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## An Empirical Examination of Sustainable Supply Chain Practices and Sustainability Performance in Bangladesh's Garment Industry.

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### ABSTRACT

Garment industry of Bangladesh is an important part of the international supply chain of apparels as well as a significant portion of the economic growth of the nation. As a reaction to the growing pressure of international customers, prudent, and stakeholders, garment companies started to revert to the principles of sustainable supply chains. This paper analyzes the degree in which environment, social and economic sustainable supply chain behaviors are in existence in the garment industry of Bangladesh and the extent by which the behaviors are associated with total sustainability performance. The quantitative research design was used based on survey data obtained among 300 respondents in the managerial level of the export-based garment manufacturing firms. The data were analysed by using descriptive statistics, reliability analysis, normality analysis, correlation analysis, and multicollinearity diagnostics. The results reveal a medium adoption of practices of sustainable supply chain in terms of environmental, social, and economic aspects. The results of sustainability performance, however, are relatively poor. The outcomes of correlation demonstrate almost negligible and largely negative links among sustainable supply chain practices and sustainability performance which indicates a fragmented and compliance-based approach to implementation as opposed to integrated sustainability approaches. Reliability analysis also reveals the weakness in the measurement scales of sustainability in internal consistency. The findings are useful in the literature as they offer empirical evidence of a developing country setting and show a necessity of more comprehensive, organized, and situation-specific strategies regarding sustainability. Managers, policymakers, and international buyers that want to enhance sustainability achievements in the global garment supply chain are provided with practical implications.

### INTRODUCTION

The national economy and the global apparel supply chain are dependent on the ready-made garment (RMG) industry of Bangladesh (Hossain, 2019). Being a leading garment exporter in the world, Bangladesh provides global brands and retailers in Europe, North America, and Asia thus making a great contribution to the employment, foreign exchange, and development of the industrial sector. Nonetheless, the intensive growth in the industry has also enhanced sustainability-related issues in its supply chain with respect to environmental degradation, labour practices, safety in the workplace, resource productivity, and the economic sustainability in the long term (Zhang & Zhong, 2025). These concerns have put growing demands on garment producing companies and their suppliers to embrace sustainable supply chain operations such that they strike a balance between economic performance and social and environmental responsibility.

Green supply chain management has become one of the most important strategic measures to manufacture companies, which compete in globalised markets and have the high level of competition (Le *et al.*, 2025). The concept of sustainability in the garment industry does not only focus on the activities of firms alone but also on the activities of their suppliers, subcontractors, logistics, and buyers (Ka & Nguyen, 2025). In the case of the

garment industry of Bangladesh, supply chain failure has led to reputational risks, buyer scrutiny, and regulatory pressure among the global interested individuals due to inadequate water and energy utilisation, inefficient waste disposal, sub-par working conditions, and failure towards international labour standard compliance (Nasrin, 2025). Therefore, establishing sustainability concepts in both supply chains has served a critical role in ensuring that operations remain profitable, its competitiveness stays long-term and secures its market share.

Although there is an increasing concern and global efforts at enhancing sustainability within the Bangladeshi garment supply chain, sustainable supply chain practice is not enforced in equitable and straightforward ways (Hasan, 2025). Domestic companies are usually restricted in their structures that include cost, inability to integrate various technologies, lack of co-ordination of the suppliers and the enforcement of regulations. As well, buyer compliance needs tend to be the motivators behind sustainability efforts instead of company-inscribed strategic commitments (Kshetri, 2025). This brings up the question of the intensity, efficiency and sustainability of sustainable supply chain practices in the industry. This has led to the need to take a critical look at the current sustainability approach across the various activities within the supply chain and the extent of its practices in relation

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to environmental protection, social life and economic performances.

The current literature available on sustainable supply chain management has concentrated mostly on the economies of the developed world or multinational companies and relatively little empirical investigation has been created into the context of the developing nations like Bangladesh (Rahman, 2021). Despite the fact that other studies have looked the compliance of labour, environmental performance, or corporate social responsibility within the garment industry, there are limited studies that look at sustainable supply chain practices holistically on a number of dimensions (Phan *et al.*, 2020). Moreover, the particularities of the institutional, economic, and socio-cultural environment of Bangladesh requires the study of particular contexts, since the issues of sustainability and the frameworks of the implementation can vary largely compared to the models in developed markets. This literature gap indicates that there has never been any systematic study that addresses sustainable supply chain practices in the garment sector of Bangladesh in a holistic manner.

