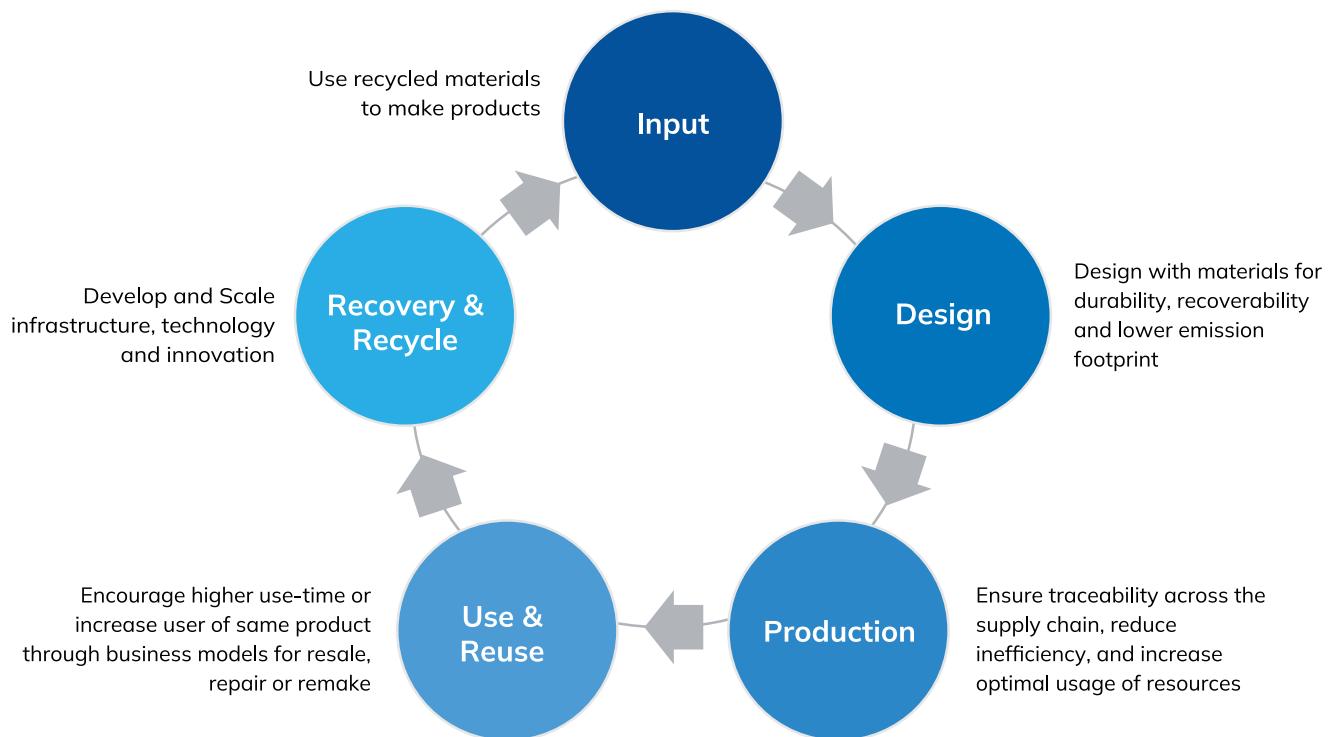


Figure: Levers for Circular Apparel System

Circularity in Bangladesh

Bangladesh must aim to position itself as a sustainable sourcing destination to remain competitive post-LDC (Least Developed Country) graduation. Increased global competition post-GSP (Generalized System of Preferences) phase-out necessitates adding greater value for brands. Circular practices, focused on recycling, traceability, and sustainability, can enhance the value offered to brands by manufacturers. By embracing

circularity, the industry can prepare itself for upcoming environmental regulations and reduce dependency on imports. This can be attributed to manufacturers being increasingly inclined toward green initiatives, as sustainability enhances their negotiating position with brands. Going circular is not only economically beneficial but also morally and environmentally imperative.

Leading in LEED Certification:

- ▶ LEED (Leadership in Energy and Environmental Design) certification for environmentally sustainable building designs is gaining traction in Bangladesh.
- ▶ Bangladesh holds the world record with more than 200 LEED-certified green factories, primarily in the apparel sector, and 500 more in the certification pipeline.
- ▶ While LEED certification adds value by attracting more significant volumes of orders and repeat business, it has limited impact on unit price negotiations with brands.
- ▶ Future competitiveness requires a broader sustainability focus beyond LEED certification due to upcoming European environmental regulations.

Established Market for Textile Waste:

- ▶ Recycling of cotton scraps and post-industrial waste into fibers and yarns is gradually gaining momentum.
- ▶ The textile waste export market in Bangladesh was valued at USD 116 million in 2023.²¹
- ▶ Approximately 60% of textile waste is exported, primarily to India and China.
- ▶ Bangladesh imports raw materials, such as staple cotton fiber, valued at USD 3.5 billion, while simultaneously exporting high-quality cotton scraps.
- ▶ Recycling companies in Bangladesh have been growing in number over the last five years, with a notable success story being CYCLO by Simco Spinning and Textile Ltd.
- ▶ The success of Simco has inspired initiatives like the Circular Fashion Partnership Project, which tracks textile waste from manufacturers and connects them with recyclers.
- ▶ By successfully trading textile waste, manufacturers can earn higher value for their waste, creating a strong business case for circularity.





Worker Wellbeing

Enabling Basic Human Rights for
the Heart of the Industry



Apparel Sector's Impact on the Wellbeing of Workers

The apparel industry is at the forefront of major global challenges when it comes to sustainability and worker wellbeing. Tasks are generally distributed based on gender in Bangladesh's garments sector and most of the working circumstances for women employees are determined by this. The sewing department mostly consists of women, whereas males predominantly work in the cutting, ironing, and finishing departments. Most

typically, women work as helpers, machinists, and less frequently, as line supervisors and quality controllers. Female cutting masters can hardly be seen in the garments sector of Bangladesh. Majority of managers and administrative positions are held by males. There have been instances that access to management positions and higher-paying white collar jobs is discriminated against for women.

