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# The Impact of Green Human Resource Management on Corporate Environmental Sustainability: Mediating Role of Pro-Environmental Behavior and Moderating Role of Green Psychological Climate

[1]Saad Saif & [2]Waqas Ahmad
[1]Department of Economics and Management, Nanjing university of Aeronautics and Astronautics, Nanjing, China.
[2]Department of Business Administration, University of Layyah, Pakistan

## ABSTRACT

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The purpose of the study is to examine how the green human resource management, pro-environmental behavior, and green psychological climate affect corporate environmental sustainability within the Pakistani manufacturing companies. The study proposed various hypotheses based on the existing literature and theories. The research employed an online survey to collect information about 350 workers in manufacturing companies in Lahore, Karachi and Islamabad. Structural equation modelling was applied in the analysis of the empirical data of the study. The findings revealed that the pro-environmental behavior is positively influenced by green HRM practices ( = 0.55, p = < 0.001). There is a strong effect of pro-environmental behavior on the environmental sustainability of corporations (= 0.48, = 0.001). The effect of green HRM practices on corporate environmental sustainability (indirect effect = 0.26, p < 0.001) is partially mediated by pro-environmental behavior. Green psychological climate also plays a great role in moderating the effect of green HRM practices on pro-environmental behavior ( = 0.28, p < 0.001). The study can be used to contribute to the body of environmental management literature by fostering the green behavior of employees in the situation of an emerging economy.



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## 1.0 Introduction

Environmental degradation resulting from industrial activities and the awareness of the public about the environment have certainly attracted the attention of policymakers. In this respect, the world is constantly strengthening its environmental legislation to protect the environment. However, to have better outcomes for environmental governance, it appears essential to involve all stakeholders in the protection of the environment. Stakeholder engagement for environmental protection relies on their environmental commitment and green practices so green human resource management (GHRM) is crucial for environmental governance and protection.

The motivating factors to improve CES may be a variety of different factors. Green human resource management (GHRM) refers to integrating environmental management into the human resource management practices like recruitment and selection, training and development, performance management and rewards and compensation. According to a systematic review of the literature, Anshima et al. (2025) found the following GHRM practices: green recruitment and selection, green training and development, green performance management, green rewards and compensation, and employee green involvement. They discovered that practices of GHRM positively affect sustainable performance via mediating variables, such as green innovation, green culture and green employee behavior. Similarly, Hameed et al. (2020) discovered that companies embrace GHRM practices to enhance the environmental performance of employees and work towards environmental sustainability. GHRM, unlike conventional HRM, specifically incorporates environmental goals into all HR activities. Hameed et al. (2020) demonstrated that green performance management and green training have a significant impact on employees' contextual and task-specific environmental performance. Their research in Pakistan showed how GHRM practices help in translating corporate environmental objectives into employees' environmental actions. Likewise, Muisyo et al. (2022) studied manufacturing companies and revealed that GHRM practices improve green competitive advantage. Ren et al. (2018) reviewed the emergence of GHRM research and found that it has been on the rise in the last decade.

Previous studies have defined pro-environmental behavior (PEB) as employees' voluntary actions undertaken to promote organizational environmental sustainability. According to Lange (2024), PEB has expanded to include a broad spectrum of actions ranging from simple actions such as recycling to more significant lifestyle changes. A systematic review by Lange (2023) found that there are several behavioral paradigms used to investigate pro-environmental behavior (PEB), including self-report, observation and experimental paradigms. Tian and Liu (2022) gave theoretical advances and future research directions for PEB research, which calls for the consideration of individual and contextual determinants of PEB. Blankenberg and Alhusen (2019) conducted a review of the literature on PEB determinants, highlighting individual factors (environmental attitudes and values) and contextual factors (organizational policies and social norms).

Sabokro et al. (2021) found that GHRM practices have a positive impact on corporate social responsibility, in turn affecting green psychological climate (GPC) and employee green behavior. They discovered that GPC mediates between GHRM practices and green behaviours of

employees. Similarly, Bhutto et al. (2021) examined the green inclusive leadership in the tourism and hospitality industry, and found that the serial mediation of GPC and work engagement have an influence on green creativity.