It is on this background that the current analysis attempts to review the concept of sustainable supply chains within the Bangladesh garment industry through the prism of analyzing how the environmental, social, and economic notions of sustainability are incorporated into supply chain operations (Nguyen *et al.*, 2020). This study focuses on the practices that are common, their effectiveness, and the challenges and opportunities related to the implementation of the same. By fulfilling such objectives, the study makes a contribution to the scholarly community regarding sustainable supply chain management in developing economies and offer some practical information to the societal stakeholders of the industry, policymakers and foreign shoppers (Driel, 2020). Finally, the knowledge of sustainable supply chain in Bangladeshi garment industry can play a significant role in encouraging industrial growth and sustenance, global competitiveness, and in fostering sustainable development agenda.

## LITERATURE REVIEW

### Concept of Sustainable Supply Chain Management

Sustainable Supply Chain Management (SSCM) is the programmatic combination of environmental, social, and economic concerns into the supply chain operations to improve the overall performance of organisations in the long-term and the welfare of the society (Rahman, 2021). In contrast to the classic supply chain management, which is largely concerned with cost effectiveness, speed and reliability, SSCM takes a wider approach and considers sustainability objectives at any procurement, production, distribution, and post-consumption levels. The growing international focus towards sustainability has placed SSCM as one of the imperative models of the industries that conduct operations in complex and internationally distributed supply chains, including the garment and

apparel industry (Warasthe *et al.*, 2020).

Its garment industry is highly supplier based, labour intensive to run, and has many environmental footprints. Consequently, the sustainability issues are more than an issue of a single company but rather cut across several levels of the supply chain. SSCM stresses the role of coordinating activities between supply chain partners as a team of partners to counter such challenges as opposed to dealing with them individually (Gonçalves *et al.*, 2025). Such a combined strategy acknowledges that the sustainability performance needs to rely on cooperation, transparency, and collective responsibility of such parties as manufacturers, suppliers, buyers and logistics providers (Bubicz *et al.*, 2021). Thus, SSCM has turned out to be a necessity in risk management, compliance, as well as sustainable competitive advantage in the global markets.

### Theoretical Perspectives Underpinning Sustainable Supply Chains

A number of theoretical insights offers a background to learn about sustainable supply chain practices. Among the most well-known paradigm is the triple bottom line approach, which promotes the simultaneous fulfillment of the economic viability, environmental stewardship and social equity. This outlook implies that companies should go beyond profit maximisation and start examining their overall consequences in the society and the natural environment (Sudusinghe & Seuring, 2020). In a garment supply chain, it is translated into the balance of efficiency in production and the responsible use of its resources and fair labour practices.

Stakeholder oriented views also support the need to have sustainability in supply chains since they draw special focus to different stakeholders such as workers, suppliers, customers, governments, and non-governmental organisations (Selvakumar, 2025). The intensity of influence on the decision-making processes of the supply chain by these stakeholders is different especially in industries that are subject to external scrutiny across the globe. The process of setting the sustainability expectations of international buyers and advocacy groups prevails in the garment industry, and the workers and local societies are less influential, but extremely important stakeholders (Jayalath *et al.*, 2024).

### This is critical in studying the adoption and prioritisation of sustainable practices of supply chain.

Institutional perspectives also have a role in the sustainability debate in that they place stress on the role of regulatory frameworks, norm, and industry standards (Khan, 2024). In developing nations, institutional pressures are usually externally based through buyer codes of conduct, certification programs and through international agreements as opposed to local regulations enforcement. Such an external orientation throws major implications of the nature and extent of sustainability practices adopted in garment supply chains.

### Environmental Sustainability in Garment Supply Chains

One of the key aspects of sustainable supply chain management within the garment industry is environmental sustainability because of the high rate of utilising nature resources and chemicals in the sector. Dyeing, washing and finishing are production processes that consume substantial amounts of water and energy produce hazardous amounts of waste and emissions (Fayyaz *et al.*, 2025). Therefore, the sustainability in the environmental aspect of the garment supply chains are usually based on the efficiency of the garment resources, lessening pollution, and the introduction of cleaner production technologies.