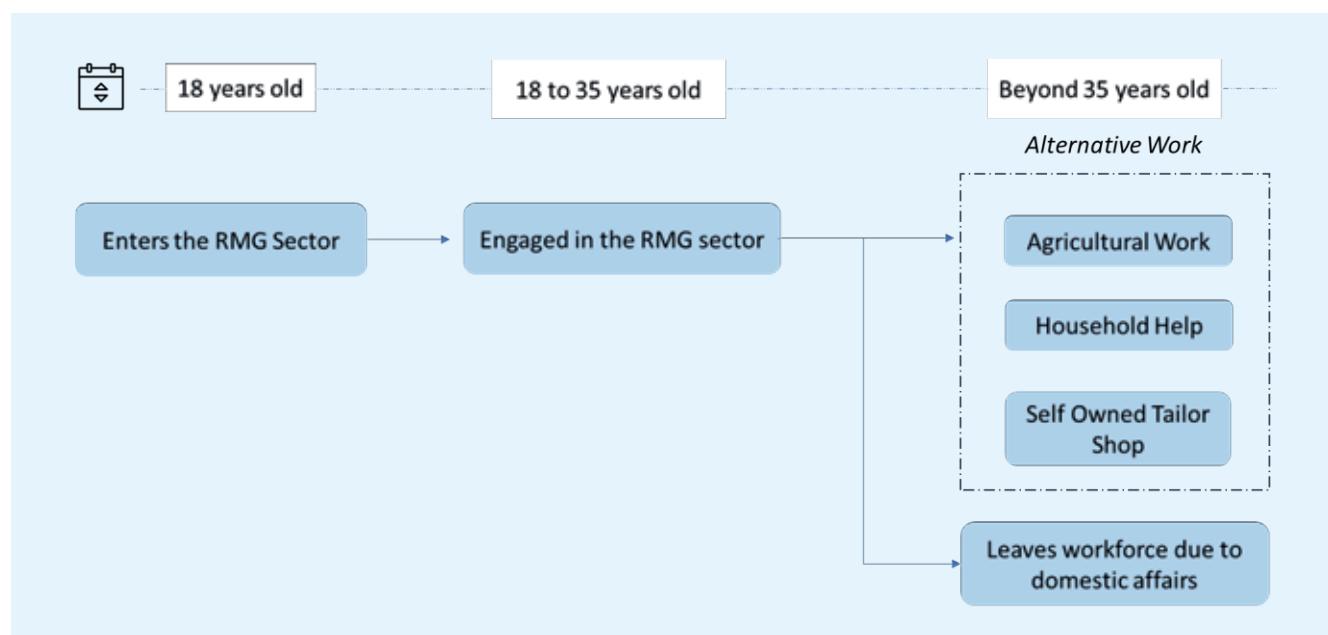


Figure: Life Mapping of Apparel Workers

A recent study by Awaj Foundation and Karmajibi Nari found that the total average working experience for garment workers, especially women, was approximately 4.96 years. The rigorous nature of such work often results in employees experiencing persistent health issues in the long run and a decrease in productivity as they grow

older. Furthermore, once these garment workers retire at the early age of 35, they often go back to taking up jobs such as household help, sweeper, cleaner, etc. Some female employees who have accumulated significant sewing and cutting skills open their own tailor businesses in their vicinity.

Factors of Vulnerability

During work:

- Working conditions
- Living wage
- Healthcare
- Childcare
- Financial Inclusion
- Upskilling

After Retirement:

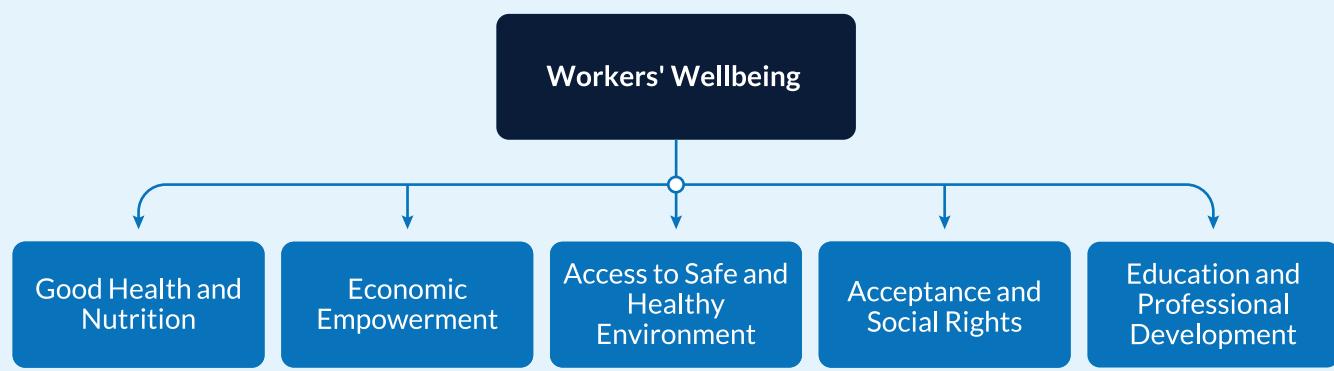
- Socio-economic vulnerability
- Lack of savings and retirement benefits
- Health insurance, pension schemes
- Difficult transition to less labor-intensive sector

Wellbeing Factors: Enabling the Basic Human Rights

A study by McKinsey indicates that around one-fifth of the global workforce will be affected by the adoption of AI and automation, which could potentially replace the need for low-cost labor with increased accuracy and efficiency. To address this, upskilling and reskilling of the existing workforce are crucial.

While international buyers prioritize safe working conditions, fair wages, no forced or child labor, social and environmental sustainability, and a favorable business environment, workers in Bangladesh's garment industry prioritize fair wages, timely bonuses, a safe working environment, overtime pay, and job security.

5 Factors of Wellbeing According to Levi Strauss Foundation's Study in Bangladesh



Food and Sanitation

According to a study conducted by GAIN (Global Alliance for Improved Nutrition), approximately 43% of women apparel sector workers in Bangladesh suffer from malnutrition. Ensuring proper nutrition for workers can lead to a significant increase in productivity, with experts estimating a potential productivity boost of up to 20%.

A survey conducted in 2020 revealed that a significant percentage of women workers still rely on cloth instead of sanitary napkins during menstruation due to poor access and societal pressures. Lack of proper handling and availability of quality healthcare products, including sanitary pads, at affordable prices further exacerbates the problem.

Healthcare and Accommodation

A survey conducted by Oxfam Australia highlighted that a considerable percentage of apparel sector workers in Bangladesh cannot afford proper medical treatment when they fall ill.

Addressing the healthcare needs of RMG workers is crucial not only for their wellbeing but also for improving overall productivity and reducing absenteeism in the workplace.

According to a study by CPD Bangladesh, between 2013 and 2018, the overall cost of living for these workers rose by 86%, with food costs increasing by 56.8% and non-food costs increasing by 115.4%. Despite the introduction of a housing allowance under the new wage scale, the average rent for a two-bedroom unit in most industrial clusters exceeds the allowance.

Inclusivity and Social Empowerment

Inclusivity and Equality

A joint study conducted by the International Labour Organization (ILO) and UN Women focused on the gender composition and experiences of RMG workers in Bangladesh. The study found that women are underrepresented in leadership positions, indicating the need for further progress in advancing gender equality. Women managers often possess higher qualifications, suggesting that they may have to work harder and pursue higher education compared to men. However, gender stereotypes and biases may still play a role in the selection of men for managerial positions, despite women's qualifications.

A study conducted by Oxfam in 2019 revealed that no garment workers in Bangladesh and only 1% of garment

workers in Vietnam earned a living wage. This disparity in wages affects women workers disproportionately, as they are more susceptible to sexual abuse due to their fear of reporting misconduct and risking the loss of income. Oxfam reported that 1 in 4 Bangladeshi garment workers disclosed some form of abuse.

Studies have shown that workplaces that support employees with mental disorders are more likely to experience economic benefits such as decreased absenteeism and increased productivity. In Bangladesh, however, the allocation of the health budget for mental health is disproportionately low, with only about 0.5% of the total health budget allocated to mental health in 2020.

