

BRIDGING SDG GAPS IN THE BANGLADESH APPAREL INDUSTRY: A COMPREHENSIVE REVIEW

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ABSTRACT

The purpose of the review is to explore the status of the apparel industry in Bangladesh, the gaps between this industry and Sustainable Development Goals (SDGs), and recommendations to minimize these gaps. Despite significant progress, several key challenges pointed out the gaps with related SDGs such as low wages (SDG 1), inadequate health and safety issues (SDG 3), gender discrimination (SDG 5), poor water and waste management practices (SDG 6 & SDG 12), limited technological innovation (SDG 9), unequal distribution of profit (SDG 10), environmental impact (SDG 13, 14, and 15), and partnership goals (SDG 17). The review data was collected from secondary sources by applying a systematic PRISMA review model and 67 articles have been selected from an initial pool of 387. Although the challenges must be addressed, the apparel sector's contribution is significant and generates 85% of the country's total export revenue. This research also highlighted the actionable recommendations to minimize the gaps between SDGs and the apparel industry in Bangladesh. The study also emphasizes collaboration among the governance, industry stakeholders, and international partners to establish a sustainable apparel sector. By addressing all these gaps, Bangladesh's apparel industry can enhance its footprint and competitiveness globally to ensure social and environmental



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sustainability.

Keywords: *Sustainable development goals, Environmental impact, Key challenges, Contribution, Recommendation.*

INTRODUCTION

The apparel industry in Bangladesh has grown to become a vital global force, contributing significantly to employment and economic expansion in the nation. Bangladesh is the second-largest exporter country in the apparel sector, and its apparel industry has made a potential contribution to economic growth and poverty reduction (Hasan & Das, 2024). The industry's quick growth has also brought several difficulties that prevent it from aligning with the UN's Sustainable Development Goals (SDGs).

Bangladesh's apparel sector is distinguished by its large workforce, the majority of whom are women. The industry has played a significant role in giving women financial freedom and empowerment. But this sector is also beset by problems like low pay, unfavorable labor conditions, and environmental deterioration (Anner, 2020; Islam et al., 2022). There are significant deviations in the apparel industry in Bangladesh with the Sustainable Development Goals (SDGs), especially those for “No Poverty (SDG 1)”, “Good health and well-being of the workers (SDG 3)”, “Gender equality (SDG 5)”, “Clean water and sanitation (SDG 6)”, “Decent work and economic growth (SDG 8)”, “Industry innovation (SDG 9)”, “Reduce inequality (SDG 10)”, “Responsible consumption and production (SDG 12)”, “Climate action (SDG 13)”, “Life below water (SDG 14)”, “Life on land (SDG 15)”, “Peace and justice (SDG 16)”, and “Partnership for the goals (SDG 17)” (United Nations, 2024). The incident of the Rana Plaza in 2013, where more than 1,100 workers died, raised a serious awareness concern globally (Khan et al., 2023). Even with later advancements in factory safety, many employees still work in abusive settings. The textile industry has a considerable environmental impact due to its high water consumption, pollution, and production of textile waste (Nasrain, 2023).

Review Objectives

The main objectives of this review paper are:

- 1) To assess the status of the Bangladeshi apparel industry: A thorough examination of the sector's economic contributions, working conditions, and gender equality concerns.
- 2) SDG Gaps in the Apparel Industry: A discussion and identification of the primary SDG compliance shortcomings.
- 3) To make recommendations for Sustainable Practice: Recommendations for enhancing environmental sustainability aligning with SDGs, working conditions, and gender equality.

After presenting the introduction, the status and SDG gaps in the apparel industry in Bangladesh are discussed in section 2, and the data collection methodology is highlighted in section 3. The contribution of the apparel industry and the recommendations to minimize the gaps in the apparel sector have been deliberated in section 4, and the conclusion is discussed in section 5.

LITERATURE REVIEW

The Present Status of the Bangladeshi Apparel Industry

The majority of Bangladesh's labor force, primarily women, are employed in the apparel business, which enhances their financial independence and self-determination (Islam et al., 2020). Nonetheless, the apparel sector in Bangladesh has significant obstacles, such as low pay, unfavorable working conditions, and environmental deterioration (Gunawan et al., 2023; Ara, 2023). Although there is no denying the industry's role in economic expansion, there are substantial social and environmental repercussions in Bangladesh (Murshed et al., 2021).