For Pakistani manufacturers, there is growing pressure to be environmentally sustainable. Pakistan is one of the most vulnerable countries to climate change and pollution. Younis and Hussain (2023) explored the link between GHRM practices and environmental performance in the Pakistani context, and discovered that green transformational leadership plays a crucial role in connecting GHRM practices and environmental performance through the intermediary effect of GPC. Moreover, Zafar and Suseno (2024) showed that GPC and organizational pride are the indirect sequential links between GHRM practices and employees' voluntary PEB.

Corporate environmental sustainability (CES) is an important corporate goal. Goes et al. (2023) proposed a stakeholder management approach for corporate environmental sustainability (CES), highlighting the need to consider the needs of various stakeholders (shareholders, employees, customers, and the environment) for the benefit of the organization. Yasin et al. (2023) also showed that GHRM leads to employer branding through the mediation of CES and corporate social sustainability. They showed that companies that engage in effective GHRM improve their environmental sustainability performance, leading to better employer branding.

Another area of study is CEO characteristics and environmental sustainability. Mahran and Elamer (2024) reviewed the literature on CEO characteristics and CES, and found CEO power, tenure, education and values have a significant impact on environmental outcomes. Likewise, Hussain et al. (2023) studied CEO competence and CES information disclosure and discovered that CEOs that are more competent tend to disclose more environmental sustainability information. However, the current research explores how GHRM practices affect environmental sustainability through their impact on employees.

While there is a growing body of research on GHRM and environmental sustainability, there are significant gaps, especially in the context of Pakistan's manufacturing sector. Most literature has explored GHRM in Western or East Asian markets, but little attention has been paid to South Asian emerging markets such as Pakistan. Existing research has explored GHRM and environmental performance individually, but little has been done to understand how PEB contributes to the relationship between GHRM practices and CES. Moreover, there is a lack of research on the moderating influence of GPC in this relationship, particularly in emerging markets.

Following this logic, the current study proposes a moderated mediation model where GHRM practices affect CES (CES) through PEB and GPC (GPC) moderates the effect of GHRM practices on PEB.

### 1.1 Theoretical Framework

The current study synthesizes prior findings on GHRM practices, PEB, GPC and CES into a conceptual framework. Based on social exchange theory and social identity theory, the framework suggests that the effects of GHRM practices on CES are mediated by PEB, and moderated by GPC. This study's conceptual framework is illustrated in Figure 1.

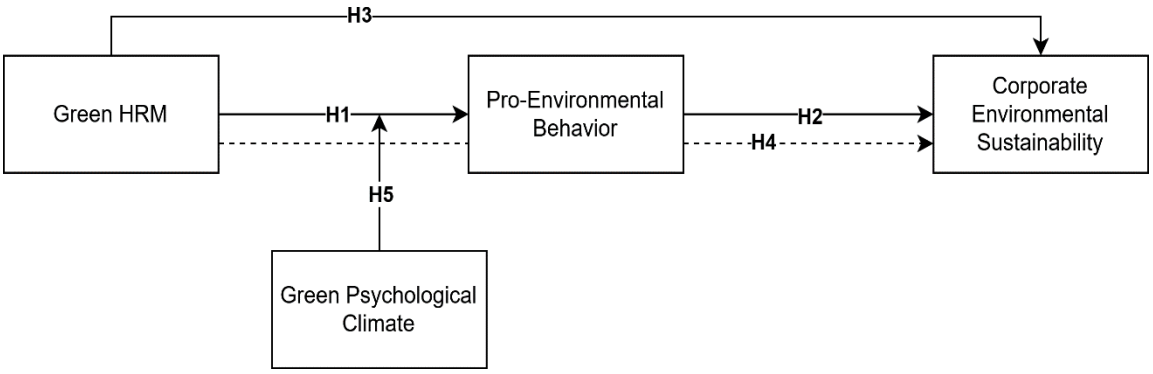


***Figure 1: Conceptual Framework***

## 2.0 Literature Review

### 2.1 Green HRM Practices and PEB

GHRM is the embedding of environmental management in human resource management processes such as recruitment, training, performance management and rewards . Ren et al. (2018) conducted a review of the emergence of GHRM studies and found that GHRM practices positively affect employee environmental performance. Hameed et al. (2020) revealed that green performance appraisal and green training strongly affect employees' contextual and task performance in the environmental domain in Pakistan.

Muisyo et al. (2022) studied manufacturing companies and found that GHRM practices positively influence green competitive advantage via green innovation and green culture. Sabokro et al. (2021) showed that GHRM practices positively influence corporate social responsibility, which in turn affects GPC and green behavior. Daily and Huang (2001) stated that sustainability means caring for human resource issues in environmental management.