Equality & Inclusivity

	Causes Impeding Progress	Possible Way Forward
 Career Progression	Societal norms and industry structure hampering women's career progress	Accessible and affordable accommodation by government within industry vicinity
 Transparent Compensation	Industry structure and labor laws implementation - disparity in experience and compensation	Livable wages and proper commensuration for experience
 Support for Parents	Lack of industry structure and labor laws implementation	Better access to support system for pregnant workers
 Mental Health Support	Social norms and healthcare structure that make it inconvenient to seek support	Access to support system for mental health
 Workplace Safety	Industry structure and weak implementation of labor standards	Strengthening Labor Standards implementation Training on Managerial skill set

Source: LCP Primary Research

Inclusivity and Equality

Basic Human Rights

	Causes Impeding Progress	Possible Way Forward
Nutrition	Inflation causing rise in food prices, thus reducing affordability of protein and fruits for workers	Fair price shops, increased wages, better access to fresh ingredients
Access to WASH	Inflation and rising prices of raw materials due to global upheaval, affecting affordability	Possible tax breaks for raw materials of hygiene products, improve access, and spur local innovations
Healthcare	Inflation causing decreased incentive to spend on healthcare unless urgent.	Microinsurance for workers through tripartite participation - workers, owners & government, in premium payments
Education	Industry practice of long hours of menial work, leading to various health causes	Accessible and affordable quality healthcare facilities within industry vicinity
Accommodation	Rise in commodity prices, thus decreasing spending on children's education	Accessible and affordable quality education facilities for children of workers within industry vicinity
	Poverty forcing early joining in the workforce, rather than completion of work	Accessible and affordable quality education & training facilities for workers within industry vicinity
	Rapid and unplanned urbanization and industrialization, reducing livable spaces for workers	Accessible and affordable accommodation by government within industry vicinity
		Access to clean water, cooking fuel and electricity for settlements through innovative ways and partnerships

Social & Economic Empowerment

	Causes Impeding Progress	Possible Way Forward
Child Rights Protection	Industry Structure and loose implementation of provision for child care spaces	Capacity building initiatives for child care spaces
Job Security	Weak implementation of labor laws and employment contracts	Initiatives to reduce job vulnerability Initiatives to improve entrepreneurial skills of out of work garment workers
Financial Inclusion	Social norms, lack of awareness and easy access to financial services	Tagging financial institutions with MFS and improving range of services. Better digital financial literacy.
Legal Counselling	Social norms and industry structure aiding workplace violence with no access to complaints	Access to complaint cell for sexual abuse, discrimination and legal counselling
Personal & Professional Development	Automation and lack of updated training institutions	Access to upskilling and reskilling programs for workers with updated modules

Source: LCP Primary Research

Reskilling

Emerging Occupations in the Apparel Industry

Occupation	Description	Areas of application
Computer aided professionals in planning and inspection	Applications and software to integrate designs and patterns into the system and perform quality inspection	Usage of CAD and CAM in marking, spreading, and cutting process Statistical process of garments inspection
Automated inspection and material device handler	Inspection of components and handling of cut fabrics	Fabric cutting and patterning
Neural network expert	Computer based process of biological neural networks	Used in overall garment and retail supply chain management
Robot operator and numerical controller	Robots used to handle fabric and numerical controllers used to perform sewing operations	Sewing operations and handling
Automatic fusing and pressing machine operator	Automatic machines that can control temperature and steam in the ironing process	Ironing
ERP expert	Integrating the entire production process through software	The entire production from of the product from fabric storage to retail

The typical tenure of a woman working in an apparel factory ranges from 18 years of age to 35 years of age. However, the lack of proficiency in adjusting to new machinery and the absence of soft skills pose significant obstacles for women in attaining supervisory positions. To address this, training institutes should incorporate soft skills training into their curriculum, enabling women to acquire the necessary skills for career advancement and better wages.

As factories continue to upgrade their technological infrastructure, the demand for cost competitive labor from unskilled women garment workers diminishes.

Adapting to the new era of automated machinery poses a psychological challenge, and while efforts can be made to foster a sustainable work environment, it remains challenging to make all workers fully comfortable and proficient in operating automated machinery instead of manual equipment.

Automation will not necessarily move workers out of the system. New opportunities will emerge within the sector and the demand for multi-skilled, skilled, technical professionals and expert individuals will rise. Bangladesh will remain competitive in the market through sustainable growth within its workforce and the only way forwards is to facilitate upskilling and reskilling programs as needed.





