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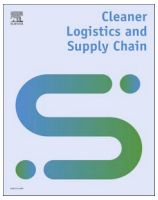

Weaving a greener future: The impact of green human resources management and green supply chain management on sustainable performance in Bangladesh's textile industry

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ABSTRACT

The purpose of this study is to investigate the impact of Green Human Resource Management (GHRM) and Green Supply Chain Management (GSCM) on the sustainable performance of the Bangladeshi textile sector. Specifically, the study focuses on environmental and employee-related aspects. Additionally, we examine how environmental performance and employee performance mediate the relationship between GHRM and GSCM. This study draws upon data collected from 450 employees across various textile enterprises in Bangladesh. Structural Equation Modeling is employed using the Amos 24 software to analyze the relationships and interactions among these variables. These findings demonstrate that using environmentally sustainable practices in human resource management and supply chain management results in enhanced sustainability. The study indicates that environmental performance significantly influences the relationship between GHRM and GSCM regarding sustainable performance. The study findings indicate that firms operating in the textile industry should implement GHRM and GSCM practices to enhance their sustainability performance. Additionally, it is recommended that these organizations prioritize the well-being and engagement of their employees. Implementing such a strategy can bolster the organization's comprehensive sustainability initiatives and raise its standing among stakeholders. This study contributes to the expanding body of literature on textile sustainability by investigating the mediating role of employee and environmental performance. It emphasizes the significance of GHRM and GSCM techniques in improving sustainable performance. The findings provide valuable insights for firms seeking to develop more effective sustainability initiatives.

1. Introduction

Based on available research, the textile sector has significantly contributed to the worldwide economy for a considerable period. It has created job prospects, generated income, and stimulated economic expansion (Masud et al., 2021; Nabi et al., 2022). However, from the creation and consumption of water, energy, and chemicals to the creation of trash and pollutants, this sector is well recognized as having a large effect on the natural environment (Bianco et al., 2021; Masud et al., 2021). Considering the urgent worldwide issue of environmental deterioration and the need to reduce the impact of climate change, it is increasingly essential for the textile sector to adopt more sustainable methods. (Feng & Ngai, 2020; Masud, 2019).

Bangladesh is a leading textile maker and exporter, but its natural resources, skilled labour, and infrastructure are limited. This research explores this remarkable paradox, showing how a textile behemoth faces major internal issues. This brief introduction highlights Bangladesh's success and internal challenges and sets the research's emphasis. (Holzberg, 2022; Masud & Mondal, 2017). Integrating Green Human Resource Management (GHRM) and Green Supply Chain Management (GSCM) have great potential to promote sustainability in Bangladesh's textile industry. By incorporating these groundbreaking methodologies,

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we expect a profound and positive effect on environmental conservation, ethical obligations, and the firm's long-term viability. This study aims to facilitate the development of an environmentally conscious and socially responsible textile sector in Bangladesh, thereby promoting a more sustainable and environmentally friendly future.

Bangladesh's textile sector is a dynamic contributor in the country's economy, making an important contribution to employment and Gross Domestic Production (GDP) (Hasan et al., 2022; Nabi et al., 2022). However, despite its phenomenal growth, there are significant environmental issues and workforce management difficulties. By evaluating the interactions between GHRM, GSCM, environmental performance, employee performance, and sustainable business practices, this study seeks to fill the gaps in the literature, particularly in the context of Bangladesh.

GHRM and GSCM are two interrelated strategies that promote ecological sustainability in the workplace by integrating environmental factors into managing human resources and supply chains. The objective of GHRM is to ensure that employees have a thorough understanding of and actively engage in environmentally sustainable practices in the workplace. (Saeed et al., 2018; Masud et al., 2017), GSCM is primarily concerned with minimizing the environmental impact of a company's supply chain. It achieves this by making ecologically conscious decisions when purchasing, transporting, and engaging in other associated procedures. These practices are regarded as crucial instruments for enhancing the sustainability of businesses.

Bangladesh's textile industry must be productive and socially responsible. Bangladesh exported the second-most clothes in 2022, behind China. In 2021–2022, Bangladesh exported $42.6 billion in garments, displaying its global economic power. Bangladesh's economic backbone is the RMG industry, which accounts for 82 % of export earnings (Qing et al., 2023) Textiles are crucial to the lives of about 4 million Bangladeshis, or nearly 8 % of the population. Bangladesh supplies essential markets like the US, EU, and Canada with ready-made garments. Bangladesh exports 21.5 % of its clothing to America (Dhali et al., 2023). This study examines the complex relationship between GHRM, GSCM, and industry success. This research aims to improve GHRM, GSCM, and sustainable performance by investigating environmental and employee performance as mediators. The findings may help Bangladeshi textile managers and policymakers. Understanding the complex relationship between these practices and performance results helps firms create and implement effective GHRM and GSCM programs for long-term success in the ever-changing sustainability context. The significance of this work is immense. The textile industry holds a prominent position in Bangladesh's economy, and enhancing sustainability performance within this sector will substantially positively affect the nation as a whole. (Hasan et al., 2022; Nabi et al., 2022). Furthermore, with the growing awareness among companies worldwide regarding the importance of sustainable practices, comprehending the influence of GHRM and GSCM on sustainability performance is crucial for managers and policymakers (Saeed et al., 2021). This investigation has the potential to assist those striving to enhance sustainability in the textile industry by examining the interrelationships among GHRM, GSCM, environmental performance, employee performance, and sustainable performance.

The existing study provides valuable insights into the intricate relationship between GHRM/GSCM practices, environmental and employee performance, and sustainable performance in Bangladesh's textile industry. However, there are still important questions that remain unresolved. This study aims to fill these gaps by addressing two key research questions: (A) what is the influence of GHRM and GSCM practices on the long-term performance of the textile sector in Bangladesh? (B) How does Bangladesh's textile industry's sustainability depend on employee and environmental performance? Bangladesh's textile industry's sustainability relies on its employees' performance and the environmental practices implemented. This study aims to provide innovative insights and practical recommendations for stakeholders interested in improving the industry's long-term sustainability by investigating these concerns. The rest of the paper is structured as follows: In Section 2, a critical review of the literature on sustainable performance, GHRM and GSCM practices, environmental performance, and employee performance is presented. The data collection and analysis procedures are outlined in Section 3. The study's findings are reported in Section 4. In Section 5, the results are discussed, their significance is evaluated, and some recommendations for further investigation are provided.

2. Literature review and Hypothesis development

As crucial sustainable business strategies, GHRM and GSCM have been gaining a lot of attention in recent years. In GSCM, environmental issues are systematically introduced into supply chain management, while in GHRM, environmental and sustainability concepts are incorporated into Human Resource (HR).

policies and procedures (Singh et al., 2019; Hossain et al., 2023; Masud et al., 2023).The effects of GHRM and GSCM on long-term success have been the subject of a large body of research. For instance, Singh et al., (2019) looked at how combining green HR practices, GSCM, and big data technology may improve business performance and boost sustainable competencies through corporate commitment. Al-Minhas et al. (2020) defined GHRM as the incorporation of environmental concepts into Human Resource (HR) policies and practices, whereas Tseng et al. (2019) performed a systematic literature review on GSCM.