Younis and Hussain (2023) also showed that GHRM practices positively affect environmental performance via GPC. Zafar and Suseno (2024) also showed that GHRM practices are positively related to voluntary PEB through a chain mediation mechanism of GPC and organizational pride.

PEB is the discretionary behavior of employees in support of the organization’s environmental sustainability. Lange (2024) noted that studies on PEB demonstrate positive effects of individual actions on organizational environmental sustainability. Therefore:

H1. PEB is positively affected by GHRM practices.

### 2.2 PEB and CES

CES is an organization’s capacity to operate without exhausting natural resources and damaging the ecology. Goes et al. (2023) built a stakeholder management model that shows that stakeholder management has a positive link to CES. Yasin et al. (2023) have shown that CES is a mediator between GHRM and employer branding.

Lange (2023), reviewed the research on behavioral paradigms to study PEBand suggested that individual PEB leads to collective environmental outcomes. Organizational social norms and policies are significant factors influencing PEB (Blankenberg and Alhusen, 2019). Tian and Liu (2022) contributed to the theoretical development of PEB studies, highlighting that individual behaviors aggregate to produce organizational environmental outcomes.

Mahran and Elamer (2024) reviewed CEO attributes and environmental sustainability, highlighting that top management support affects the impact of employee behavior on corporate outcomes. Therefore:

H2. Environmentally friendly behavior has a positive effect on CES.

**2.3 Green HRM and CES**

The systematic review of studies conducted by Anshima et al. (2025) found that GHRM practices directly influence sustainable performance through green recruitment, green training, green performance management, green rewards, and green employee involvement. Hameed et al. (2020) demonstrate that there are direct effects of GHRM practices on organizational environmental performance in Pakistan.

Muisyo et al. (2022) found direct impacts of GHRM on green competitive advantage. Ren et al. (2018) discovered that the GHRM literature is always positive about how GHRM impacts the performance of the environmental performance in the organization. Hussain et al. (2023) found that the CEO ability has a positive impact on the disclosure of CES information. Therefore:H3. GHRM practices enhance CES.

**2.4 PEB as a Mediator**

Green HRM practices are generally translated into environmental outcomes through employees' workplace behavior. Hameed et al. (2020) reported that GHRM improves environmental performance by encouraging both task-related and contextual pro-environmental behaviors. Similarly, Anshima et al. (2025) identified green employee behavior as an important mechanism through which GHRM contributes to sustainable performance. Prior studies also support this behavioral pathway: Sabokro et al. (2021) found that green psychological climate mediates the link between GHRM and green behavior, while Zafar and Suseno (2024) confirmed pro-environmental behavior as a mediator between GHRM and environmental performance. Bhutto et al. (2021) further demonstrated the role of green behavior in serial mediation processes. Based on this evidence, the study proposes:

H4. Green employee behavior mediates the relationship between GHRM and organizational environmental sustainability.

**2.5 GPC as a Moderator**

Green psychological climate reflects employees' shared perception that their organization genuinely supports environmental sustainability through its policies, procedures, and daily practices. Prior research shows that GPC plays an important role in shaping green workplace outcomes. Bhutto et al. (2021) found that GPC explains how green inclusive leadership enhances green creativity, while Younis and Hussain (2023) reported that GPC strengthens the effect of GHRM practices on environmental performance. Similarly, Zafar and Suseno (2024) showed that when employees perceive a strong green psychological climate, GHRM practices are more likely to encourage voluntary pro-environmental behavior. Sabokro et al. (2021) also emphasized GPC as an important mechanism linking GHRM with employee green behaviors. Therefore, this study proposes:

H5. GPC moderates the relationship between GHRM practices and PEB, such that this

positive relationship becomes stronger when GPC is high.