Policy Implications and Regulatory Landscape

Policies Shaping Bangladesh's Apparel Sector

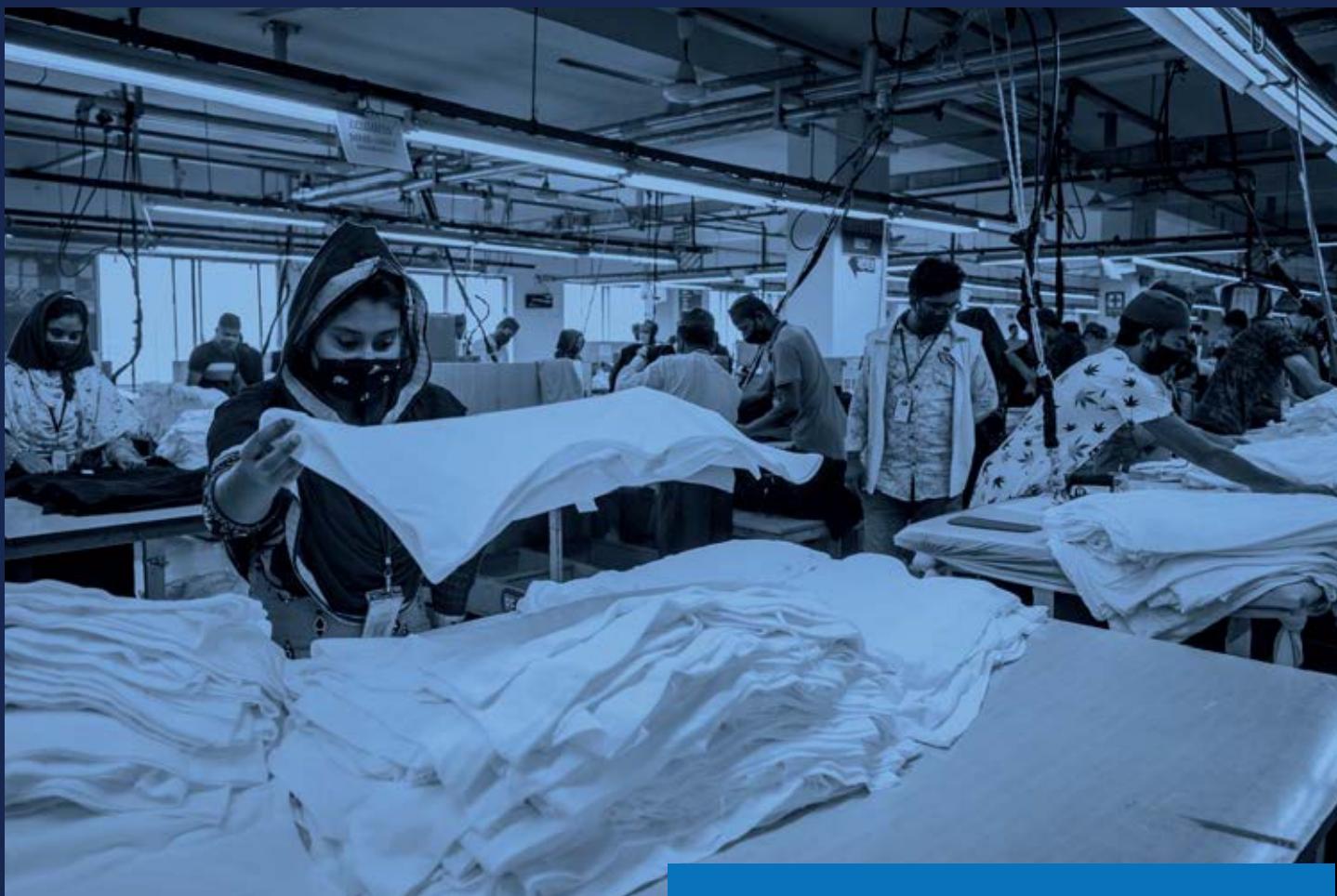


Photo: The Asia Foundation/Fahad Kaiser

Policy Implications

Existing Policies Influencing the Apparel Sector in Bangladesh

Policy Area	Initiatives	Impact on the Sector
Fiscal Incentives	<ul style="list-style-type: none"> ■ Reduced Corporate Tax Rates: RMG factories with green building certification enjoy a 10% tax rate, while those without it pay 12%. ■ Import Bonded Warehouse: Allows 100% export-oriented garment factories to import materials duty-free. ■ Duty Drawback and Cash Subsidy: Reimbursement of duty fees and taxes on imported goods for 100% export-oriented garment factories. ■ Cash Incentives: Cash subsidies for export-oriented garment sectors with local value addition. ■ Back-to-Back L/C: Facility for export-oriented garment industries. 	<p>These fiscal incentives have significantly reduced the tax burden on garment factories, making them more competitive. The bonded warehouse system has streamlined material imports, reducing production delays. Duty drawback and cash subsidies boost profitability. Back-to-Back L/C facilitates compliance and financing, supporting growth.</p>
Childcare Policy	<ul style="list-style-type: none"> ■ The Bangladesh Labour Act of 2006 requires establishments with 40+ women workers to provide suitable childcare rooms. ■ Consent for night work from women workers. ■ Protection of pregnant workers from hazardous work. ■ Supportive environment for lactation after childbirth. ■ Initiatives to improve childcare facilities. 	<p>These policies have promoted the inclusion of women workers by addressing their childcare needs, reducing turnover rates. However, there are still scope of improvement by ensuring safety for pregnant workers enhances workforce stability. Initiatives can be further improved for the overall work environment of women workers.</p>
Nutrition Policy	<ul style="list-style-type: none"> ■ National Nutrition Policy aims to ensure proper nutrition for the population. ■ Programs like Nutrition of Working Women (NoWW) to provide nutritional support to women garment workers. 	<p>Improved nutrition enhances the health and productivity of RMG workers, reducing absenteeism. The NoWW program directly benefits women garment workers, addressing health issues and boosting overall wellbeing.</p>
Worker Wellbeing Policy	<ul style="list-style-type: none"> ■ Bangladesh Labor Act 2015 safeguards workers' rights, including gratuity, Provident Fund, and compensation for workplace injuries. ■ Prohibition of child labor. ■ Occupational health and safety measures. ■ Worker's Compensation for workplace incidents. 	<p>These policies have enhanced the overall wellbeing and safety of workers, improved job satisfaction and reducing disputes. Prohibition of child labor aligns with international labor standards, improving the industry's image.</p>

Policy Area	Initiatives	Impact on the Sector
Skills Development Policy	<ul style="list-style-type: none"> ■ Training programs for RMG workers. ■ Emphasis on skill development through various policies and initiatives. ■ Support from the Finance Division through the Skills for Employment Investment Program (SEIP). 	Skill development programs have increased the expertise of RMG workers, improving product quality and efficiency. Support from SEIP has facilitated access to training, benefiting both workers and employers.
Environmental Policies	<ul style="list-style-type: none"> ■ Focus on environmentally friendly industrial waste management. ■ Promotion of EIA and Effluent Treatment Plants. ■ Incentives for waste management industries. ■ Encouragement of the 3R strategy. ■ Green Factory Initiative for eco-friendly factories. ■ Green Factory Awards for compliance with environmental standards. 	These policies have driven sustainability efforts in the sector, reducing its environmental impact. The Green Factory Initiative has encouraged eco-friendly practices, making the sector more appealing to eco-conscious consumers and brands. However, the green financing budget is not adequate to accommodate renewable energy sources. Waste taxation policy, standardizing EIA, and strengthening ETP oversight are some of the avenues requiring exploration.

Policy Implications

International Policies Influencing the Apparel Sector in Bangladesh

Policy Area	Policy Implications	Impact on the Sector
Least Developed Country (LDC) Graduation	<p>Bangladesh, classified as an LDC by the United Nations since 1975, benefits from trade advantages such as the EU's Everything But Arms (EBA) initiative, which grants duty-free and quota-free access for LDC exports, significantly boosting its apparel exports to the EU.</p> <p>While it was originally set to graduate from LDC status by 2024, the COVID pandemic has delayed this to November 26, 2026. Bangladesh's LDC status facilitated its inclusion in GSP facilities.</p>	<p>The Generalized System of Preferences (GSP) from countries like the EU and Canada has given Bangladesh preferential market access, boosting exports, especially in apparel. Bangladesh receives GSP facilities from 38 countries, including 27 in the EU and 11 others: UK, Australia, Belarus, Kazakhstan, Canada, Liechtenstein, Japan, New Zealand, Norway, Russia, Switzerland, and Turkey. The EU's GSP scheme, "Everything but Arms (EBA)", provides duty-free access for the 50 least developed countries, covering 99% of tariff lines, except arms and ammunition. Bangladesh also enjoys similar benefits from Japan, Australia, Canada, New Zealand, Norway, Switzerland, as well as Duty Free Quota Free (DFQF) facilities in developing economies like Chile, China, India, Turkey, and South Korea.</p> <p>When Bangladesh graduates from LDC in 2026, trade benefits associated with LDCs will end immediately in nations including Canada, China, and Japan. But the EU (and the UK) are expected to extend a three-year grace period, giving EBA trade facilities up until 2029.</p>