Through research, it has been revealed that in the garment sectors there has been a development of wastewater treatment systems, energy saving machinery used and the waste recycling programmes (Sims, 2025). Batches of environmentally friendly raw materials and sustainable packaging have also been considered as associate to larger supply chain efforts. The level of adoption however differs greatly amongst individual firms, greatly relying on financial ability, access to technology, and need to purchase (Velluti, 2024). Big exporter based manufacturers are in a good position to invest in environmental changes whereas smaller suppliers usually face the challenge of fulfilling sustainability requirements, simply because of the cost limitations.

Although the environmental initiatives have improved, there still lie issues in terms of ensuring coherence in implementation of various levels of the supply chains. Most of environmental sustainability activities often focus on the manufacturing phase with minimum consideration given to either the sourcing of raw materials upstream or downstream logistics (Pal, 2023). Such a piecemeal nature makes environmental sustainability of garment supply chains less effective in general and makes the integration of the more thorough and systematic approaches essential.

### Social Sustainability and Labour Issues in Garment Supply Chains

The issue of social sustainability is severe in the garment supply chains because the industry is tied to low-cost labour and has been connected with insufficient working conditions in the past. Social sustainability captures matters like occupational health and safety, remuneration, reasonable working hours, and freedom of association and the wellbeing of workers (Raihan, 2024). These concerns are especially relevant in the case of developing nations, where workers tend to be subjects of exploitation and hazardous workplaces, due to the inadequate labour protection and enforcement measures.

Research has always indicated that social sustainability programs in garments supply chains are mainly motivated by external pressures of international customers, government agencies, and civil society's organisations.

Code of conduct, compliance audits and certification schemes have been accepted as the common tools of labour practices (Ivanov, 2024). Although these actions have led to the positive results in working safety and minimum compliance, one should be worried about their efficiency in the area of more structural problems like power asymmetries, job insecurity, and limited worker involvement (Chakraborty & Biswas, 2020).

The other major problem is associated with subcontracting and informal production arrangements that prevail in production processes within garment supply chains. These activities undermine transparency and effective monitoring of labour conditions becomes hard. That is why, the most vulnerable workers are often out of reach of the social sustainability efforts (Alhassan *et al.*, 2025). The literature indicates that sustainable social performance entails the enhancement of supply chain management, increased transparency, and the increased intervention of employees in the entire decision-making procedures.

### Economic Sustainability and Supply Chain Performance

Economic sustainability is the capacity of firms and supply chains to be long-term profitable, resilient and competitive in the process of satisfying sustainability goals. The issue of economy is decisive in the implementation of sustainability in the garment industry as the suppliers are subjected to severe cost constraints and limited profit margins (Pandey & Jjirojhul, 2023). The buyers often require low prices with a short lead time, which puts pressure on economic activities and sustainability investments.

Studies have shown that although sustainable supply chain may be associated with high costs in the short term, it could have long term economic returns. This can reduce the costs of operating in the long term through improvement in resource efficiency, reduction in waste and optimisation of processes (Sinha & Jha, 2025). Moreover, the aspect of sustainability compliance may also raise the level of buyer trust, strengthening the relationship in the long term, and accessing the market. Nevertheless, the advantages do not necessarily manifest themselves instantly, which contributes to a serious lack of emphasis on long-term sustainability by many suppliers on the maintenance in the short term.

Unequal wealth distribution among the actors in the supply chain makes matters worse when it comes to adoption of sustainability (M & V, 2025). Service expenses are frequently on manufacturers and suppliers, reputational benefits and market advantages are often enjoyed by buyers. Such an imbalance provokes the question of fairness and incentives in the chain of supply of garments and outlines the necessity of fairer cost-sharing mechanisms to help to make the economy more sustainable.

### Sustainable Supply Chain Practices in Developing Countries

Different institutional, economic and socio-cultural contexts influence the realisation of sustainable supply chain practices in developing countries (Zhang & Zhong, 2025). Lack of regulatory implementations, poor infrastructure and financial restrictions often cripple sustainability efforts. Sustainability adoption in these environments tend to be reactive more than a proactive process that is dictated by the external demands of buyers and not the strategic nature of the company.

The suppliers of garment industries in the developing world usually consider sustainability as a verification issue but not competitive advantage (Shamsuzzaman & Islam, 2025). This compliance mentality may lead to surface implementation where the sustainability practices are used and its main aim is to meet audits without an actual role in incorporating it in the day to day activities of the organization. In addition, organization and technical skills are also limited which reduces the effectiveness of sustainability programs.