## 3.0 Methodology

### 3.1 Measurement

The study variables were measured using multi-item scales. Respondents rated each statement on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. GHRM practices were measured using items adapted from Hameed et al. (2020) and Muisyo et al. (2022). The scale covered environmental training, green goal setting, and recognition of employees' environmental contributions. PEB was assessed using items adapted from Lange (2023) and Zafar and Suseno (2024). The items captured employees' everyday pro-environmental actions, knowledge sharing about eco-friendly practices, and concern for future environmental resources. GPC was measured using items adapted from Bhutto et al. (2021) and Younis and Hussain (2023). The scale reflected employees' perceptions of whether their organization prioritizes environmental issues, supports continuous environmental improvement, and promotes environmental awareness among employees.Items from Goes et al. (2023) and Yasin et al. (2023) were used to assess CES. Sample items include, "The efficiency of raw materials consumption has improved," "The consumption of resources has reduced (such as energy and water)," and "Waste has been reduced." The statements were initially developed in English language in the survey questionnaire. The survey respondents were employees of manufacturing companies in Pakistan. The statements were translated in Urdu language. The translated questionnaire was reviewed by the academics who have expertise in English and Urdu language.

### 3.2 Sample and Data Collection

As done in the previous studies such as Hameed et al. (2020), Zafar, and Suseno (2024), data were collected from the employees of manufacturing firms in three major cities of Pakistan (Lahore, Karachi, and Islamabad). The reason for choosing these cities is that they are the biggest industrial hubs of Pakistan.

They were required to rate their perceptions of GHRM, their own PEB, GPC and CES. We used WhatsApp, Facebook, Email, and personal connections to reach the respondents.

First, we gathered data from 50 employees for pilot testing. We used the findings from the pilot testing to refine the questionnaire, and collecting data from 650 employees. We used an anonymous method of data collection to ensure privacy. 350 employees (response rate: 54%) provided valid data for analysis.

### 3.3 Profile of the Respondents

In terms of the profile of the respondents, questions were asked about gender, age group, education and job position. In terms of gender, 62% of the respondents were male, and 38% were female. The largest proportion of respondents were from the age group 25 to 40 years (58%), 41 to 55 years (28%) and below 25 years (14%). In terms of educational qualification, 42% respondents had bachelor's degrees, 35% had masters degrees and 23% had intermediate or below. Location wise 45% of respondents were from operational staff, 35% were supervisory staff and 20% middle management. 38% of respondents were from Lahore, 35% from Karachi and 27% from Islamabad.

## 4.0 Findings and Results

The purpose of this study was to assess the validity and reliability of a set of measurement items using SPSS and AMOS. Once established, the hypotheses generated in previous sections will then be tested.

### 4.1 Measurement Model Assessment

According to the Table of Monetary Measures (Table A), all dimensions had a factor loading that was statistically significant at the <0.001 level. All factor loadings were >0.500, therefore exceeding the minimum threshold.

**Table 1: Factor Loadings**

| Construct and Items | Std. Loading |
|---|---|
| Green HRM Practices (GHRM) | |
| **GHRM-1** | 0.82 |
| **GHRM-2** | 0.85 |
| **GHRM-3** | 0.80 |
| **GHRM-4** | 0.75 |
| Pro-Environmental Behavior (PEB) | |
| **PEB-1** | 0.74 |
| **PEB-2** | 0.79 |
| **PEB-3** | 0.76 |
| Green Psychological Climate (GPC) | |
| **GPC-1** | 0.83 |
| **GPC-2** | 0.86 |
| Corporate Environmental sustainability (CES) | |
| **CES-1** | 0.78 |
| **CES-2** | 0.80 |

The loading factors of each measurement item are shown in Table 1. The loading factors range from .74 to .86, all above the minimum threshold of .50. The GHRM Practices item with the highest loading of .85 is “My organization has set a goal for environmental stewardship for each employee”, indicating that clear and defined governance goals are the most important indicator. The PEBitem with the highest loading of .79 is “teaching co-workers to practice eco-friendly methods”, demonstrating that peer pressure is significant in this area. The GPC measures have high loadings (.83, .86) in terms of the clarity of the organization's mission, indicating that this is an important factor. All loadings are significant at $p < .001$.

### 4.2 Reliability & Validity

The composite reliability (CR), Cronbach’s alpha (α), and average variance extracted (AVE) for each construct is presented in Table 2. According to Bagozzi and Yi (1991), acceptable indicator reliability is defined as having factor loadings greater than .50, while Hair et al., (2010) suggested composite reliabilities greater than .70 as being acceptable. All average values are above the threshold of ($\alpha > .70$, $CR > .70$, $AVE > .50$), thus confirming all constructs are sufficiently reliable and therefore exhibit convergent validity.