Policy Implications

International Policies Influencing the Apparel Sector in Bangladesh

Policy Area	Initiatives	Impact on the Sector
GSP+ Scheme	The GSP+ scheme, aimed at helping vulnerable developing countries like Bangladesh, provides full tariff elimination on over 66% of EU tariff lines. Bangladesh must ratify 32 international conventions and meet EU-defined 'vulnerability' criteria to qualify.	As of June 2022, Bangladesh has ratified 20 conventions and acceded to 12. Meeting these requirements involves amending labor laws, eradicating child labor, registering trade unions, and clearing labor law case backlogs to be eligible for GSP+.
Double Taxation Agreements (DTAs)	Double Taxation Treaties (DTTs) are agreements between two countries that prevent foreign investors' income from being taxed in both nations simultaneously, replacing it with zero or reduced tax in one of the countries	Bangladesh has established such treaties, known as DTTs, with a total of 36 countries. This encourages foreign investment and trade by reducing the tax burden on exporters, liaison offices, investors.
Regional Trade Agreements (RTAs)	Bangladesh is a member of the South Asian Free Trade Area (SAFTA) and the Asia-Pacific Trade Agreement (APTA), which have helped increase regional trade.	Bangladesh is exploring the possibility of joining the Association of Southeast Asian Nations (ASEAN), which could further boost its exports.
South Asian Free Trade Area	South Asian Free Trade Area was established in 2004 at the 12th SAARC Summit among the member states Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan & Sri Lanka.	The Agreement has scope for a sensitive list for each country, which are not subject to tariff reduction program. Bangladesh, India and Nepal maintain different sensitive lists for LDCs and Non-LDCs.
Bilateral Engagements	Bangladesh has engaged in numerous bilateral trade agreements that have facilitated its export growth. For instance, the Bangladesh-India bilateral trade agreement has allowed duty-free access to the Indian market for Bangladeshi products. In November 2013, USA and Bangladesh signed the Trade and Investment Cooperation Forum Agreement (TICFA) to bolster bilateral trade and investment.	This has enabled the rapid growth of trade between the countries, that has a large share in apparel export. Prior to this, Bangladesh had lost the GSP facilities in USA due to failure to improve working conditions in the country. However, this GSP did not cover duty free access for apparel to begin with, hence it had very little impact on export loss for Bangladesh

Policy Area	Initiatives	Impact on the Sector
EU's Due Diligence Act	HREDD: Introduced in March 2021, this legislation promotes responsible and sustainable business practices, including fair supply chain treatment and environmental impact reduction. It applies to major EU and non-EU companies operating within the EU, based on criteria like employee count and worldwide turnover. Initially, it targeted very large companies with 1,000+ employees and €300 million+ turnover, but the European law now covers companies with 250+ employees and over €40 million worldwide turnover.	The directive makes large corporations accountable for human rights and environmental damage, including that of subsidiaries and associates, with fines and legal responsibility for breaches. It also requires alignment with the Paris Agreement. Amendments enacted on June 1, 2023, mandate comprehensive assessments to identify and address adverse effects on human rights and the environment. It includes a union-wide assessment considering social, political, and environmental supply chain risks.
The Carbon Border Adjustment Mechanism (CBAM)	A groundbreaking policy initiative proposed by the European Union, to prevent "carbon leakage", a scenario where companies transfer their operations to countries with less stringent carbon regulations, thereby undermining the EU's ambitious climate goals.	The CBAM will enter into force in October 2023, but it will be applicable to import only certain goods in the beginning. The mechanism is seen as a tool to encourage other nations to adopt robust carbon pricing policies. By imposing a carbon cost on imports, countries outside the EU might be motivated to implement their own carbon pricing systems, allowing their exporters to avoid the CBAM charges. Even though at this point there is no provision for CBAM to be applied to apparel sector, it might soon be the case, driving prices high for Bangladesh's export.
Intellectual Property	The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIP) Agreement: Mandates patent protection for inventions in all sectors, ensuring accessibility and non-discrimination. WTO's TRIPS Council extended the transition period for Least Developed Countries (LDCs) to 2034 on June 29, 2021.	For the upcoming GSP+ facilities and FTA's, it is essential that Bangladesh get better at protecting IP rights. Even to implement IPR after 2026, the country has to work towards setting up proper infrastructure to address protection, patent, copyrights. Earlier in 2023, United States Trade Representative (USTR) started a Special 301 Review on IPR (intellectual property rights) Protection and Enforcement after complaints were raised about Bangladesh exporting counterfeit products.

Policies and Schemes that Aided the Apparel Sector

International Policies Influencing the Apparel Sector in Different Countries

	Reform Policies	Government Incentives and Subsidies	Development Facilities	Foreign Direct Investments (FDI)	Free Trade Agreements	Value Building Initiative
Vietnam	Doi Moi policy, 1986 Enterprise Laws of 2000 and 2005	Low entry barriers Friendly Employment Laws Fiscal and investment incentives (ex. zero duty on import of capital machinery) Preferential tax rates and tax holidays	Economic Zone Investment Incentives- 2 to 4 years of tax exemption and 4 to 9 years of 50% reduction on payable CIT.	Law on Foreign Investment in 1987 (Amended in 1990 and 1992)- leading to high FDI inflow.	Signatory to 18 active bilateral and multilateral FTAs.	Vietnam Textile and Garment Industry Development Strategy to 2030. Vietnam National Brand (Vietnam Value) Programme for the period 2020-2030
India	National Textile Policy 2000	Amended Technology Upgradation Fund Scheme for textiles industry (ATUFS) in 2016- capital subsidy program. Corporate tax rate stands at 17% with no Minimum Alternate Tax (MAT) payment requirement. A 3% interest subsidy is provided on both Pre- and Post-Shipment Rupee Export Credit for (MSMEs), while Non-MSMEs and Merchant Exporters receive a 2% interest subsidy until 2024.	Scheme for Integrated Textile Parks (SITP) in 2005- offers assistance for the development of facilities. The 'Scheme for Capacity Building in Textile Sector (SCBTS) in 2017- skill development opportunities. Scheme for Capacity Building in Textile Sector (SAMARTH) until 2024.	Law on Foreign Investment in 1987 (Amended in 1990 and 1992)- leading to high FDI inflow.	Signatory to 18 active bilateral and multilateral FTAs.	Vietnam Textile and Garment Industry Development Strategy to 2030. Vietnam National Brand (Vietnam Value) Programme for the period 2020-2030