However, the emerging sustainability opportunities in the developing countries are also mentioned in the literature. Suppliers can work around supplier's capacity-building programmes, technology transfer, and collaborative partnership can address the issue of resource constraints. Specific research is necessary to find the pathways that helps to match the sustainability objectives to the local conditions and development priorities.

### Sustainability Challenges in Bangladesh's Garment Supply Chain

The garment industry in Bangladesh has a specific sustainability situation that is influenced by its role in the economy of Bangladesh, a labor-driven system, and participation in the global value chain (Abdullah *et al.*, 2025). Water pollution, energy inefficiency and waste management are some of the environmental issues that are especially acute, as the volumes of production are large, and the environmental infrastructure is underdeveloped. The social aspects such as the workers safety, their wages and job stability remain under the international focus (Lupo & Verma, 2025).

It is indicated in the literature that global purchasers and global regulations play a significant role in sustainability efforts by the supply chain of Bangladesh garments. Although these compulsions have resulted in quantifiable gains in factory safety and environmental standards, there are still worries as to its sustainability in the long run and local ownership of programs (Sharma & Sangal, 2025). Most companies embrace green business because they want to have a sustained business and not as part of its internal strategy.

The problems in coordination between the supply chain actors also limit sustainability. The lack of good information dissemination, sense of underdeveloped suppliers and broken governance create limitations in effectiveness of the sustainability efforts (Frempong

*et al.*, 2021). These issues highlight the importance of the combined supply chain strategies that cover the environmental, social and economic aspects at the same time.

### Research Gaps and Justification for the Study

Although there has been an increased amount of literature on sustainable supply chain management, there are evident gaps that still exist especially on the garment industry in Bangladesh. Current research tends to address individual sustainability challenges (like labour compliance or environmental performance) without considering their relationship with each other throughout the chain of supply. The empirical findings also do not have much at the firm-level of capturing the experiences, perception, and strategic motivation around sustainability adoption. Moreover, a significant part of the current studies embraces a compliance-oriented perspective as it implies a narrow scope regarding the efficiency and sustainable performance of sustainable supply chains. Absence of situational, holistic research limit the knowledge of how sustainability can be integrated into developing economy supply chain strategies. To fill these gaps, extensive literature should be conducted to include the environmental, social, and economic aspects and capture the actual circumstances of the Bangladesh garment supply chain.

### Conceptual Framework

Sustainable Supply Chain Practices is the independent construct, as in this framework and are conceptualised in three main dimensions of environmental practices,

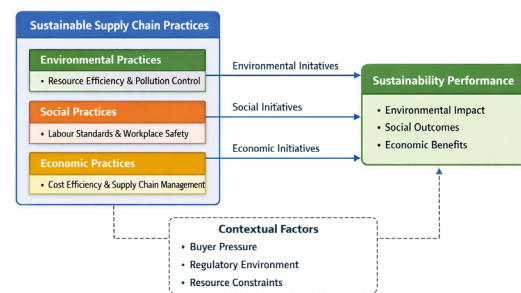


Figure 1: Conceptual Framework

social practices, and economic practices. Environmental activities involve efforts touching on the efficient use of resources, environmental pollution, waste management, and energy conservation in the supply chain processes. Social practices revolve around labour standards, safety in work place, welfare of employees, and ethical sourcing of suppliers in supplier networks. Economical operations are associated with cost-efficiency, supply-chain integration, lasting travelling to buyer to supplier relationship and resilience in operations. Such sustainable supply chain practices should have an effect on Sustainability

Performance which is the dependent construct of the framework. Sustainability performance results in the form of better environmental performance, and workers social conditions as well as economic sustainability of garment companies.

## MATERIALS AND METHODS

The project takes a framework approach and methodological approach in its research to analyze sustainable supply chain practices in Bangladesh Garment sector. The research design is formulated to provide the methodological rigor, relevance in the context, and correspondence to the objectives of the research. A quantitative research methodology is used in offering empirical evidence on the role of current practices and their sustainability implications given the nature of the research problem which aims at understanding what is practiced in the industry and how.