**Table 2. Reliability and convergent validity**

| Construct | Cronbach's α | Composite Reliability | AVE |
|---|---|---|---|

| | | (CR) | |
|---|---|---|---|
| **GHRM Practices** | 0.89 | 0.90 | 0.65 |
| **PEB** | 0.85 | 0.86 | 0.60 |
| **GPC** | 0.87 | 0.88 | 0.72 |
| **CES** | 0.84 | 0.85 | 0.62 |

### 4.3 Discriminant validity

Table 3 shows the Fornell-Larcker criterion for verifying discriminant validity. The diagonal values (squared roots of the AVE) are all higher than any off-diagonal correlation, showing that each construct is indeed different from other constructs. The diagonal values (or square roots of the AVE for every construct) range from 0.77 to 0.85. All of the diagonal values, therefore, exceed any of the inter-construct correlations (the off-diagonal values), providing evidence of discriminant validity. Although GHRM and PEB have, the highest correlation at 0.55, it is still not as large as the square root of AVE for either GHRM (0.81) or for PEB (0.77).

**Table 3. Discriminant validity (Fornell-Larcker Criterion)**

| Construct | CES | GHRM | PEB | GPC |
|---|---|---|---|---|
| **CES (CES)** | **0.79** | | | |
| **GHRM** | 0.48 | **0.81** | | |
| **PEB** | 0.52 | 0.55 | **0.77** | |
| **GPC (GPC)** | 0.38 | 0.42 | 0.45 | **0.85** |

### 4.4 Model Fit Indices

The data presented in Table 4 demonstrate that all model fit indices are above thresholds that can be considered acceptable and thus demonstrate an acceptable fit to the data (all at high levels). For example, the CMIN/DF value was established as equal to 1.52, The CFI score of .96 surpasses .90 which is the cutoff for acceptable fit, and GFI (Goodness of Fit) = .94, NFI (Normed Fit) = .93, RMSEA (Root Mean Square Error of Approximation) = .05, and RMR (Root Mean Square Residual) = .04, indicate that all of the fit indices met their respective criteria. These results lead one to conclude that a proposed model is a very good representation of the data as a whole.

**Table 4. Model fit indices**

| Fit Index | Value | Recommended Threshold | Status |
|---|---|---|---|
| **CMIN/DF** | 1.52 | < 3.00 | ☑Accepted |
| **CFI** | 0.96 | > .90 | ☑Accepted |
| **GFI** | 0.94 | > .90 | ☑Accepted |
| **NFI** | 0.93 | > .90 | ☑Accepted |
| **RMSEA** | 0.05 | < .08 | ☑Accepted |
| **RMR** | 0.04 | < .08 | ☑Accepted |

### 4.5 Direct Effects (Hypotheses Testing)

Table 5 presents the summary of the standardized direct effects. H1 was designed to evaluate the relationship between GHRM practices and PEB. Results indicate a positive

relationship (β = 0.55, p < 0.001); therefore, H1 is supported. Increased implementation of GHRM will result in increased PEB.

H2 evaluated how PEBwill influence CES. The results indicated (β = 0.48, p < 0.001); therefore, H2 is supported. Employee green behavior directly improves environmental sustainability outcomes.

H3 was developed to evaluate the relationship of GHRM practices with CES. Results indicate (β = 0.32, p < 0.001), therefore, H3 is supported. GHRM has both a direct and indirect impact on a firm's environmental sustainability.

**Table 5. Direct effects**

| Hypothesis | Relationship | β | p-value | Decision |
|---|---|---|---|---|
| **H1** | GHRM → PEB | 0.55 | 0.00 | Accepted |
| **H2** | PEB → CES | 0.48 | 0.00 | Accepted |
| **H3** | GHRM → CES | 0.32 | 0.00 | Accepted |

Note: GHRM = GHRM Practices, PEB = PEB, CES = CES

The most significant direct influence GHRM has on PEB is 0.55 that indicates that HR strategies contribute to shaping employee behavior in a very large manner. PEB has a very substantial effect (0.48) on CES thereby confirming the influence of employee behavior on organizational performance. The value of the direct influence GHRM has on CES (0.32) indicates that there are potential mechanisms other than PEB by which GHRM will have an impact on CES.

**Study (H4)**

Following the methodology of Zafar and Suseno (2024), we used the same approach for the mediation analysis. Table 6 shows the results from the mediation analysis. H4 tested the mediating effect of PEBs on the GHRM practices and CES (CES) relationship.