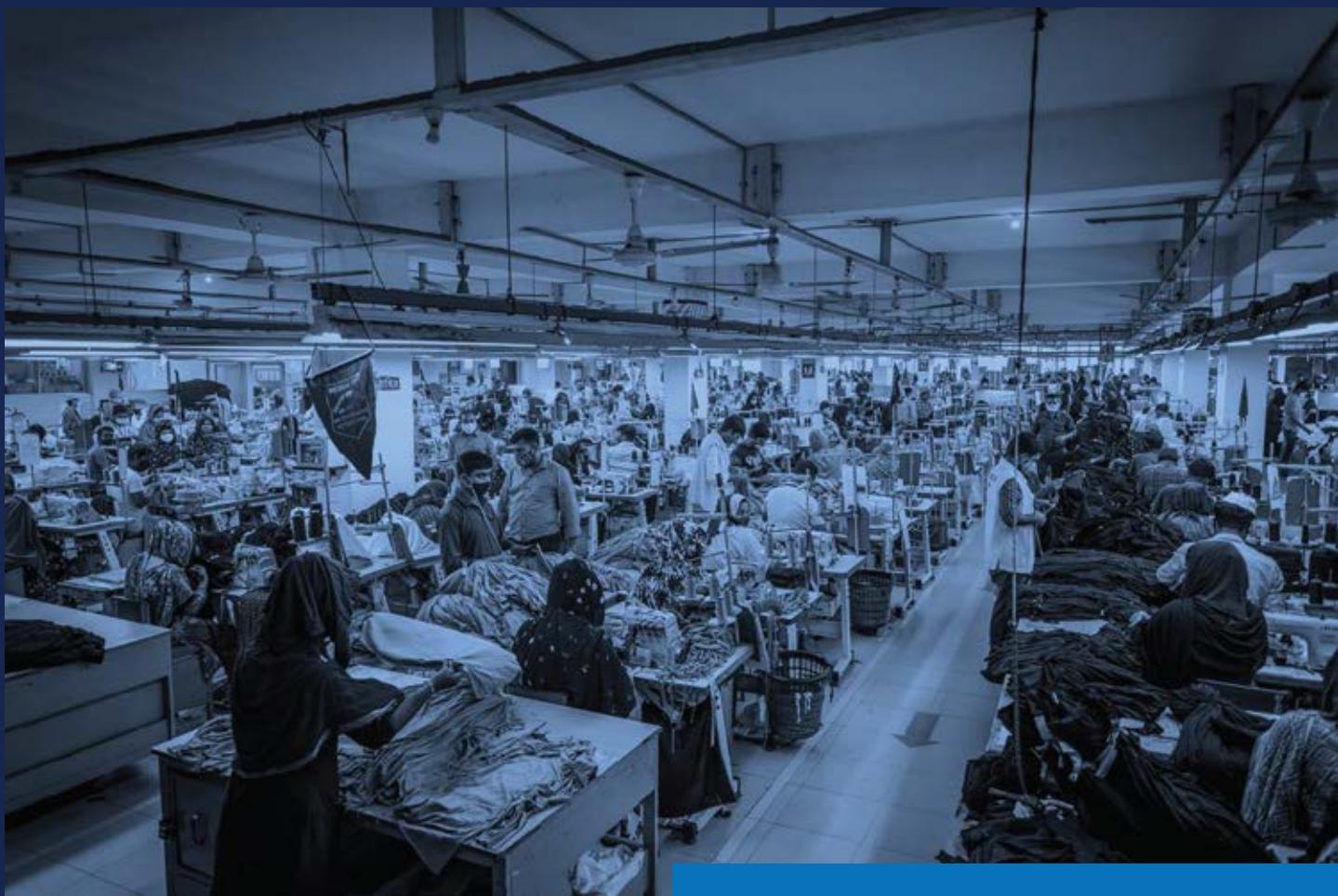
	Reform Policies	Government Incentives and Subsidies	Development Facilities	Foreign Direct Investments (FDI)	Free Trade Agreements	Value Building Initiative
China	Economic reform and opening-up policy introduced in the late 1970s. End of textile quotas in 1990s	Special Fund to Support the Restructuring of the Textiles Industry and the Efforts of Chinese Textile Companies to "Go Global" (ex, subsidies for investment in research and development (R&D)). Production and investment subsidies (ex. credits for input materials and exports, low interest rates etc.	Establishment of Special Economic Zones with fewer import and export restrictions.	Foreign-invested enterprises (FIEs) have been granted favourable taxation policies	China currently upholds 16 Free Trade Agreements (FTAs) with its trade and investment associates, and it is in the process of discussing or enacting an extra eight FTAs.	"Made in China 2025" (MiC2025) introduced in 2015 with the aim to become a dominant force in production. Special fund to facilitate brand development for companies

Key Takeaway: Free trade agreements, building a brand value proposition internationally that is geared towards the future investment into technology upgradation and ease of FDI are some areas where Bangladesh can take inspiration from countries like Vietnam, India and China.



Steps Towards the Future of Growth

Aspirations & Recommendations for Bangladesh's Apparel Industry



Charting the Path for Next Decade

Scenario 1

Implications of the US-China Trade War on Bangladesh's Apparel Sector

China's dominance in the global apparel industry for decades has helped the country become a market leader in certain high-end apparel products across major importing regions such as Europe and North America. However, the US-China trade war, which began in 2018, entailed the imposition of tariffs across an extensive spectrum of commodities, consequently reshaping the global economic landscape. As a result of the trade tensions between the two economic giants, many countries have started to deprioritize Chinese manufacturers and rethink their supply chain strategies.

The uncertainty produced by the trade war is one of the primary causes of this reaction. The introduction of tariffs on numerous Chinese commodities, as well as the prospect of more duties, made businesses concerned about the stability and predictability of sourcing from China. Many businesses recognized the threats of relying significantly on a single manufacturing base, which may be exposed to abrupt changes in trade policies and regulations.

To mitigate these risks and diversify their supply chains, manufacturers started exploring alternative manufacturing destinations. Countries in Southeast Asia and South Asia, such as Vietnam, Cambodia, Bangladesh, and Indonesia, have emerged as attractive destinations due to their relatively competitive labor costs, favorable trade agreements, and proximity to major consumer markets. These countries have seen an influx of

investments as companies sought to shift some of their production away from China.

With this context in place, escalation of the current trade war may lead to possible scenarios that will leave different impacts on countries that are part of the trading system of both the USA and China.

Firstly, there is an opportunity to capture China's US market share by producing the similar products and leveraging the existing gaps in the market. This diversification can enhance Bangladesh's product portfolio, ultimately leading to improved long-term trade relations with the USA.

In addition, capital flight from China is paving its way towards other South Asian countries. While neighboring countries like Vietnam and Cambodia might provide a lucrative geological location, Bangladesh is at an advantageous position in terms of operational cost. The minimum wage in Vietnam and Cambodia is nearly double that of Bangladesh. Chinese or other foreign manufacturers will bring capital investment and technology into the apparel ecosystem and will increase the adoption of new machinery needed to diversify the product portfolio. This will not only open Bangladesh's market opportunities in Western economies, but also in China as they are moving away from low-valued production processes such as apparel.



Furthermore, in the event of a war, if induced by a possible Chinese invasion of Taiwan, global economic uncertainty would likely increase. A conflict between these two economic giants could disrupt global supply chains, including raw material imports and finished goods exports. This disruption could lead to delays in shipments, shortages of essential materials, and difficulties in meeting production schedules, affecting the overall efficiency and competitiveness of the Bangladeshi apparel industry. The aforementioned scenario could lead to reduced consumer spending and lower demand for apparel products, both domestically and internationally. As a result, Bangladeshi garment manufacturers might face declining orders and financial challenges due to weakened demand for their products.

A full-blown war would lead to countries worldwide imposing trade restrictions and sanctions on each other. This could result in disruptions to Bangladesh's apparel

exports to key markets like the US and Europe, potentially leading to reduced export volumes and revenue for the industry.

Therefore, the apparel industry will be facing both challenges and opportunities in the coming years. While the likelihood of war is low, China's decline in the global apparel industry opens doors for countries like Bangladesh and Vietnam. Bangladesh heavily relies on the EU for exports, but its transition from the Least Developed Country status by 2026 and the loss of GSP privileges in 2029, along with the EU's HREDD act, pose risks. Diverse compliance criteria from international buyers affect cost competitiveness, with smaller factories running on thin margins. Strategic actions are crucial to safeguard Bangladesh's position in the global apparel industry.