### Research Design

The research is based on the cross-sectional research design, where the data is collected at one time, among the garment manufacturing companies that are located in Bangladesh. This design can be used to capture the current practices in sustainability supply chain and evaluate them in connection to the sustainability performance. The main data collection instrument is a structured survey approach, which would facilitate the gathering of identical and fitting data on a fairly high number of participants.

### Study Population and Sample Selection

The study target population included export-oriented garment manufacturing companies in Bangladesh. These companies are chosen because they directly operate the global supply chains and are exposed to the requirement of sustainability which is enforced by international purchasers. The target population is derived in managerial and supervisory roles within the company such as supply chain managers, production managers, compliance officers, and sustainability-related staff because they have relevant knowledge on the subject of the supply chain operations and sustainability efforts.

A non-probability purposive sample is used so that the respondents are of sufficient experience and of relevant involvement in the activities pertaining to supply chain and sustainability. The size of the sample chosen is decided by the necessity of adequate statistical power during data analysis, availability of firms and their feasibility. This sampling methodology is appropriate since it is challenging to find a full sampling frame on the garment industry and also aiming at informed respondents.

### Data Collection Instrument

To collect the data, a structured questionnaire has been used that helped to measure sustainable supply chain practices and sustainability performance. The questionnaire has been designed into three major sections. The first part includes general firm and respondent variables, including

the size of the firm, the number of years of operation, and the position of the respondent. The second segment is devoted to the sustainable supply chain practices, which encompass the environmental, social and economic aspects. Products under this category evaluate measures touching on efficiency in terms of resources, waste management, labour norms, occupational safety, cost efficiency, and coordination of supply chains. Part three measures the outcomes of performance sustainability through the reduction of the environmental impact, improvement of society and economic advantages.

The questions in the questionnaire are all measured based on a five-point Likert scale, of strong disagreement to strong agreement. It is a scalable technique because it is easy, reliable, and is commonly used in supply chain and sustainability studies. Before final data collection, the questionnaire has been looked at in order to determine its relevancy and clarity such that the questions are descriptive of the constructs being studied.

### Data Analysis Techniques

Statistical analysis software is used to code and analyse collected data. They use descriptive statistics to generalise the characteristics of the respondents and give a general indication on the positive practices of sustainable supply chains among the sample. Means and standard deviations are some of the means that are used to determine the prevalent sustainability practices and performance level. Inferential methods of statistics are used to test the relation between sustainable practices in supply chain and sustainability performance. The strength and direction of the associations between variables are found by correlation analysis whereas the regression method is applied to find out the effect of the environmental, social, and economic practices of supply chains on sustainability performance. These methods of analysis are suitable to test the conceptual frames and to answer the research hypotheses.

### Reliability, Validity, and Ethical Considerations

In the quest to achieve reliability, internal consistency of measurement items is measured using the well documented indicators of reliability. The approach of content validity has been satisfied with proper questionnaire design and congruence with the concepts of sustainability and supply chain. The priority in the research process is ethical considerations. The research is conducted in accordance to the ethical standards of research that entails transparency, voluntary interest, and to undertake responsibility in data handling.

## RESULTS AND DISCUSSION

In this section, the empirical results of the research project on sustainable supply chain practices were presented and discussed in the garment industry of Bangladesh. The analysis is organized based on the most significant statistical products of the data, descriptive statistics, reliability analysis, a test of normality, correlation analysis

and multicollinearity diagnostics. These results are also incorporated into the discussion alongside the discussed study objectives and the conceptual framework to give a comprehensive picture of the relationship between environmental, social and economic practices relating to the sustainability performance on the supply chain.

**Descriptive Statistics of Study Variables**

The descriptive statistics illustrates a preliminary understanding of the level of sustainability performance and sustainable practices of a supply chain perceived to be practiced by the garment industry in Bangladesh. According to the feedback data of 300 participants, all

**Table 1:** Descriptive Statistics

| Variable                   | n   | Mean        | SD          | Minimum     | Maximum    |
|----------------------------|-----|-------------|-------------|-------------|------------|
| Environmental_Practices    | 300 | 3.013809524 | 0.546530976 | 1.428571429 | 4.57142857 |
| Social_Practices           | 300 | 3.002857143 | 0.552843988 | 1.571428571 | 4.42857143 |
| Economic_Practices         | 300 | 3.031428571 | 0.528324086 | 1.571428571 | 4.71428571 |
| Sustainability_Performance | 300 | 2.912857143 | 0.533587593 | 1.142857143 | 4.42857143 |

four major variables have mean values that are near to the median value in the scale of measurement, which depicts a moderate rate of adoption and performance.