The significant environmental effects need to be addressed quickly to expand this sector. The generation of textile waste, chemical contamination, and the use of excessive water have become significant challenges for the environment (Kishor et al., 2021). Research has indicated that these effects on the ecosystem notify the regulator, and more sustainable practices are

required (Liu et al., 2021). In addition, even though the industry raised safety requirements after the Rana Plaza incident, problems with labor rights and workplace safety still exist (Frenkel et al., 2022).

SDG Gaps in the Apparel Industry in Bangladesh

Table 1. Gaps between SDGs and the Apparel Industry in Bangladesh

Main SDG	Description
SDG 1	The minimum wages of workers in the apparel industry in Bangladesh fall below their living standard, which pushes them into poverty (Kabir et al., 2022). The workers are not covered by insurance or a pension scheme, during their unemployment period (Shahen, 2022).
SDG 3	The working environment is unhealthy, and the workers are under poor ventilation systems, in an open and toxic environment, and cramped factory conditions, leading to diseases such as respiratory and skin diseases (Parvin et al., 2020). Though improvements have been noticed nationally and internationally after the pathetic Rana Plaza incident in 2013 and the Tazreen Fashion Garment factory fire incident in 2012 in Bangladesh, the factory inspection and audit are inadequate (Islam, 2019).
SDG 5	Approximately 80% of garment factory workers were women in the 1980s, which is 54% at present. However, female workers are less privileged in leading their roles than male workers (Claire Jenns, 2023). The policy for apparel industry workers is inadequate, and female workers are pushed into unsafe working environments where they are not protected (Ashraf & Prentice, 2019).
SDG 6	The wastewater of the dying and washing plants in the apparel industry has been released into the river and sea without cleaning, and water has become polluted, which affects the environment (Hussein, 2020). On the other hand, most of the dying and washing factories use water from local sources, contributing to the shortage of clean water locally (Sakamoto et al., 2019).
SDG 8	Frequently, workers are forced to work extra hours or overtime against their willingness (Sharmin & Manan, 2022). Workers do not have the option to become permanent, and they have become deprived of long-term benefits such as insurance, gratuity, and job security (Fahim, 2020).
SDG 9	Several factories are using old machinery for production, the machines consume more energy, creating higher levels of pollution in the environment (Chowdhury et al., 2023).

SDG 10	Maximum earnings from apparel industries by selling the product go to the garment owners and international brands. The workers are not availing themselves of any incentive from profit, which is the inadequate distribution of profit against their low wages (Jahan, 2024). The working conditions are poor in safety and security, lower wages, and an unhealthy environment in the rural areas compared to the city areas (Uddin et al., 2021).
SDG 12	The fast fashion industry creates more pressure on apparel production companies to produce large numbers of garments. Many of these clothes become waste, and ultimately, they contribute to an environmental impact when they are thrown into the environment (Chen et al., 2021). In producing large quantities of garments, extra amounts of chemicals are used to maximize production, and no strict policy is applied for using chemicals in apparel industries in Bangladesh (Mia et al., 2019). Due to excessive use of these chemicals, the chemicals released in the air, water, and soil may have a serious impact on the health of the people as well as on the environment (Manisalidis et al., 2020).
SDG 13	Notable amounts of carbon have been emitted into the atmosphere from apparel industries which contributed to changes in the climate (Peters et al., 2021). Most of the factories in Bangladesh depend on fossil fuels to operate these factories like spinning mills, weaving, and dyeing factories. Due to the excessive use of fossil fuels, a significant amount of carbon is emitted from these factories (Biswas et al., 2024).
SDG 14	Mainly apparel industries become polluted from apparel industries in two ways: 1) microplastics generated from synthetic garments, and 2) from untreated waste (Stefan et al., 2022; Periyasamy & Tehrani-Bagha, 2022). Washing plants release microplastic from synthetic cloths, and untreated wastewater contains harmful chemicals and dyes that discharge into the seas and contaminate the eco-friendly system (Le et al., 2022; Sacchidananda, & Periyasamy, 2021).
SDG 15	Large forest areas grow cotton, which is used to produce clothes, and it demolishes normal wildlife, reduces biodiversity, and changes the climate (Filip & Filip, 2020). These harmful chemicals reduce soil fertility and prevent growing plants, which not only resist growing the plant but also affect the agricultural ecosystem (Alengebawy et al., 2021).
SDG 16	Labor laws are weakened due to corruption which helps to make an ineffective workforce, and many workers become exploited and receive low wages (Datta, 2023).
SDG 17	Inadequate collaboration among internal brands, local suppliers, and government bodies to promote the sustainable apparel industry [39]. Local suppliers in Bangladesh do not have sufficient technology support to adopt eco-friendly methods (Khan et al., 2024; Sabus et al., 2021).