Sustainable performance is a holistic approach that evaluates an organization's long-term impact on the economy, society, and the environment, and encompasses environmental sustainability, social responsibility, and financial stability (Masud et al., 2021; Masud et al., 2023; Wang et al., 2023). Therefore, by incorporating GHRM and GSCM into their business practices, organizations can improve their sustainable performance and contribute favorably to the world's economy, society, and ecosystem.

2.1. Underpinning theory

Theoretical statements indicate that the assumed connections between the concepts in this study are positive and straightforward. GHRM and GSCM are recognized as crucial drivers for attaining sustainable performance in the textile industry. Given the facts we have provided, multiple theoretical frameworks could be appropriate for our study. The Resource-Based View (RBV): This idea highlights the significance of a company's internal resources and competencies in attaining a competitive edge (Hasan et al., 2022; Nabi et al., 2022). The Natural Resource Dependence Theory (NRDT) suggests that enterprises relying on natural resources, such as the textile industry, are more inclined to embrace environmentally friendly methods to manage risks and secure long-term viability. Institutional Theory: This theory centers on the impact of external institutions and norms on the conduct of organizations. Implementing GHRM and GSCM techniques in the textile sector is driven by societal pressure and environmental legislation. This, in turn, is resulting in environmental and employee performance enhancements. We utilized the theoretical framework of Normative Rationality Decision Theory (NRDT); The RBV and Institutional Theory as proposed by Singh et al., (2019 and Hossain et al. (2023) in our study. One of the crucial aspects for successfully implementing green supply chain practices in the sector is the adoption of GHRM practices. These factors can affect the long-term success of the textile sector in Bangladesh, with environmental and personnel performance acting as potential intermediaries. According to the hypothesis, it is believed that each of these linkages will exhibit a positive and direct impact (see Fig. 1).

2.2. Hypothesis development

The RBV theory provides a tactical viewpoint on the significance of

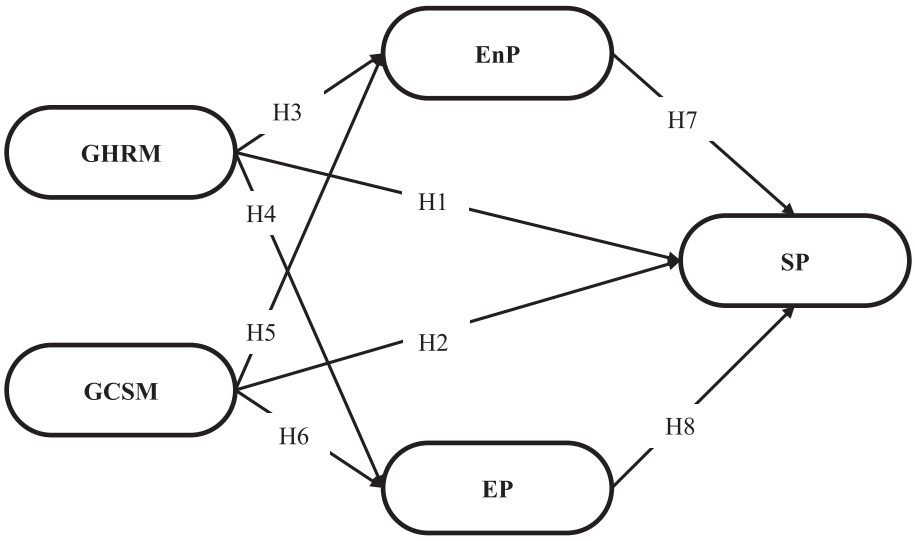

Fig. 1. Theoretical Model. **Notes**: GHRM: green human resource management; GSCM: green supply chain management; EnP: Employee performance; EP: Environmental performance; SP: Sustainable performance.

an organization's distinctive resources and skills in gaining long-term competitive advantage (Lubis, 2022). In this context, we develop hypotheses linking GSCM, GHRM, and employee, environmental, and sustainable performance (Ziyadeh et al., 2023c). The GHRM and GSCM practices are regarded as important internal resources that influence performance within the RBV framework (Al-Alawneh et al., 2023). With the RBV's emphasis on the strategic significance of internal assets, we will investigate how these practices affect environmental and employee performance.

2.2.1. GHRM and sustainable performance

The RBV theory posits that organizations can achieve sustained competitive advantage through the effective deployment of unique resources and capabilities (Ziyadeh et al., 2023b). In the context of GHRM, the incorporation of environmental sustainability principles into Human Resource Management (HRM) processes represents a distinctive resource, as per Bianco et al. (2021). Implementation of GHRM practices can result in enhancement of an organization's sustainable performance, as noted by Saeed et al. (2018). These practices can encourage ecologically conscious actions among workers and equip them with the required information and abilities to function sustainably, as highlighted by Feng and Ngai (2020) and Green et al. (2019). GHRM involves incorporating environmental sustainability principles into key HRM processes, including recruitment, training, development, retention, and health monitoring (Masud et al., 2021; Gazi et al., 2023; Hossain et al., 2023). The adoption of a sustainability culture through GHRM practices has the potential to enhance an organization's economic, social, and environmental outcomes (Pathak et al., 2020; Hossain et al., 2023). Moreover, GHRM practices can also contribute to an organization's social performance by fostering employee well-being through various measures such as promoting work-life balance, providing access to support programs for employees, and encouraging further education and training (Holzberg, 2022).

Numerous studies have explored the correlation between GHRM and sustainable performance, and have provided empirical evidence supporting a favorable association between the two (Bianco et al., 2021; Green et al., 2019; Holzberg, 2022; Masud et al., 2021; Pathak et al., 2020; Saeed et al., 2018; Singh et al., 2019). One example is the study by Saeed et al. (2018), A positive correlation was shown between GHRM practices and the long-term viability of a business. Based on their research, implementing GHRM practices can cultivate a sustainability-oriented mindset within a company's employees. This results in adopting environmentally friendly activities and improved environmental, societal, and economic outcomes. Likewise, in accordance with Bianco et al. (2021) research, it was observed that implementing GHRM practices is essential for improving a company's sustainable performance, indicating a positive correlation between GHRM and sustainable practices.

Given the above-mentioned empirical evidence, we postulate the following hypothesis:

Hypothesis 01: GHRM is positively related to Sustainable Performance.

2.2.2. GSCM and sustainable performance

The RBV theory highlights the strategic significance of resources and capabilities, and GSCM practices can be considered valuable and unique resources (Al-Alawneh et al., 2023). GSCM, which incorporates environmental sustainability principles into supply chains, has attracted much attention due to its potential to increase the social and environmental performance of businesses (Green et al., 2019; Gazi et al., 2022). According to Elbaz and Iddik (2020), GSCM integrates the principles of environmental sustainability throughout the supply chain from the source of raw materials through product disposal. According to the study by Green et al. (2019) and Liu et al. (2020), GSCM practices such as selecting environmentally responsible suppliers, enacting green procurement laws, and reducing waste and pollution in the production process can improve sustainability performance. By implementing green practices, businesses can reduce their negative impact on the environment and improve their standing as socially responsible companies.