The environmental practices scores an average of 3.01, which indicated that garment firms have embarked on the environmental sustainable practices that include water efficiency, energy management and waste minimization. But, the score does not point towards a high or developed state of environmental sustainability. This observation represents the truth of the Bangladesh garment industry with environmental programs usually presented as buyer-driven necessities and not as a proactive sustainability policy. The average standard deviation (0.55) also laboratories that there are changes in the firms, which means that though there are factories that have been quite intense in their environmental practices, some are well behind.

The average of the social practices is 3.00 which depicts an average of the implementation as well. It means that efforts that concern labour standards, safety in the workplace, and the welfare of workers are there but are not fully enshrined in the industry. The inconsistency of responses can be used to indicate different implementation and application of social sustainability concerns especially between various firms and management platforms. This observation is corroborated by the fact that the advances in social sustainability in the garment sector have been more of compliance and the focus on the audit, which leads to haphazard results.

Economic practices show a mean score of slightly higher (3.03) that shows that firms are focusing slightly more on economic sustainability such as cost competence, supply chain alignment, and buyer relations. Such outcome does not come as a surprise because economic survival and competitiveness are at the top agenda of garment manufacturers in the backdrop of cutthroat price competition. The standard deviation is relatively lower (0.53), which implies that economic practices are adopted by firms more in a uniform manner as opposed to environmental and social practices.

All other sustainable practices also show low adoption levels of sustainability in supply chain with the lowest mean value standing at 2.91, which implies that overall

sustainability performance has been lower despite moderate adoption of sustainability in supply chain practices. This disjuncture between performance outcomes and practices uptake indicates that sustainability efforts might not be as integrated and implemented well to produce tangible outcomes. All of these descriptive data point to the fact that even though sustainability-related practices are present in the garment supply chain in Bangladesh, their contribution to the outputs of tangible performance is limited.

**Reliability Analysis of Measurement Scales**

Analysis reliability, which has been determined by Cronbachs Alpha, raises a major issue on the internal

**Table 2:** Reliability Analysis

| Scale                      | Cronbach_Alpha |
|----------------------------|----------------|
| Environmental Practices    | 0.036009706    |
| Social Practices           | 0.0588994      |
| Economic Practices         | -0.0139219     |
| Sustainability Performance | -0.013135839   |

consistency of the measurement scales applied in the research. The Cronbach Alpha of environmental practices (0.036), social practices (0.059), economic practices (-0.014) are not even close to the conventional value of 0.70 and sustainability performance (-0.013) share the same value.

These findings suggest that the measures included in every scale do not always measure one underlying construct. The alpha values are extremely low and negative, which indicates there is a weak correlation between items and possible conceptual irrelevance between the survey items. Adverse Cronbachs Alpha values, in the case about economic practices and sustainability performance, indicate severe reliability problems, which can be caused either by the fact that the items are not correlated, or by the fact that indicators that are conceptually different are used to construct one scale.

Interpretatively, the results suggest that sustainable practices in supply chains in Bangladesh garment industry

might not be viewed as consistent and coherent units by the respondents. Rather, the environmental, social and economic efforts can be perceived as discrete, autonomous operations and not unified sustainability efforts. This inconsistency confirms the belief that sustainability in the garment supply chain is an implementation practice that is usually taken in micro-steps and is compliance based. The reliability problems also indicate that one should proceed with great care when interpreting any future inferential analysis. As the findings are very informative in terms of exploratory data, they demonstrate the necessity to conduct future studies that would refine measurement scales, possibly examine dimensions of sustainability independently and provide better conceptual congruence between survey questions.

**Assessment of Data Normality**

Shapiro-Wilk test of normality was done in an attempt to establish whether the data-distributions are distributed normally in their attempt to have the necessary normal distribution to perform the parametric statistical tests.

**Table 3:** Shapiro-Wilk Normality Test

| Shapiro-Wilk normality test |          |
|-----------------------------|----------|
| W                           | 0.99167, |
| p-value                     | 0.08909  |

The W statistic of the test was found to be 0.99167 with a p-value of 0.08909. Since the p-value is more than the traditional level of significance, 0.05, then the alternative of normality cannot be rejected.