REVIEW METHODOLOGY

This review paper aims to explore the sustainability gaps in the Bangladesh

apparel industry concerning the SDG target through a systematic review. We used a review protocol that referred to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Page et al., 2021), which is shown in Figure 1. The selection of this PRISMA model is based on the predefined eligibility criteria which aligned with the objectives of this review highlighted in the introduction section. Then we developed a strategy for searching the databases and related items from several databases. Next, the identification, screening, and eligibility selection process were followed to select the relevant articles. As part of this, the identification process is discussed in detail in step 1 where the literature search was conducted for several databases. The articles' screening process had also been placed in this section in step 2, the duplication removing criteria and articles extraction process were discussed. Finally, the authors verified the eligibility of the articles in step 3 and selected them for final review.

Searching Strategy

The PRISMA, a systematic review methodology was followed to gather data from secondary related sources to i) the present status of the apparel sector in Bangladesh, ii) the gaps between SDGs and the apparel industry, and iii) researchers' previous suggestions and recommendations. Several databases such as Textile Exchange, Google Scholar, Scopus-indexed journals, peer-reviewed journals, web of Science, reputed publications, research journals, thesis papers, trade articles, and the Internet were used to collect the information. To optimize the search method, the Google search engine and ResearchGate were used to collect information. The search strings such as 'SDGs', 'Gaps between SDGs and apparel industry', 'present apparel industry condition', 'sustainable challenges', 'environmental impact', 'apparel sector contribution in Bangladesh', and 'researchers' suggestion' were used to search data.

Identification: Step 1

The information that was not related to the scope of this paper was considered almost equivalent to this review paper, and publications that did not match this review paper's criteria were excluded. Initially, 387 papers were selected and downloaded by using the above keywords. The literature search was tested through major 7 databases such as Scopus

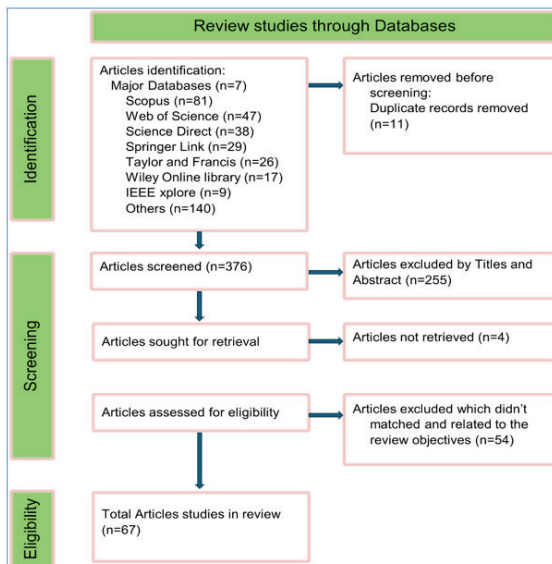
(n=81), ScienceDirect (n=38), Web of Science (n=47), Springer Link (n=29), Taylor & Francis (n=26), Willy Online Library (n=17), and IEEE Xplore (n=9), along with other sources (n=140). A total of 387 articles have been considered in Step 1.

Screening: Step 2

After removing the 9 duplicate research papers, 376 papers were selected, and this screening process was conducted based on the articles' titles and abstracts. Through this process, 255 articles were excluded as they did not align with the research objectives. The remaining 121 articles were sought to retrieve with full text, where 4 articles could not be retrieved. Thereafter, 117 articles were accessed for eligibility criteria.

Eligibility: Step 3

After properly assessing among 117 articles, 54 articles were excluded from the final list which did not directly match the review criteria of this review paper. Eventually, 67 articles were included in the final review stage.