Additionally, GSCM can contribute to the social performance of organizations by promoting fair labor practices among suppliers and partners, thereby improving the well-being of employees and stakeholders (Pathak et al., 2020). Adopting green logistics practices, such as using low-emission transportation and reducing packaging waste, can also reduce the environmental impact of organizations and enhance their reputation as socially responsible entities (Green et al., 2019; Masud et al., 2023).

Moreover, firms can achieve financial advantages by improving supply chain efficiency and effectiveness through just-in-time inventory systems and lean manufacturing processes. (Majumdar & Sinha, 2019; Gazi et al., 2022). To recapitulate, the incorporation of eco-friendly procedures across the supply chain, advocacy of equitable labor practices, and enhancement of overall supply chain efficiency and efficacy are imperative factors in promoting sustainable performance.

In alignment with the RBV theory, we propose the following hypothesis based on previous research:

Hypothesis 02: GSCM is positively related to Sustainable Performance.

2.2.3. GHRM and environmental performance

Following the RBV theory, the implementation of GHRM methods has a favorable effect on an organization's environmental performance, at least according to the research currently in use (Rehman et al., 2021; Gazi et al., 2022). To implement GHRM strategies, all facets of human resource management, including hiring, orientation, training, development, and retention, must incorporate environmental sustainability principles. Additionally, employee well-being and commitment to the organization's sustainability goals must be evaluated (Bataineh, 2019). Organizations can effectively mitigate their influence on the world by fostering eco-conscious behaviours among employees, implementing training and education initiatives, and establishing policies and practices that prioritize environmental sustainability (Kumar et al., 2023).

It is worth noting that compliance with environmental regulations is also an important aspect of GRHM practices (Freitas et al., 2020). Through training and education programs on environmental regulations and the implementation of policies and procedures that align with these regulations, organizations can ensure that they comply with the relevant laws and regulations, thereby avoiding penalties or legal issues. Incorporating environmental sustainability into HRM can be achieved in several ways, such as creating a culture of sustainability that benefits both the organization and its employees (Aldaas et al., 2022; Nabi et al., 2021). According to Wongleedee (2020), organizations that cultivate such a culture are inclined to accomplish their environmental goals by diminishing their environmental footprint and enhancing their standing as a socially responsible entity. This suggests that establishing an environmentally conscious culture can significantly benefit organizations in terms of both environmental impact and reputation.

According to Rehman et al. (2021), there exists a strong correlation between the implementation of GHRM and an organization's environmental performance. Adopting GHRM practices has been found to lead to enhanced overall environmental performance. In order to further improve their environmental performance, organizations must cultivate environmentally responsible practices among their staff, provide environmental education and training opportunities, introduce environmentally sound policies and procedures, and establish a culture of sustainability, as suggested by Bataineh (2019). We therefore propose the following:

Hypothesis 03: GHRM is positively related to Environment Performance.

2.2.4. GHRM and employee performance

In line with the RBV theory, integrating environmental sustainability concepts into various human resource management areas for operationalizing GHRM practices, including recruitment, training, development, retention, and monitoring employee well-being and commitment. Academic studies in the field of sustainability and HRM support this privilege. According to Elbaz and Iddik (2020), such practices have been associated with significant enhancements in employee performance. By promoting environmentally-friendly behaviors among employees, providing training and education programs, and developing policies and practices that promote environmental sustainability, organizations can create a culture of sustainability that benefits both the organization and its employees.

Research has shown that employees who understand and engage with their organization's sustainability goals may have higher levels of motivation, the implementation of this approach may result in enhanced productivity, work quality, and attendance, as supported by scientific evidence. (Liu et al., 2020; Shou et al., 2020; Hossain et al., 2021). Additionally, organizations that prioritize employee well-being by encouraging a healthy work-life balance, providing access to employee support programs, and promoting further education and training may experience lower turnover rates and a more positive organizational culture (Reche et al., 2022).

Furthermore, enterprises that accord significance to ecological sustainability using GHRM practices can entice and uphold proficient staff members who are stimulated by the prospect of operating in an ecologically responsible manner (Kumar & Rao, 2023; Kalyar et al., 2019; Kalyar et al., 2019b; Masud et al., 2021). The positive link observed between GHRM and employee performance suggests that organizations can derive benefits by implementing Green HRM practices to improve their overall performance. This led us to hypothesize that:

Hypothesis 04: GHRM is positively related to Employee Performance.

2.2.5. GSCM and environmental performance

In contemporary times, there has been a worldwide change towards ecological sustainability, and corporations are not immune to this transformation. Many enterprises have adopted GSCM tactics to diminish their environmental impact and boost their overall environmental effectiveness (Bianco et al., 2021). According to Feng and Ngai (2020), the integration of eco-sustainability principles throughout the supply chain process, starting with the procurement of raw materials and ending with the promotion of final products, is an important component of GSCM. GSCM Seeks to mitigate environmental harm by incorporating sustainable measures throughout the supply chain.

GSCM consults a significant benefit to organizations by facilitating compliance with environmental regulations and mitigating legal risks (Holzberg, 2022; Amin et al., 2020). Adhering to relevant regulations can be ensured by selecting partners and suppliers who are compliant with environmental regulations and by implementing policies and procedures that are in line with these regulations, which can prevent legal issues and penalties. Furthermore, the adoption of green logistics practices, such as minimizing packaging waste and employing low-emission transportation, can contribute to reducing the environmental impact of organizations and improve their reputation as a socially responsible entity (Saeed et al., 2018).

Moreover, Singh et al. (2019) have established a verifiable link between GSCM and improvements in environmental performance. Through the encouragement of environmentally-friendly supply chain practices, the enforcement of compliance with environmental regulations, and the integration of green logistics, GSCM facilitates businesses in improving their environmental performance. Hence, a robust link exists between GSCM and environmental performance, thereby leading to the formulation of the following hypothesis:

Hypothesis 05: GSCM has a positively related to Environmental Performance.

2.2.6. GSCM and employee performance

Reche et al. (2022b) indicates that the adoption of GSCM methods can have a beneficial effect on employee performance. Implementing GSCM involves incorporating principles of environmental sustainability into the entire supply chain, including sourcing raw materials, product design, and distribution methods. GSCM can improve employee performance by choosing suppliers and partners who prioritize fair labour practices. This ensures that employees are not negatively affected by the organization's operations, resulting in improved motivation, job satisfaction, and attendance (Kumar & Rao, 2023).

Additionally, it is noteworthy that GSCM promotes a sustainable workplace environment, which may potentially result in heightened levels of employee engagement and motivation. By adopting eco-friendly practices and sustainable sourcing of raw materials, organizations can establish a positive work environment that attracts and retains talented employees who are motivated to work in an environmentally responsible manner. Furthermore, the incorporation of eco-friendly logistics methodologies and the placement of just-in-time inventory systems may culminate in a more proficient and productive supply chain, thereby engendering better job performance among personnel.

In synthesis, extant empirical studies have demonstrated a robust

affirmative association between GSCM and employee performance. Organizations that adopt GSCM practices are likely to experience a significant increase in worker productivity (Bianco et al., 2021; Feng & Ngai, 2020; Holzberg, 2022; Saeed et al., 2018; Singh et al., 2019; Masud & Hossain, 2019). The adoption of GSCM practices, which promote just labor standards, establish a sustainable workplace, and enhance supply chain efficiency, can act as a driver for organizations to achieve greater overall performance. Thus, this study proposes the following hypothesis:

Hypothesis 06: GSCM is positively related to Employee Performance.