This fact shows that the values are roughly normally distributed implying that the methods used in analyzing the data, including correlation and regression analysis,

**Table 4:** Correlation Analysis

| Correlation                |                         |                  |                    |                            |
|----------------------------|-------------------------|------------------|--------------------|----------------------------|
|                            | Environmental_Practices | Social_Practices | Economic_Practices | Sustainability_Performance |
| Environmental_Practices    | 1                       | 0.02358843       | -0.04500273        | -0.004051439               |
| Social_Practices           | 0.023588431             | 1                | 0.01160944         | -0.04936245                |
| Economic_Practices         | -0.04500273             | 0.01160944       | 1                  | -0.085646727               |
| Sustainability_Performance | -0.004051439            | -0.04936245      | -0.08564673        | 1                          |

show that the correlations between all variables pairs are very weak hence, there are no substantial linear relations in the data.

The environmental practices positively relate to the social practices with a very weak correlation ( $r = 0.024$ ), which implies that there is no strong correlation between implementing environmental practices and social sustainability practices by firms. This poor correlation points to the lack of an overall approach to sustainability, in which the process can be improved in one aspect and this change can be expected to support other aspects. The existing association among the environmental and economic practices are weakly negative ( $r = -0.045$ ), which

are parametric. This normality is used to strengthen methodological validity of the statistical procedures used in making the study. Nevertheless, although the data comply with the assumption of normality, the questions of reliability raised above indicate that statistical significance might not be sufficiently adequate to precisely denote the dynamics of sustainability underlying the garment supply chain.

**Correlation Analysis among Study Variables**

Shapiro-Wilk test of normality was done in an attempt to establish whether the data-distributions are distributed normally in their attempt to have the necessary normal distribution to perform the parametric statistical tests. The W statistic of the test was found to be 0.99167 with a p-value of 0.08909. Since the p-value is more than the traditional level of significance, 0.05, then the alternative of normality cannot be rejected.

This fact shows that the values are roughly normally distributed implying that the methods used in analyzing the data, including correlation and regression analysis, are parametric. This normality is used to strengthen methodological validity of the statistical procedures used in making the study. Nevertheless, although the data comply with the assumption of normality, the questions of reliability raised above indicate that statistical significance might not be sufficiently adequate to precisely denote the dynamics of sustainability underlying the garment supply chain.

**Correlation Analysis among Study Variables**

The correlation analysis studies the linkages between the environmental practices, social practices, economic practices and sustainability performance. The findings

suggests a possible perception among companies that the ecological efforts can be antagonistic to the economical effectiveness or economic goals.

The correlation between environmental practices and sustainability performance is nearly negligible ( $r = -0.004$ ), which makes it evident that, despite the environmental initiatives, nothing is perceived even in the general performance on sustainability. This observation could be an indication of the surface application of the regulations where the environment-related policies are implemented so as to meet buyer audit reviews instead of first initiating actual performance gains.

The positive relationship between social practices and

economic practices ( $r = 0.012$ ) is very weak meaning that there is little match between social responsibility activities and economic factors. The low negative relationship between the social practices and sustainability performance ( $r = -0.049$ ) implies that the social initiatives can lack effectiveness in their relation to the overall performance results, which might be because they are compliance-based initiatives.

The strongest negative correlation with the performance of sustainability is observed between economic practices ( $r = -0.086$ ), and the magnitude is weak. This finding could suggest that the high priorities of cost-cutting and efficiency may compromise the larger sustainability goals in case the environmental and social concerns are not sufficiently incorporated.

The findings of the correlation, in general, indicate that the adoption of sustainable supply chains in the Bangladesh garment industry is isolative and not synergistic. Environmental, social and economic projects seem to work separately, and their effectiveness of influencing the sustainability performance is limited. Such fragmentation compromises the aspect of the holistic sustainability model presented in the conceptual framework and brings into focus the aspect of integrated supply chain measures.

### Multicollinearity Diagnostics

Variance Inflation Factor (VIF) was used to determine the multicollinearity existence among independent variables.