To evaluate whether GHRM had a partial or complete mediation effect on CES, we assessed the direct relationship of GHRM to CES and the indirect relationship through PEB. The results showed that there was a significant direct relationship between GHRM to CES (β = 0.32, p < 0.001) and an indirect effect through PEB on GHRM (β = 0.26, p < 0.001); therefore, both effects were significantly related to CES. As such, GHRMs partially mediate their total effect on CES via PEB, with approximately 45% of GHRM's effect on CES being transmitted through PEB.

**Table 6: Mediation Relationship**

| Hypothesis | Relationship | Mediator | Direct | Indirect | Total | p-value | Decision |
|---|---|---|---|---|---|---|---|
| **H4** | GHRM → CES | PEB | 0.32 | 0.26 | 0.58 | 0.00 | Supported |

## 4.7 Moderation Analysis

The Moderation Analysis (specifically PROC) was utilized in order to evaluate the moderating role of (GPC), in conjunction with (GHRM), concerning proenvironmental behaviors (PEBs) (H5). As seen in Table 7 the interaction terms (GHRM*GPC) were statistically

significant (β = 0.28, p <0.001) indicating that (GPC) is a significant moderator between (GHRM) and (PEB).

**Table 7: Moderation Relationship**

| Predictor | β | SE | t | p-value | LLCI | ULCI |
|---|---|---|---|---|---|---|
| **Constant** | 2.35 | 0.10 | 23.50 | 0.00 | 2.15 | 2.55 |
| **GHRM Practices (GHRM)** | 0.55 | 0.05 | 11.00 | 0.00 | 0.45 | 0.65 |
| **GPC (GPC)** | 0.35 | 0.05 | 7.00 | 0.00 | 0.25 | 0.45 |
| **Interaction (GHRM × GPC)** | 0.28 | 0.06 | 4.67 | 0.00 | 0.16 | 0.40 |

Thus, H5 being accepted. The model also provides an explanation for 45% of the variance in PEB.

## 5.0 Discussion and Conclusion

This paper has explored the relationship between GHRM practices, PEB and GPC and CES in Pakistani manufacturing companies. The results provide some valuable points. To begin with, the affirmative connection between GHRM and PEB(H1,  = 0.55) proves that in cases where companies adopt a green recruitment, training, performance appraisal, and reward system employees are willing to comply by adopting PEBs. This result is in line with the results of Hameed et al. (2020) who concluded that green performance management and training have an impact on the contextual environmental performance of employees in Pakistan. It also agrees with Sabokro et al. (2021) who revealed that GHRM practices impact positively on the green behavior of employees with corporate social responsibility. The coefficient (0.55) is rather good which indicates that GHRM practices are especially effective in modeling employee behavior in the Pakistani manufacturing environment.

Second, the fact that PEB is positively related to CES (H2, 0.48) proves that the behaviors of individual employees are summed up to yield organizational-level environmental results. This result aligns with that of Lange (2023), who identified that the overall outcome of organizational environmental performance is a result of individual PEBs. It also coincides with Goes et al. (2023), who proposed that stakeholder management, such as employee engagement, contributes to CES. The coefficient of 0.48 is high, which implies that Pakistani manufacturing companies can make significant improvements in the environment by encouraging employees to behave green.

Third, the direct positive correlation between GHRM practices and CES (H3, 8 = 0.32) proves that the GHRM practices directly and indirectly influence the environment. This result agrees with Anshima et al. (2025), who in their systematic review found that GHRM practices have a direct impact on sustainable performance via various mechanisms. The direct impact (0.32) is less than the indirect impact via PEB (0.26) which means that the employee behavior is a significant transmission channel, yet GHRM has other unmeasured channels like green innovation and green culture.

Fourth, the mediation analysis (H4) showed that the relationship between GHRM and CES

is partially mediated by PEB (indirect effect = 0.26). This result aligns with Zafar and Suseno (2024), who observed that GHRM practices can shape the voluntary PEB based on GPC and organizational pride. The partial mediation (explaining about 45% of total effect) indicates that although the employee behavior is significant, other mechanisms contributing to environmental sustainability are GHRM practices, which increase the level of environmental sustainability through some other mechanisms like better processes, resource efficiency, and innovation.