*Articles excluded which did not match and relate to the review objectives- language in the figure cannot be edited

Figure 1. PRISMA 2020 Workflow for Systematic Review

Source: Author, 2025

FINDINGS

The contribution of the apparel industry in Bangladesh

The apparel sector in Bangladesh has made a significant contribution to the national economy. From the late 1070s to the 2000s, the apparel industry played a vital role in the growth of the economy of Bangladesh, and it became the primary revenue income source of Bangladesh (Ogiemwonyi et al., 2023; Heng, 2022). It has made a great contribution to growing socioeconomic development in the country. There were a few issues such as the Rana Plaza tragedy in 2013, and Tazreen Fashions Factory collapsed by fire in 2012, and 112 workers died (Huda, 2024). Though these kinds of incident records were tragic, this sector is the main contributor to the economy in Bangladesh. As per the record of BGMEA (2023), presently this apparel industry contributes 84.58% of export revenue whereas the remaining 15.42% of export revenue comes from other sectors in Bangladesh as shown in Figure 2. Therefore, these statistics give a clear picture of the contribution of this sector in Bangladesh.

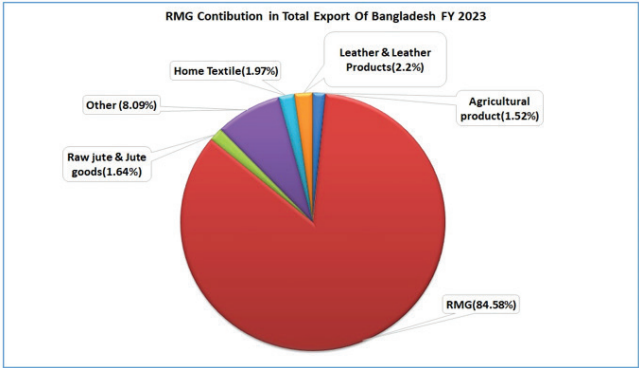


Figure 2. Apparel Sector Contribution in Bangladesh's Economy
Source: Author, 2025

Recommendations to Minimize SDG Gaps in the Apparel Industry in Bangladesh

Table 2. SDG Gaps in the Apparel Sector and Recommendations

SDGs	Previous Researchers' Suggestions	Researchers' Recommendations
Enhance Worker Wages and Social Safety Nets ("SDG 1")	Reforming and implementing wages for labor need to be ensured by local Government and industry stakeholders of the apparel industry in Bangladesh (Hasan et al., 2020). The financial security of apparel workers during unemployment periods, health crises, insurance, and emergency funds management, need to be ensured by developing a national society safety net program (Sen et al., 2020).	Workers' wages and other facilities must be ensured by encouraging local suppliers and international brands. The suppliers and brands should allocate a fair share of the retail prices to the apparel workers in Bangladesh.
Improve Occupational Health and Safety ("SDG 3")	Workers' wages, health benefits, and safety net should be implemented and mandatory for all factories regardless of the company size and locations (Syed & Karim, 2024). Installation of proper ventilation and air circulation systems needs to be ensured to reduce harmful chemicals and waste from the apparel factories in Bangladesh (Siraj et al., 2023).	Training programs on health and safety rules for managers and all workers should be mandatory with regular inspections and maintaining probation for penalties to keep the workplace safe.
Address Gender Inequality ("SDG 5")	One of the major challenges is gender inequality, which needs to be addressed by enforcing wage policy and ensuring equal wages and other facilities for both men and women in the apparel sector (Islam et al., 2020). To enhance opportunities for female workers in leadership roles through mentorship and skill development programs (Harrison et al., 2022).	Regular training on leadership and mentorship programs for the female workers in the apparel factories is essential to increase their presentation skills and that may help them to increase their confidence level.
Reduce Environmental Impact ("SDG 6")	Approximately 80% of the apparel industries in Bangladesh fail to comply with waste and effluent treatment requirements, which need to be addressed by investing in technology-based solutions that meet the environmental standard internally (Rahman et al., 2019).	A significant budget for Research & Development (R&D) is required to develop an alternative technology-based dyeing processing system that may be capable of using less water and discharging less amount of toxic chemicals. Incentive programs need to be introduced to encourage the establishment of clean production methods in apparel factories.