Charting the Path for Next Decade

Scenario 2

ESG Collaborations to shape the Future of Fashion

European Union serves as the most significant buyer of our exported goods, constituting 50% of Bangladesh's export volume. Hence, the EU Due Diligence Acts presents a pivotal area of intervention for Bangladesh's apparel industry, which is highly reliant on exports, especially to the EU market. The proposed legislations seeks to ensure environmental and social compliance within supply chains, addressing concerns ranging from forced labor to sustainability. Apparel firms in Bangladesh will face increased scrutiny and accountability, both in the domestic and international markets. Non-compliance with due diligence requirements could lead to penalties and damage to the industry's reputation. In addition, market access to the EU may be affected by EU Due Diligence Acts, making it essential to ensure compliance with human rights and environmental standards to maintain a competitive edge in the EU market, which is Bangladesh's largest export destination.

In response to these challenges, apparel firms in Bangladesh are actively adopting sustainable practices. These include the implementation of green building technologies, circularity in material usage, and the use of green technologies to reduce environmental impact. There is also a notable shift from natural cotton to man-made fibers in raw material sourcing, particularly for water conservation. Rainwater harvesting during the monsoon season is becoming a common practice, contributing to resource efficiency. To enhance energy efficiency, the industry is also adopting advanced technologies like rotary screw, inverted air compressors, and solar power systems. Some factories are even incorporating blockchain technology to ensure

transparency, security, and trust within the supply chain.

The proposed legislations also emphasizes the importance of human rights due diligence. This means that the industry needs to engage with a diverse range of stakeholders to effectively implement human rights due diligence. This includes collaboration with backward and forward linkage industries, buyers, retailers, and consumers. To navigate the changing landscape shaped by the EU Due Diligence Acts and ensure the sustainability and growth of Bangladesh's apparel industry, several steps can be taken.

These include welcoming FDIs, investing in sustainability, diversifying the supply chain, enhancing raw material procurement, collaborating with stakeholders, investing in capacity-building initiatives, adapting to new technologies, creating consumer awareness about sustainability, and maintaining profitability by balancing it with sustainability efforts. The successful adaptation can help Bangladesh's apparel industry remain competitive, ensure market access, contribute to a more sustainable and ethical global supply chain.

In addition, as new regulations on traceability emerge, global competitiveness rises, and brands pivot toward incorporating recycled materials in response to market and regulatory demands, the RMG sector in Bangladesh must seek to establish itself as a trustworthy and sustainable sourcing destination for buyers. Therefore, embracing a circular business model and integration of ESG frameworks is imperative for the RMG sector, especially as it readies itself for the forthcoming shifts associated with LDC graduation.



Charting the Path for Next Decade

Scenario 3

The Shifting Landscape: Influence of Automation & Nearshoring

The incorporation of cutting-edge technologies and automation within Bangladesh's ready-made garment (RMG) sector exemplifies the industry's dedication to innovation and staying competitive. These technological strides, encompassing automated knitting machines, robotics, AI-powered software, and digital printing equipment, have brought about transformative changes in several facets of garment manufacturing, such as knitting, dyeing, printing, and overall operational effectiveness.

Through the utilization of automation, manufacturers in Bangladesh are increasing productivity, cutting expenses, elevating quality, and establishing themselves as frontrunners in the worldwide apparel industry. The persistent commitment to investing in automation underscores the industry's resolve to remain at the vanguard of technological progress and secure a sustainable and prosperous future.

Automation has the potential to enhance the cost-efficiency and productivity of garment production in the country. However, it also carries the risk of significant job displacement in the future as machines replace human workers.

The McKinsey Global Institute forecasts that automation could lead to the loss of around 800 million jobs globally by 2030. In Bangladesh, the garment sector is expected to be particularly affected by Industry 4.0. A study conducted by the Government of Bangladesh (a2i) estimates that approximately 60%, which is equivalent to 5 million jobs, may be lost in the next 15 years.

Workers displaced by automation are often redeployed within the production process. Aging or less productive workers may transfer to smaller factories. Automation impacts both skilled and unskilled, high and low-paying roles, but low-paid workers suffer more due to limited machinery expertise.

Over time, automation's growth in the apparel industry will spur higher economic growth, generating new jobs in other high-value sectors. The workforce may shift from the **apparel industry to different economic activities**. However, sustaining the industry hinges on automation and skilled personnel, with their development closely intertwined. A comprehensive approach is essential to bolster the apparel industry's future.

The introduction of better equipment and automation is reducing the bargaining power of workers, particularly affecting women workers who may face biases when handling advanced equipment. Automation results in uneven demand for new labor, potentially eroding the positive impact on employment in the apparel industry that the country has enjoyed for years.

As automation continues to spread, when sewing is incorporated into the fold of 4IR, Bangladesh's advantage in labor intensive manufacturing will wane and nearshoring will significantly curb out market share from the country. The country has to rely on friend-shoring, FTAs and existing ecosystem advantages in the short run. In the long run, the country has to specialize in value-added segments in order to keep competing while increasing investments are needed to be made in modernizing equipment and upskill the workforce.



Way Forward - Industry Leaders

Embracing Automation

- ▶ Allocate a portion of production to high-value products for better future investments and increased competitiveness
- ▶ Recruit graduates with expertise in new product areas to drive innovation and adaptability in production strategies
- ▶ Optimize factory layouts and infrastructure to accommodate modern automation and eco-friendly equipment efficiently
- ▶ Establish a comprehensive maintenance and support network for automated machinery to minimize production disruptions and reduce the need for standby operators
- ▶ Enhance collaboration between educational institutions and the industry to provide students with access to the latest technology and practical skills training, bridging the skills gap for mid-level management roles in the automation-driven industry
- ▶ Implement an incentivized skills development program within factories, coupled with retention strategies, to reduce turnover rates during festival holidays and encourage ongoing investment in worker training

Enhancing Worker Wellbeing

- ▶ Provide better access to support system for pregnant/lactating workers through childcare facilities
- ▶ Provide training on managerial skills
- ▶ Provide access to support system for mental health issues Microinsurance for workers through tripartite collaborations - workers, owners, and government
- ▶ Take initiatives to improve entrepreneurial skills out of garments workers
- ▶ Provide access to complaint cell for sexual abuse, discrimination and legal counselling
- ▶ Provide access to upskilling and reskilling programs for workers with updated modules
- ▶ Incorporate soft skills training into the curriculum of training institutes to empower women with the skills needed for career advancement and improved wages
- ▶ Facilitate social enterprises that serves wellbeing of workers. Example: Wagely, Apon

Entering Circular Economy

- ▶ Explore opportunities in man-made fiber production to tap into the growing global demand. However, the industry should tread carefully about adopting mmf. The transition to circularity would be hindered if they work with mmf, for higher value-added products
- ▶ Implement strategies to reduce human errors at all stages of fashion production, including design sampling, cutting, and sewing, with a focus on minimizing waste and resource consumption in line with the "Reduce" principle of the 3Rs (Reduce, Reuse, Recycle)
- ▶ Transition to a circular economy model using ESG frameworks to boost sustainability, compliance, reduce imports, and strengthen brand bargaining power, aligning economic and ethical goals
- ▶ Expand sustainability efforts beyond LEED certification to proactively address upcoming European environmental regulations, ensuring future competitiveness in the industry
- ▶ Accelerate the adoption and scaling of recycling processes for cotton scraps and post-industrial waste to produce fibers and yarns