2.2.7. Environment performance and sustainable performance

Contemporary research suggests that firms can improve their sustainable performance by adopting environmentally conscious activities that reduce their adverse effects on the environment and comply with environmental regulations and norms (Kalyar et al., 2019b; Rehman et al., 2021; Masud & Ferdous, 2016). These practices include the implementation of eco-friendly policies that promote responsible resource usage, energy conservation, and waste reduction. Not only do they benefit the environment, but they can also attract and retain environmentally conscious consumers, leading to improved economic performance (Kalyar et al., 2019b).

Furthermore, organizations can enhance their sustainable performance by aligning their policies and procedures with relevant regulations and standards, which also helps them avoid legal issues and penalties. By promoting the use of energy-efficient systems, reducing waste, and promoting the sustainable sourcing of raw materials, organizations can create a more sustainable future and reduce costs associated with energy and materials (Kalyar et al., 2019b).

Based on empirical evidence and supported by previous research, there appears to be a substantial link between environmental performance and sustainable performance. Companies that exhibit robust environmental performance are more inclined to attain improved environmental, social, and economic performance, as stated by Rehman et al. (2021). Therefore, the present study puts forward the following hypothesis:

Hypothesis 07: Environment Performance is positively related to Sustainable Performance.

2.2.8. Employee performance and sustainable performance

According to Bataineh (2019), an employee's performance is defined by their level of competence in carrying out their duties, which includes factors such as productivity, quality, and turnout. Through the facilitation of a work-life balance, implementation of employee support programs, and provision of education and training opportunities, enterprises can enlarge workforce engagement and motivation, thereby resulting in enhanced performance. This can positively impact organizational performance by improving productivity, promoting fair labor practices, and creating a culture of sustainability that benefits both the organization and its employees.

Moreover, involving employees in the organization's sustainability goals and creating a culture of sustainability can improve employee performance by increasing motivation and engagement. GRHM practices, as proposed by Elbaz and Iddik (2020), can help organizations incorporate environmental sustainability principles into all areas of human resource management, including recruitment, selection, training, and retaining. By fostering pro-environmental behaviors, delivering training and development programs, and implementing policies and practices that support environmental sustainability, organizations can empower their employees with the competencies and awareness necessary to operate sustainably, limit their environmental footprint, and enhance their overall environmental efficacy (Masud & Alam, 2014).

Thus, empirical research suggests a positive relationship between sustainability and employee performance. Firms with great employees tend to increase their sustainable performance, which improves financial results and worker happiness. Hence, based on the previous discussion, the present study proposes the following hypothesis:

Hypothesis 08: Employee Performance is positively related to Sustainable Performance.

2.2.9. The mediating role of environmental performance and employee performance

Understanding the relationship between GSCM, GHRM, and sustainability performance in the textile industry of Bangladesh requires an understanding of the critical roles played by mediating variables like environmental performance and employee performance. Environmental performance is the effect that business operations and products have on the environment, and environmental performance may be improved by including environmental considerations into HRM processes (De Souza Freitas et al., 2020; Kumar et al., 2023). Asif *et* al. (2020) claim that the GSCM strategy strives to integrate environmental considerations into sourcing, procurement, production, and transportation.

According to earlier studies Aldaas et al. (2022), GHRM and GSCM have a favorable effect on environmental performance, and employee performance can mediate the relationship between GHRM and GSCM practices and sustainable performance in the textile industry (Rehman et al., 2021c; Paul et al., 2013). Employee productivity can also serve as a bridge between GHRM policies and long-term success, with GHRM practices boosting productivity by enticing supervise to get involved in the business' environmental objectives.

In the context of the textile industry in Bangladesh, mediation analysis can reveal the underlying causal pathways linking GHRM and GSCM practices to environmental performance, employee performance, and sustainable performance. This critical analytical approach can shed light on the complex mechanisms at play and provide a scientific basis for understanding the relationships between these crucial variables.

Based on the literature review, the following hypotheses are proposed:

Hypothesis 09a: Environmental performance plays a significant role in the interplay between GHRM and sustainable performance.

Hypothesis 09b: Environmental performance has an influence on the interplay between GSCM and sustainable performance.

Hypothesis 10a: The interplay between GHRM and sustainable performance is influenced by employee performance.

Hypothesis 10b: The interplay between GSCM and sustainable performance is influenced by employee performance.

3. Research methodology

3.1. Research design and operationalization of constructs

Bangladesh's textile industry's toxic and hazardous waste was quantified to assess its environmental impact. Cross-sectional surveys were used to collect data from a representative textile manufacturing sample. Textile industry representation was achieved by stratified random selection. 700 textile factories in Gazipur, Savar, and Narayanganj were targeted. 450 executives, managers, and directors from supply chain, manufacturing, marketing, and operations participated. The list included 425 yarn mills, 796 fabric mills, and 240 dyeing mills. Data collected from January to June 2022 provided a complete picture of practices and perceptions. A standardized questionnaire was created to gather respondents' thoughts on their organizations' environmental practices. Participants were randomly recruited from the identified industries to ensure diversity across textile production stages. The study's 64.28 % response rate indicates a solid and representative sample. This degree of engagement improves dependability and generalizability. The main variables were environmental practices, and GHRM and GSCM implementation. Environmental awareness, waste disposal, and sustainable practices in human resource management and supply chain operations were measured quantitatively. The associations between variables were examined using descriptive statistics and inferential

analysis. We acquired Barishal University Institutional Review Board or Ethics Committee approval before collecting data. Each participant gave informed consent for confidentiality and voluntary participation.

These concepts have emerged from the sustainable business practices and environmental management literature were developed by the (Pathak et al., 2020; Hossain et al., 2023; Bianco et al., 2021; Feng & Ngai, 2020; Green et al., 2019; Holzberg, 2022; Masud et al., 2021; Pathak et al., 2020; Saeed et al., 2018; Singh et al., 2019).

3.2. Tools and analysis

The decision to use structural equation modeling (SEM) as the analytical technique was made because of its effectiveness in assessing the validity and reliability of the theoretical relationships between variables in the model. This crucial decision was made to augment the scientific rigor of our research. In this work, we utilized Amos-24 and SPSS, software packages that provide simultaneous and immediate estimation of the measurement and structural models. These software packages employ rigorous statistical approaches. Initially, we assessed the measurement model following the recommendation of Anderson and Gerbing (1988) by examining the relationships between variables and items. Afterwards, a structural model analysis is conducted to learn more about the variables and their relationships. We inspected the study constructs in the measuring model for both convergent and discriminant validity.