**Table 5:** Variance Inflation Factor

| Variance Inflation Factor |        |
|---------------------------|--------|
| Environmental Practices   | 1.0026 |
| Social Practices          | 1.0007 |
| Economic Practices        | 1.0022 |
|                           |        |

The VIF of the environmental practices (1.0026), social practices (1.0007), and economic practices (1.0022) are very near to 1 meaning they do not have multicollinearity. These findings attest to the fact that the independent variables are statistically different and they do not cover much variance in the regression model. In terms of methodology, this makes the analysis more robust as every variable is interpretable without worrying about inflated standard errors and upset coefficients. Nevertheless, despite the absence of the multicollinearity issue, the fact that independent variables do not correlate with each other supports the idea that sustainability practices are not applied as the system of the garment supply chain. The fact that multicollinearity is nonexistent is not only a statistical feature but also a practical one, in the sense that the environmental, social, and economic initiatives are separated.

### Discussion of Key Findings in Relation to the Conceptual Framework

The proposed conceptual framework held that

environmental, social, and economic supply chain practices would have a positive impact on sustainability performance. Nevertheless, the empirical evidence does not play out this assumption strongly. Weak correlations and negative responses of the garment industry in Bangladesh indicate that sustainable practices applied to the chain of supply in these companies are not yet a cohesive mechanism that can achieve sustainable results in the future.

Moderate scores of descriptive scores show that there is the presence of sustainability practices that are not well rooted. Low sustainability performance mean also implies the presence of a discrepancy between the adopted policies and performance outcomes. The explanation of this gap could be adherence to regulations, the lack of managerial dedication, and the structural factors like the cost pressure and the inability to communicate with suppliers.

The reliability problems also suggest that constructs of sustainability might not have a consistent and consistent conceptualisation or operationalisation in firms. Such conceptual ambiguity can lead to poor implementation and performance measurement. Collectively these implications claim that sustainability in the Bangladeshi supply chain approach to the garment segment is at the transitional level where initiatives appear to be isolated and not these types of initiatives to consider as measures.

### Implications of the Results

As a manager, the outcomes raise awareness of how garment firms should go beyond the one-off sustainability efforts and implement a more comprehensive supply chain strategy. The environmental, social, and economic activities must be integrated and instilled in the operational strategies that core strategic level activities aim to makes visible enhancements in performance.

Policymaking, the findings implies that regulatory and industry commitments should promote the evolution of the sustainability practices more than merely being applied through adherence. Capacity-building programmes, supplier development initiatives as well as incentive mechanisms can be used in closing the gap between performance and practice adoption outcomes.

Academically, the findings are also relevant to sustainability literature, as it throws more insight into the difficulties associated with applying integrated sustainable supply chain practices in the setting of the developing countries. The findings highlighted the significance of location-based studies and measuring tools that are more sophisticated to grasp the nature of sustainability.

### CONCLUSIONS

The results demonstrate that the environmental, social, and economic sustainability practices are moderate in the garment firms, that is, their realization in real sustainability performance results is low. This means that there is much disparity between the implementation of sustainability-related practices and the realization of significant

environmental, social, and economic outcomes.

As seen in the empirical evidence provided, the practices of sustainable supply chains in the Bangladeshi garment industry were mostly inconsistent and not applied as a launch in unison of the secondary approaches of sustainability. Low correlation of sustainability dimensions indicates that the programs on environmental initiatives, social compliance and economic efficiency programmes do not go hand in hand. Rather, going through the sustainability practices seems to be largely motivated by the outside compliance pressure of international purchasers and not inner-company strategic dedication. Such a compliance-focused strategy restricts the sustainability initiatives in the long-term scope and intensity.

There are also considerable measurement and implementation challenges that are identified in the study. The extremely low levels of reliability show that sustainability constructs were not consistently perceived in the firms, as well as operationalised: a conceptual indistinctness and variability in the application of sustainability principles. Despite the data meeting statistical conditions including normality and the lack of multicollinearity, the low internal consistency of sustainability scales is an indication that it requires more specific measurement systems, and more coherent incorporation of sustainability on an organisational scale. Practically speaking, the results help to realise that there is need to look at sustainable supply chain management in a holistic and coordinated manner. Environmental, social, and economic efforts should be interconnected within main supply chain strategies through garment firms instead of viewing them as separate parts of compliance mandates. This transition can be encouraged by policymakers and other industry organizations better regulatory systems, capacity building, and incentives that facilitates long term sustainability as opposed to compliance that is short term.

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