Harnessing the Global Tides

- ▶ Leverage trade relationships with China and the USA to diversify product offerings and reduce import dependency from China, and export finished goods to the USA, capitalizing on China's declining market share and potentially leading to enhanced trade facilities with the USA
- ▶ Seize the opportunity presented by capital flight from China by attracting Chinese and foreign manufacturers to invest in Bangladesh's textile industry, leveraging the country's competitive advantage in lower operational costs
- ▶ Foster industry ecosystem development, machinery adoption, and product portfolio diversification to position Bangladesh for Western market access and meet China's transition away from low-value production processes
- ▶ Explore diverse export destinations to grab potential market share
- ▶ Industry leaders should proactively engage in international lobbying efforts to support the government in securing improved negotiation terms for maintaining trade benefits

Way Forward - Policymakers

Embracing Automation

- ▶ Develop and implement more accurate and inclusive credit assessment mechanisms tailored to the needs of small-scale RMG factories.
- ▶ Collaborate with financial institutions to offer specialized loans or credit lines for automation investments.
- ▶ Standardize accounting practices for small-scale RMG factories to simplify financial reporting and enhance eligibility for the SREUP financing.
- ▶ Creating collaborations among industry players to ensure better after sales service from Machinery manufacturers.
- ▶ Establish skills development programs specifically designed to train workers and factory managers in automation-related technologies and processes.

Enhancing Worker Wellbeing

- ▶ Collaborate with employers to implement comprehensive retirement packages and pension schemes for RMG workers to ensure financial security during their retirement years.
- ▶ Promote financial literacy among workers to help them make informed decisions about their retirement savings.
- ▶ Facilitate the creation of affordable healthcare facilities near RMG factories, ensuring workers have access to quality medical services.
- ▶ Encourage the development of low-cost housing options for RMG workers, reducing the burden of long commutes and high rent expenses.
- ▶ Strengthen labor standard enforcement mechanisms by increasing the number of labor inspectors and conducting regular audits of RMG factories.
- ▶ Microinsurance for workers through tripartite collaborations, workers, owners, and government
- ▶ Take initiatives to improve entrepreneurial skills out of garments workers.

Entering Circular Economy

- ▶ Review and revise import restrictions on second-hand clothing and machinery to promote the circular economy by extending the life cycle of products.
- ▶ Shift the regulatory focus beyond mere compliance to encompass broader sustainability standards and certifications.
- ▶ Establish benchmarks for resource efficiency, waste reduction, and responsible sourcing within the RMG sector.
- ▶ Implementing policy incentives can play a pivotal role in supporting the growth of the local recycling sector and formalizing waste handling companies.
- ▶ Creating a pool of resident experts in ESG like frameworks who can help companies transition faster.
- ▶ Collaborations and loan support to accelerate circular and green practices.

Harnessing the Global Tides

- ▶ Actively pursue and negotiate further Free Trade Agreements (FTAs) and Bilateral Agreements with key trading partners to mitigate the negative effects of losing GSP (Generalized System of Preferences) facilities.
- ▶ Prioritize agreements that provide preferential access to target markets and reduce trade barriers for Bangladeshi RMG exports.
- ▶ Enhance and enforce intellectual property rights laws and regulations to protect the designs, innovations, and trademarks of Bangladeshi RMG manufacturers.
- ▶ Provide incentives or grants for research and development efforts focused on producing new types of garments and fashion accessories.
- ▶ Strengthen quality assurance and compliance standards to meet the requirements of international markets.
- ▶ HS Code modernization in line with the need for producing higher value-added products.

Concluding Remarks

The apparel industry in Bangladesh has taken confident strides over the past decade to become the second-largest player in the world. The country's apparel sector has been a leading example of making low-valued products that cater to the fast-fashion segment. With the support from the government in backward linkage and the establishment of a textile industry, the apparel industry has grown multifold in the past few decades.

The total workforce has remained relatively stagnant (4 million)²² during the same period, indicating an increase in efficiency in production. The continuous rise in fast fashion in the west and specific demand from buyers have led to factories adopting newer equipment that has reduced wastage, improved efficiency, and enhanced traceability in the production process, leading to the need for a lower number of operators in some of the production processes and a higher number of operators in the finishing department. **Semi-skilled or unskilled workers got shifted as per the demand of different processes. However, increased automation in manual labor driven departments will eventually lead to job losses in the sector.**

Bangladesh's primary export destination is the European Union, closely followed by the United States of America. Currently, the EU is in the process of developing due diligence acts that will require buyers to ensure the compliance of their procured products with all aspects of the production process. Furthermore, **Bangladesh is slated to lose its GSP moratorium by 2029. In light of this, the industry must proactively prepare to sustain its competitiveness within the sector.**

This objective can be achieved by reducing lead times, aligning with buyer demands, and actively pursuing new market opportunities. Bangladesh has predominantly focused on manufacturing cotton-based products, even as the global landscape shifts towards synthetic fibers.

Conversely, there is a burgeoning demand for circular products, presenting a significant opportunity for Bangladesh to tap into this market. **Notably, the country stands to benefit due to the establishment of numerous recycling facilities here, owing to the substantial volume of industrial waste generated in the region.**

The nation has now established an ambitious goal to export Ready-Made Garments valued at USD 50 billion by 2025, aiming to reach USD 100 billion by 2030. In the last decade, the export has more than doubled, but reaching such ambitious targets will require the country to adopt dynamic growth strategies aligned with the future. **In 2021, 43% of the world's apparel trade was based on man-made fibers, whereas Bangladesh's industry only has 22% MMF based RMG.** Significant technology integration and innovation are required to capture this trend while walking the path of circularity.

Bangladesh has to move to enhance its production capacity in higher value-added product categories, as technology keeps adding new features reducing the need of labor. Cost-competitive labor advantage is waning and the market for basic goods will likely be crowded with new players, having better trade agreements, or location advantage. **Diversification of products will lead to an expansion of production lines and factories, thereby generating new employment opportunities.** In the long term, integration of automation throughout the industry is an inevitable step to maintain competitiveness within the global market.

The consensus spirit among industry stakeholders — from owners, to employees, and ancillary players — remains high. The enterprising factory owners, and the resilient women workers, all express hope for a better future driven by growth. However, there are macroeconomic factors of technology, policies, and geopolitics, mesoeconomic factors related to local adaptation, and microeconomic factors of ground level practices — all needs to be reconsidered and realigned in light of the waves of change that the industry will face. Concerted effort and proactiveness here would play a pivotal role.

The successful realization of these objectives will necessitate a collaborative endeavor involving buyers, factory proprietors, development practitioners, and governmental entities. This collective effort will be instrumental in guiding the industry to flourish amidst forthcoming challenges, thus safeguarding the well-being of women workers by mitigating the risk of job losses.



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