4. Empirical results

4.1. Survey administration and socio-demographic profile of the respondents

A research investigation encompassing 450 employees employed in the textile sector in Bangladesh was executed. The study participants were predominantly female (54.9 %) while the remaining participants were male (45.1 %) (See Table 1). The usage of gendered language in this context is scientific, as it accurately reflects the gender distribution of the study population. Most of the participants were highly educated, with 57.3 % holding a graduate degree and 38.2 % holding a post-graduate degree. Only a small percentage (2.7 %) had a doctorate degree, while 1.8 % were undergraduates. The participants had varying levels of work experience, with 34.4 % having less than 5 years, 41.1 % having 5–10 years, and the remaining 24.5 % having 11 or more years of experience. The participants held various positions, with the largest group being senior executive officers (28.0 %). The majority of the participants worked in the garments manufacturing sector (28.7 %) and held positions in the supply chain department (34.0 %). The majority of the sampled companies, amounting to 74.2 %, had a workforce of over 200 employees. Furthermore, every company in the sample has certifications in both ISO 9000 and ISO 14001 standards.

Table 1
Demographic characteristics (n = 450).

Variable	Items	Percentage
Gender	*Male*	*45.1 %*
	Female	*54.9 %*
Educational qualification	*Undergraduate*	*1.8 %*
	Graduate	*57.3 %*
	Post-Graduation	*38.2 %*
	Doctorate	*2.7 %*
Work experience	*'Less than 5 years'*	*34.4 %*
	'5–10 years'	*41.1 %*
	'11–15 years'	*16.2 %*
	'16–20 years'	*6.4 %*
	'More than 20 years'	*1.8 %*
Position	*'Executive officer'*	*25.1 %*
	'Senior executive officer'	*28.0 %*
	'Assistant manager'	*22.2 %*
	'Senior Manager/Manager'	*13.3 %*
	'General manager/DGM'	*8.0 %*
	'Managing director/Director/ CEO'	*3.3 %*
Company Type	*'Yarn manufacturing'*	*5.6 %*
	'Fabric manufacturing'	*25.6 %*
	'Garments manufacturing'	*28.7 %*
	'Dyeing industry'	*9.1 %*
	'Printing industry'	*9.6 %*
	'Washing industry'	*7.3 %*
	'Home textiles'	*5.8 %*
	'Sweater manufacturing'	*4.0 %*
	'Accessories industry'	*4.4 %*
Working department	*'Production'*	*18.4 %*
	'Supply chain'	*34.0 %*
	'Operations'	*27.8 %*
	'Marketing'	*14.0 %*
	'Research and development'	*5.8 %*
Age of company	*'Less than 5 years'*	*28.2 %*
	'6 to 10 years'	*35.1 %*
	'11 to 15 years'	*22.4 %*
	'16 to 20 years'	*10.0 %*
	'More than 20 years'	*4.2 %*
Employees	*'Under 200 employees'*	*23.1 %*
	'Over 200 to 500 employees'	*35.3 %*
	'Over 500 to 1000 employees'	*26.7 %*
	'Over 1000 to 2000 employees'	*12.2 %*
	'Over 2000 employees'	*2.7 %*
'Is your company ISO 9000 certified?'	*'Yes'*	*100 %*
	'No'	*0 %*
'Is your company ISO 14001 certified?'	*'Yes'*	*100 %*
	'No'	*0 %*

4.2. Common method bias test (CMB)

It is possible that common method biased (CMB) is present since the same instrument was used to capture both the endogenous and exogenous variables. To ensure that CMB is not a serious problem, we used systematic and statistical methods (Aithal & Aithal, 2020). We used a separate *t*-value for each of the primary dimensions to check for non-response bias, and found that respondents were consistent without any needless discrepancies. It may be deduced that there are no major concerns of technique biases since the analysis showed that the first factor accounted for 42 % of the variation and that 6 factors are responsible for beginning values larger than 1.

4.3. Descriptive statistics (EFA)

Table 2 displays Exploratory Factor Analysis (EFA)'s main findings. The correlation matrix analysis confirmed sufficient correlations between the measures for factor analysis. Eigenvalue determined the number of factors. Kaiser-Meyer-Olkin was 0.891, within the acceptable range. Bartlett's sphericity test fit the correlation matrix well ($p < 0.000$). Communalities of 25 measurements ranged from 0.790 % to 0.953 %.

4.4. Measurement model evaluation

The study's measurement instrument demonstrated psychometric soundness (see Fig. 2), with robust reliability shown by Cronbach's alpha and composite reliability scores exceeding 0.70, and convergent validity supported by standardized factor loads and average variance extracted meeting or exceeding the requisite minimum thresholds of 0.70 and 0.50, respectively (see Table 3).

4.5. Reliability and validity measurements

Our assessment of the reliability of the measurement model involved a critical evaluation of its convergent and discriminant validity. All constructs had appropriate loadings above 0.70, meeting the criteria for convergent validity. We also calculated the Cronbach's alpha, average

Table 2
Model estimates and factor extraction outcomes of the EFA.

Items	Mean	Std. Deviation	Factor Loadings				
			1	2	3	4	5
EnP01	5.24	1.650	0.953				
EnP06	5.48	1.751	0.935				
EnP02	5.29	1.655	0.900				
EnP03	5.26	1.669	0.890				
EnP04	5.33	1.552	0.888				
EnP05	5.17	1.555	0.874				
GHRM01	5.16	1.667		0.922			
GHRM02	5.16	1.668		0.865			
GHRM05	5.19	1.607		0.847			
GHRM04	5.36	1.604		0.833			
GHRM06	5.33	1.585		0.826			
GHRM03	5.19	1.502		0.790			
SP01	5.32	1.752			0.940		
SP03	5.35	1.724			0.936		
SP02	5.35	1.795			0.925		
SP05	5.49	1.743			0.913		
GSCM01	5.19	1.701				0.937	
GSCM02	5.19	1.752				0.927	
GSCM04	5.35	1.643				0.921	
GSCM03	5.36	1.683				0.890	
EP02	5.35	1.645					0.895
EP03	5.30	1.628					0.876
EP04	5.30	1.652					0.866
EP05	5.32	1.645					0.855

variance extracted (AVE), and coefficient of determination, which exceeded the critical thresholds of 0.70, 0.50, and 0.70, respectively, indicating satisfactory reliability and validity statistics. Furthermore, we examined inter-item correlations and found that all square root of AVE values exceeded relevant correlation values, indicating no issues with discriminant validity (see Table 4).

4.6. Model fit test

Our assessment of overall model fit included established indicators such as GFI, AGFI, NFI, RFI, CFI, IFI, and TLI. To be deemed excellent, these should exceed 0.9 and be less than 3 (Bentler, 1990), while RMSEA should be under 0.08 (Hu & Bentler, 1998). Our model met these standards with CMIN/DF = 1.390, GFI = 0.942, AGFI = 0.928, NFI = 0.965, CFI = 0.990, IFI = 0.990, TLI = 0.988, and RMSEA = 0.029 (see Table 5). These statistics reflect a satisfactory and strong model fit.

4.7. Structural model analysis

We created a structural model to examine how our variables impacted the results. Table 6 summarizes the model fit indices, indicating the model fits moderately well (CMIN/DF = 1.460, GFI = 0.938, AGFI = 0.924, NFI = 0.931, CFI = 0.988, IFI = 0.988, TLI = 0.986, and RMSEA = 0.032). (Fig. 3) illustrates the routes between components, revealing that the model explains 55 % of environmental performance, 41 % of sustainability performance, and 49 % of employee performance. These findings suggest reasonable predictability.