Improvement of the working environment ("SDG 8")	Workers in these sectors are forced to work overtime, and a worker's well-being policy must be developed to ensure the practice (Tarafder & Burgess, 2022). (Aman-Ullah et al., 2022) highlighted that the compensation for the worker, job security, and turnover rate become high, a comparative study across different countries and regions will help to develop a strong and effective policy to mitigate these challenges.	Local government and apparel industry stakeholders may work together to develop a strict labor policy to withdraw overtime practices and confirm fair compensation.
Invest in Technology and Innovation ("SDG 9")	The owners of the apparel industry should invest and upgrade to new environmentally less energy consumption machinery (Gu et al., 2021). To achieve sustainable and eco-friendly production, the private sector and international brands must work together (Rahaman et al., 2024).	Promote incentive practices in this sector to adopt clean technology in clothing production.
Ensure Fair and Equal Distribution of Profits ("SDG 10")	Fair distribution of profits across the supply chain locally, and among the workers can play a vital role in encouraging them in the apparel industry (Alamgir & Banerjee, 2019). International buyers may play a significant role in reducing the inequalities in this apparel industry (Cajal-Grossi et al., 2019).	Establishing an Ethical pricing model to ensure the wages and profit for all stakeholders in this industry is essential.
Environmentally friendly products ("SDG 12")	Recycling practices must be ensured in the apparel industry to reduce waste (Saha et al., 2022). Introducing a tracing system is essential to monitor the usage of recycling and non-recycling materials (Karmaker et al., 2021).	To promote sustainability in this industry, recycling products and organic products, along with a strong monitoring system need to be introduced.
Introduction of Green energy ("SDG 13")	Introducing green energy through solar panels or other renewable sources to encourage the stakeholders (Parvez, 2024). Strong policy and regular monitoring are required to track greenhouse gases to reduce carbon emissions, and the discharge of waste into the environment (Chowdhury et al., 2021).	Encouraging the use of renewable energy can help to reduce significant amounts of carbon emissions in the environment such as dyeing factories and production in fabrics.
Strong policy implementation ("SDG 14")	Tiny plastics or microplastics should be removed from used water to wash synthetic clothes (Usman et al., 2022).	Tiny particles or microplastic discharge rules and regulations must be strictly followed by the Bangladesh apparel industry.

Use of sustainable resources ("SDG 15")	The partnership among the local communities, apparel stakeholders, brands, and government bodies needs to form and work together to encourage for using sustainable products like organic cotton, recycling products, hemp, etc. to save living lives (Beyers & Heinrichs, 2020).	To protect the environment and biodiversity, collaboration among apparel companies, local governments, and international bodies is highly recommended.
Strengthening compliance practice ("SDG 16")	Inspection of the apparel industry should be open and transparent, maintaining labor rights strictly, and giving freedom to workers freely without fear (Uddin et al., 2020). Strong rules and regulations are needed to protect workers' rights effectively in the apparel industry in Bangladesh (Op den Kamp, 2023).	Compliance practices must be developed in companies through the collaboration of local government and the owners of the apparel companies.
Building partnerships to implement sustainability ("SDG 17")	Working with international bodies, brands, local authorities, companies, governments, and NGOs to achieve sustainable development goals (Jani & Jatmika, 2023).	To form coalition bodies among the stakeholders, government, and international forum, they may take initiatives to reduce waste, find out ethical sourcing of materials, and fair labor practices.

CONCLUSION

The apparel industry of Bangladesh is the main contributor to the national economy and faces challenges in aligning with the Sustainable Development Goals (SDGs). This research has found the key gaps between the apparel sector and SDGs which are poor wages, unhealthy working environment, environmental degradation, gender discrimination, fair distribution of profit, and inadequate infrastructures of this industry to progress towards sustainability. However, properly addressing these challenges followed by strict rules and regulations, and policies that will be capable of addressing the mentioned obstacles can create a pathway for the apparel industry to align with the SDGs.

On the other hand, for the successful implementation of these recommendations, global collaboration among government bodies, apparel industry stakeholders, international brands, and partners needs to work together. To achieve sustainable development goals, Bangladesh's apparel industry also needs to focus on ethical labor rights and technological innovation to maintain its global footprint globally. Furthermore, it is important to follow up and monitor progress through collecting data,

researching this data, and continuous, and adjustment of policies, which helps to contribute positively to meeting the targets set by SDGs.

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AUTHORS CONTRIBUTIONS

All the authors have played a significant role in preparing this manuscript including the introduction, literature review, finding the SDG gaps in the apparel industry in Bangladesh, recommendations to minimize these gaps, and finally, wrap up with the conclusion.

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