Table 6 presents the postulated interrelationships among GHRM, GSCM, environmental performance, employee performance, and sustainable performance in the textile industry of Bangladesh. The critical analysis revealed that GHRM exerts a significant and favorable impact on both long-term performance and environmental performance, while its influence on sustainable performance and employee performance was not statistically significant. Moreover, GSCM was observed to have a positive and acute effect on environmental performance. Furthermore, it was discovered that employee performance significantly and positively impacted sustainable performance, whereas environmental performance had a somewhat favorable impact. The fit indices of the structural equation model suggest that it is a highly accurate and crucial representation of the variables. Thus, the findings of this study suggest that the adoption of GHRM and GSCM practices may critically enhance sustainability performance in Bangladesh's textile industry through the critical mediating effect of environmental and employee performance.

4.8. Mediation analysis

Using Hayes' product of coefficient method and bootstrapping technique, a study investigated the relationship between GHRM, GSCM, and sustainable performance, mediated by employee performance and environmental performance (Hayes, 2009). The study aimed to determine the importance of indirect impact by checking whether the confidence range for mediating effect included zero. Results showed that GHRM significantly influenced sustainable performance through employee performance (0.014, 95 % CI [0.000, 0.047], p = 0.034) and environmental performance (0.008, 95 % CI [-0.006, 0.039], p = 0.312), while GSCM indirectly affected sustainable performance through employee performance (0.017, 95 % CI [0.001, 0.051], p = 0.022), but not via environmental performance (0.006, 95 % CI [-0.006, 0.036], p = 0.402). The mediation study provides support for the impact of GHRM and GSCM on sustainable performance via employee performance (Table 7).

4.9. Coefficient of determination (R2)

Table 8 displays coefficients of determination for Environmental, Sustainable, and Employee Performance, indicating proportion of explained variation in each construct's performance. Coefficients of 0.55, 0.41, and 0.49 respectively suggest significant contributing factors with other factors not captured.

5. Discussion

This study applies the RBV theory to explore the relationship between GHRM and GSCM in the Bangladeshi textile sector. It specifically investigates how these practices influence sustainability performance. This research highlights the crucial significance of environmental and employee-related aspects. Empirical evidence supports the conclusion that implementing GHRM and GSCM has a beneficial effect on the sustainability performance of the textile industry in Bangladesh. The results of this study confirm the hypothesis that GHRM is positively associated with both sustainability performance (H1) and environmental performance (H3). Existing literature has previously demonstrated the significant impact of GHRM adoption on sustainability and environmental performance (Wongleedee, 2020; Masud et al., 2013). In addition, GSCM has a positive relationship with environmental performance (H5), and previous studies have emphasized the role of GSCM in enhancing sustainability performance (Al-Sheyadi et al., 2019). While previous studies indicate a positive relationship between GSCM and sustainability performance (Bonoli et al., 2021b; Hossain & Masud, 2012), our results do not support this hypothesis (H2) based on scientific critical analysis.

The hypothesis that employee performance is favorably correlated with sustainability performance (H8) was supported, and prior studies confirmed that employee performance has a significant impact on sustainability. Contrary to the claims made by Wang et al. (2020) and Mira et al. (2020), we find no evidence that GHRM (H4) or GSCM (H6) have any impact on employee performance (Al-Sheyadi et al., 2019). In contrast, a negative correlation between environmental performance and sustainability performance was discovered (H7), indicating that environmental performance is not a robust mediator. This study's findings provide credence to the idea that GHRM and GSCM are critical to boosting sustainability outcomes in Bangladesh's textile sector. And given the critical positive relationship between GHRM and sustainability performance, it is reasonable to believe that enterprises that adopt eco-friendly training programs and environmental responsibility initiatives will experience a corresponding increase in their sustainability

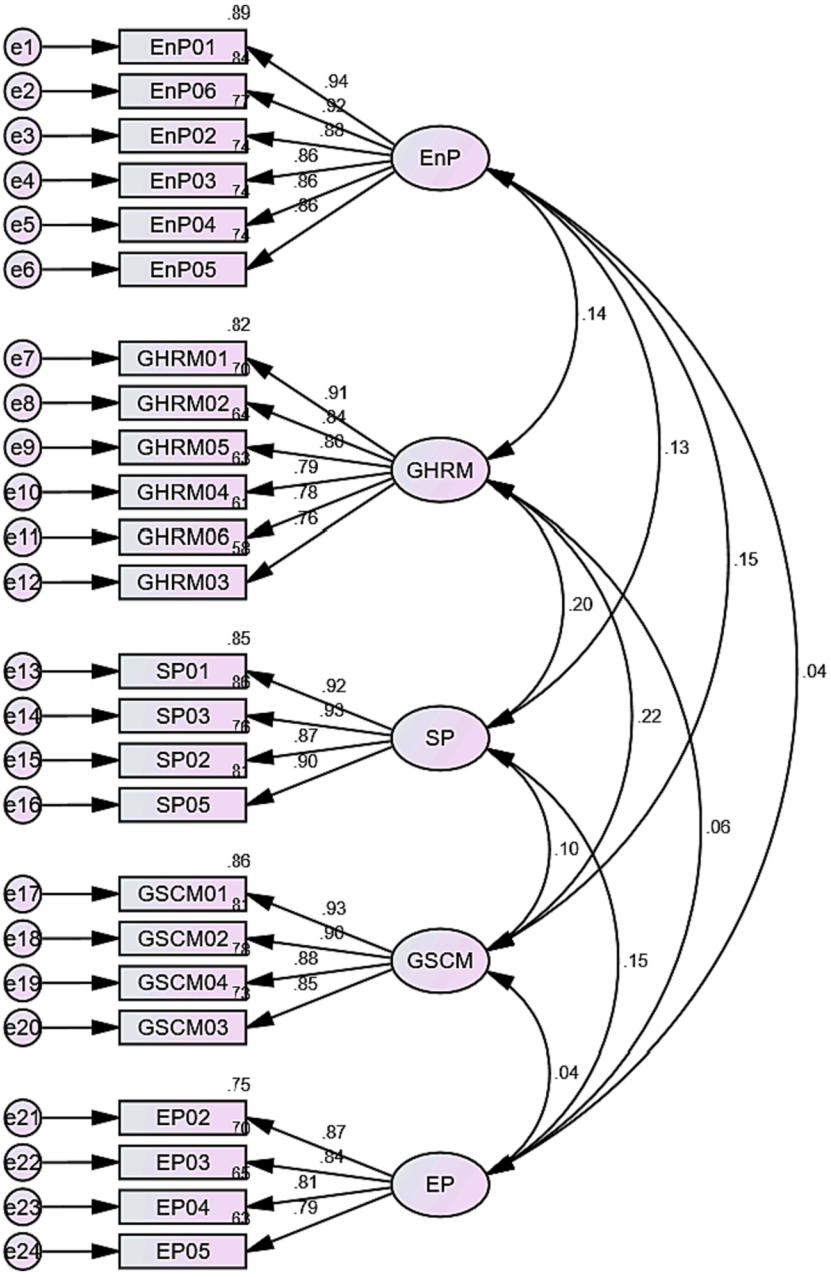

Fig. 2. First order measurement model.

performance.

In a similar vein, the positive correlation between GSCM and environmental performance implies that companies who implement ecologically responsible supply chain strategies, such as cutting down on waste and emanations, will also experience an uptick in their environmental performance. Yet, GSCM's lack of a meaningful association with sustainability performance suggests that, although it may boost environmental performance, it may not increase overall sustainability performance. The results suggest that the performance of the staff acts as a mediator in the relationship between sustainability performance and business success. This underscores the importance of prioritizing employee satisfaction and motivation to enhance sustainability outcomes. However, because there isn't much of a correlation between the two, it's possible that GHRM programs, which are meant to boost the company's sustainability record as a whole, do not have much of an effect on individual employees' productivity. "In answering our questions about recharging, we found that adopting GHRM and GSCM practices positively impacts the sustainability of Bangladesh's textile industry. GSCM mainly improves environmental performance, while the connection between GHRM and sustainability is influenced through employee performance.".

Although the relationship between these practices and sustainable performance is complex and nuanced, our findings generally provide credence to the idea that both GHRM and GSCM have the ability to promote sustainable performance within the textile industry in Bangladesh. Therefore, companies want to consider implementing a sustainable plan that takes into account GSCM, GHRM, and overall employee happiness.

6. Conclusion and implications

However, GSCM correlated positively with environmental performance but not sustainability performance, suggesting a complicated relationship. This requires a more holistic sustainability approach

Table 3
Item loadings.

Variables	Code	Estimate	S.E.	t-value	Cronbach's Alpha
Environmental Performance (EnP)	EnP01	0.944			
	EnP06	0.917	0.025	36.548	0.956
	EnP02	0.880	0.031	31.892	
	EnP03	0.859	0.031	29.732	
	EnP04	0.862	0.031	30.071	
	EnP05	0.861	0.029	29.971	
Green Human Resource Management (GHRM)	GHRM1	0.907			0.922
	GHRM2	0.839	0.038	24.794	
	GHRM5	0.800	0.038	22.621	
	GHRM4	0.793	0.039	22.254	
	GHRM6	0.783	0.036	21.712	
	GHRM3	0.764	0.040	20.790	
Sustainable Performance (SP)	SP01	0.919			0.947
	SP03	0.928	0.029	33.902	
	SP02	0.874	0.034	28.841	
	SP05	0.898	0.031	30.969	
Green Supply Chain Management (GSCM)	GSCM1	0.925			0.939
	GSCM2	0.902	0.031	31.263	
	GSCM4	0.883	0.032	29.617	
	GSCM3	0.852	0.035	27.137	
Employee Performance (EP)	EP02	0.868			0.896
	EP03	0.837	0.044	21.566	
	EP04	0.808	0.046	20.497	
	EP05	0.794	0.046	19.986	

beyond supply chain considerations. Using the RBV in the study helps explain how human and supply chain resources contribute to sustainable performance. The results show that textile companies need a multifaceted strategy incorporating GHRM, GSCM, and workplace productivity. This study suggests that firms should engage in sustainable human resource practices since employee well-being and environmental outcomes are linked. A holistic sustainability strategy should include supply chain strategies and recognize that environmental management and sustainability are separate.

These findings suggest that Bangladesh's textile industry adopts a multifaceted sustainability strategy that tackles GHRM, GSCM, and workplace productivity. By doing so, companies may build a more robust and sustainable platform for success, promoting environmental stewardship and regional business viability.

6.1. Theoretical implications

The research findings have significant theoretical implications for the sustainability and textile industry of Bangladesh. The findings of this study add to the expanding body of literature showing that GHRM and GSCM can improve the sustainability performance of organizations. Enacting eco-friendly HR policies and implementing environmentally responsible supply chain operations can lead to better sustainability outcomes. This study has filled the gap of the study of through the lens of RBV. The findings also indicate that performance is a critical mediator of sustainability performance, lending credence to the premise that workers' happiness and engagement may play a significant role in driving sustainability. Therefore, firms should focus on employee development and training to encourage sustainable practices.

This research provides a substantial theoretical contribution by elucidating the intricate network of elements contributing to achieving sustainability in Bangladesh's textile industry. Expanding beyond individual focuses, it uncovers a multi-dimensional structure in which GHRM, GSCM, employee performance, and sustainability results are interdependent. This undermines the conventional practice of categorizing sustainability initiatives into separate compartments and requires a comprehensive strategy. The results of our research are consistent with the current developments in sustainability studies, highlighting the vital

Table 5
Model fit statistics.

Model Fit Indices	Obtained Value (Measurement)	Obtained Value (Structural)	Suggested Value
The ratio of chi-square to degrees of freedom (X2/df)	1.390	1.460	<3
The goodness-of-fit index (GFI)	0.942	0.938	>0.90
The average GFI	0.928	0.924	≥0.80
The comparative fit index (CFI)	0.990	0.988	≥0.90
The normalized fit index (NFI)	0.965	0.913	≥0.90
The incremental fit index (IFI)	0.990	0.988	≥0.90
The tucker–Lewis index (TLI)	0.988	0.986	≥0.90
The root-mean-square error of approximation (RMSEA)	0.029	0.032	≤0.05

Table 6
Results of the Hypotheses Tests.

Hypothesized paths	Estimates	S.E.	*t-value*	*P-value*	*Decision*
H1 GHRM → Sustainability performance.	0.166	0.052	*3.355*	***	Accept
H2 GSCM → Sustainability performance.	0.049	0.047	1.012	*3.12*	*Reject*
H3 GHRM → Environmental performance.	0.110	0.052	2.240	0.025	Accept
H4 GHRM → Employee performance.	0.049	0.049	0.948	0.343	*Reject*
H5 GSCM → Environmental performance.	0.124	0.047	2.531	0.011	Accept
H6 GSCM → Employee performance.	0.031	0.045	0.606	0.544	*Reject*
H7 Environmental performance → Sustainability performance.	0.094	0.049	1.936	0.050	*Accept*
H8 Employee performance → Sustainability performance.	0.136	0.054	2.733	0.006	Accept

X^2/df. = 1.460, AGFI = 0.924, GFI = 0.938, CFI = 0.988, TLI = 0.986, IFI = 0.988, RMSEA = 0.032, Pclose = 1.000.
Note: *** $p < 0.001$; ** $p < 0.05$; * $p < 0.1$, n.s. = not significant.

Table 4
Reliability and validity statistics.

Variables	CR	AVE	MSV	Max (RH)	EnP	GHRM	SP	GSCM	EP	VIF
Environmental Performance (EnP)	0.957	0.788	0.021	0.962	**0.888**					1.881
Green Human Resource Management (GSCM)	0.922	0.666	0.049	0.931	0.136**	**0.816**				1.265
Sustainable Performance (SP)	0.948	0.819	0.038	0.950	0.0128**	0.196***	**0.905**			
Green Supply Chain Management (GSCM)	0.939	0.794	0.049	0.943	0.146**	0.221***	0.103*	**0.891**		1.722
Employee Performance (EP)	0.896	0.684	0.023	0.900	0.136	0.055	0.150	0.041	**0.827**	1.471

Model fit indices: X^2/d = 1.390, GFI = 0.942, AGFI = 0.928, CFI = 0.990, TLI = 0.988, IFI = 0.990, NFI = 0.965, RMSEA = 0.029, PClose = 1.000.
Note: bold diagonal values are the square root of AVE value.

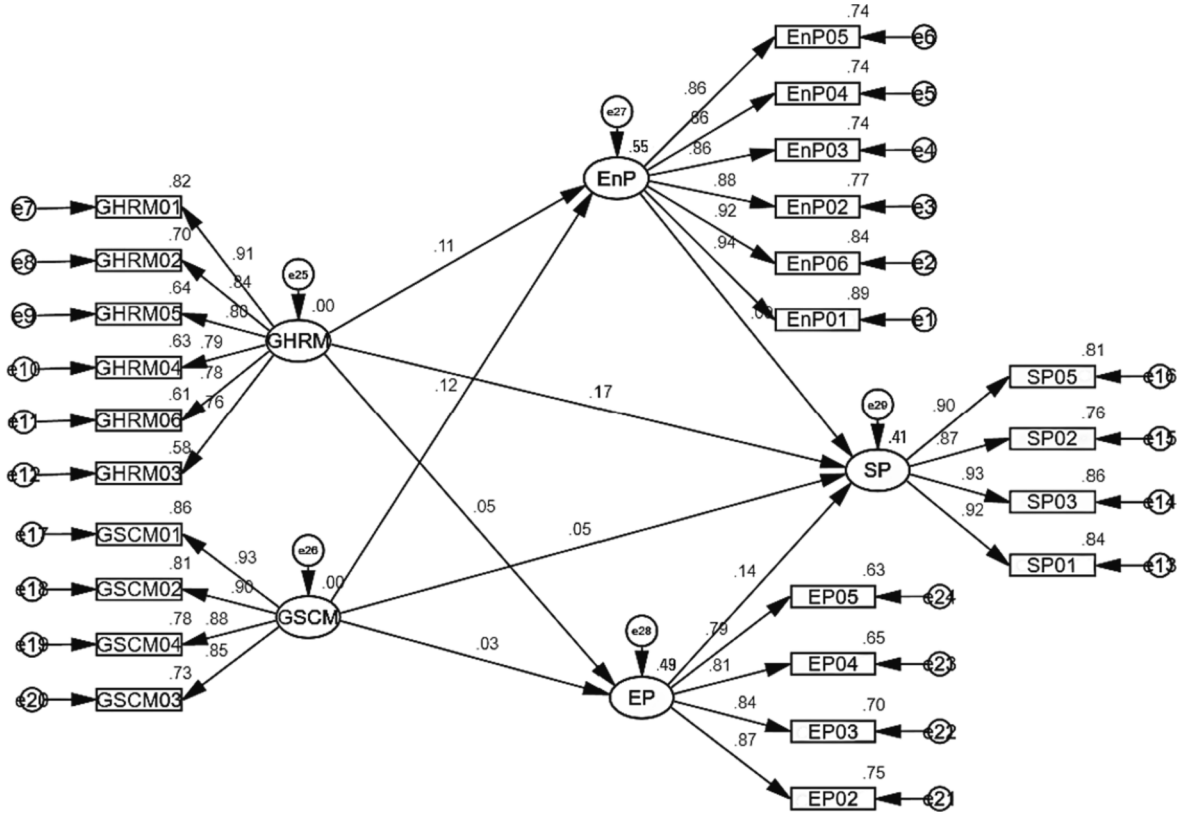

Fig. 3. Structural equation modeling results.

Table 7
Mediation model results.

Variables	Estimate	Bootstrapping			
		Bias-corrected			
		95 % CI			
Indirect effect		lower	upper	*p*-value	
GHRM- –>EnP- –>SP	0.014	0.000	0.047	0.034	Accept
GHRM- –>EP- –>SP	0.008	−0.006	0.039	0.316	Reject
GSCM- –>EnP- –>SP	0.017	0.001	0.051	0.022	Accept
GSCM- –>EP- –>SP	0.006	−0.006	0.036	0.402	Reject

Note: *** $p < 0.001$; ** $p < 0.05$; * $p < 0.1$, n.s. = not significant, CI = confidence interval, the process repeated 5000 times.

Table 8
Coefficient of determination.

Constructs	Coefficient of Determination (R^2)
Environmental Performance	0.55
sustainable performance	0.41
Employee Performance	0.49

importance of interconnectedness and synergy among different practices and variables. Perceiving sustainability as a complex and interconnected system rather than a set of isolated projects allows for realizing more significant benefits regarding environmental, social, and economic progress.

Moreover, the study emphasizes the crucial significance of employee performance in this integrated framework. Organizations can use their human capital to catalyze sustainable growth by promoting employee involvement and enhancing their knowledge and skills in sustainability practices. This emphasizes the necessity of implementing GHRM strategies that foster a workforce proficient in executing and advocating for sustainability projects.

6.2. Practical implications

The results of this study suggest that textile firms in Bangladesh that use GHRM and GSCM methods can improve their sustainability performance. The study emphasizes the importance of environmental responsibility training programs and other initiatives as examples of environmentally friendly human resource practices. This study highlights the importance of adopting environmentally friendly HR practices by showing a favorable relationship between GHRM and sustainability performance. Subsequently research has found a positive relationship between GSCM and environmental performance, businesses may do well to adopt GSCM practices such as dropping waste and emissions if they want to do their part for the environment.

In addition, the findings point to the importance of employee's happiness and motivation in driving sustainable success. So, businesses should evaluate not just the environmental and sustainable effects of their activities, but also the effects on employee's productivity. Businesses in Bangladesh's textile sector would benefit from a holistic strategy for sustainability that takes into explanation GHRM, GSCM, and the health and happiness of its workforce as a whole.

6.3. Limitations and future research

Several suggestions must be considered while assessing the conclusions of the study. Initially, the research findings were exclusively relevant to the textile industry in Bangladesh; hence, their applicability to other sectors or countries may be limited. The second limitation is that the research relied on self-reported information, which might have inherent flaws. Furthermore, the research did not account for other potential mediators of sustainability performance, such as technological

developments or market shifts. These findings may pave the way for future studies of how GHRM, GSCM, and sustainability performance relate to other industries and or others countries. More research into the potential mediation factor of worker happiness and motivation in the connection between other qualities and sustainability performance is necessary. The deployment and success of GHRM and GSCM activities in boosting sustainable performance over time is another something to think about. Researchers will benefit from a better knowledge of the interconnected nature of these practices and sustainability performance, and businesses will be aided in their future attempts to become more environmentally responsible as a result.

CRediT authorship contribution statement

Syed Ridoy Ali: Conceptualization, Formal analysis, Writing – original draft. **Abdullah Al masud:** Conceptualization, Formal analysis, Investigation, Project administration, Supervision, Writing – review & editing. **Md. Alamgir Hossain:** Conceptualization, Methodology, Project administration, Supervision, Visualization, Writing – review & editing. **K.M. Zahidul Islam:** Conceptualization, Supervision, Validation, Writing – review & editing. **S.M. Shafiul Alam:** Supervision, Validation, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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