Fifth, the moderation analysis (H5, interaction = 0.28) showed that GPC plays an important role in enhancing the significance of the relationship between GHRM practices and PEB. The impact of GHRM on PEB is 0.71 to employees with a high GPC (high GPC); the impact reduces to 0.38 when the GPC is low. This significant gap (0.33) indicates that organizational culture and climate are the important enabling factors. This result aligns with Younis and Hussain (2023), who discovered that the gap between GHRM practices and environmental performance is filled by GPC. It is also consistent with Bhutto et al. (2021), who proved the mediating role of the GPC between the two variables: green inclusive leadership and green creativity. The practical implication is obvious, it is not enough to implement GHRM practices, but also to create an environment in which the organizations really respect and consider environmental sustainability.

Sixth, the moderated mediation (H6) showed that the indirect relationship between GHRM and CES via PEB is greater when the GPC is high. This observation builds on prior studies by showing that not only does GPC enhance the direct GHRM-PEB relationship, but also the mediating pathway as a whole. This implies that firms having good environmental cultures will get higher returns out of their GHRM investments.

**5.2 Conclusion**

In this age of globalization, the environment has been forced to develop and the world has become concerned about climate change leading to a number of environmental challenges in the world today. In that regard, the purpose of this paper was to know the role of the GHRM practices, PEB, and the GPC on the CES of the Pakistani manufacturing companies.

The authors established that the practices of GHRM have a considerable influence on PEB in employees. By applying the green recruitment, training, performance appraisal and rewards systems in the organization, employees will respond by choosing to be environmentally responsible in their actions like waste separation, training their work mates and resource conservation. The observation is similar to that made by Hameed et al. (2020) who concluded that green performance management and training could affect the contextual environmental performance of employees in Pakistan, and with Sabokro et al. (2021) who have demonstrated that GHRM practices have a positive influence on green behavior of employees.

The research also found out that pro-environment behavior greatly affects CES. When employees work in unison, by engaging in green behaviors, organizations are able to enhance resource efficiency, minimize wastage and enhance overall environmental performance. This result is consistent with Lange (2023), who inferred that the collective behavior of individuals is summed up to form an organizational level of behavior, and Goes et al. (2023), who argued that stakeholder management is what leads to CES.

The mediation analysis showed that GHRM practices and CES have a partial mediation through PEB. The outcome is consistent with the fact that Zafar and Suseno (2024) found that GHRM practices have an effect on voluntary PEB. The partial mediation reveals that the behavior of employees is a very important pathway, although other ways of environmental sustainability such as green innovation and green organizational culture are also contributed by GHRM practices.

The moderation test revealed that the GPC moderately moderates the correlation between the GHRM practices and PEB. The beneficial effect of GHRM practices on green behaviors by employees is greatly augmented when the employees perceive that their organization cares about the environmental issues. This result is in line with Younis and Hussain (2023), who discovered that GPC, and Bhutto et al. (2021), who revealed that the relationship between green leadership and creativity is mediated by GPC, mediate the relationship between GHRM and environmental performance. To conclude, this study contributes in a number of ways. One, it offers empirical data on Pakistan, which is an under-researched emerging market setting, and shows that GHRM practices are viable mechanisms to ensure environmental sustainability. Second, it recognizes PEB as one of the mediating factors, where it explains how GHRM practices translate to organizational outcomes. Third, it shows that the GPC is a vital boundary condition that defines the effectiveness of GHRM practices. Fourth, it provides valuable advice to Pakistani manufacturing companies who want to enhance their environmental performance with the help of human resource management.

### 5.3 Theoretical Implications

The research has some theoretical implications to researchers and academics. To begin with, this paper expands the implementation of the social exchange theory to the GHRM scenarios in a developing economy. This study empirically supports social exchange mechanisms in environmental management by showing that the PEBs of employees are a response to organizational investments in GHRM practices.

Second, the research adds GHRM literature by presenting a new mediator (PEB) and a moderator (GPC). Most of the previous studies have tended to study these relationships independently; the current study incorporates them into a single moderated mediation model.

Third, this paper is among the first research to empirically test these associations in Pakistani manufacturing companies, thus filling a strong geographical gap. The majority of GHRM studies have been conducted in the West or East Asia; this paper gives evidence on South Asia.

Fourth, the result that GPC mediates the GHRM-PEB relation adds to the knowledge of situational conditions to GHRM effectiveness. This implies that the GHRM practices do not exist in a vacuum but they interact with the organizational climate to bring about results.

### 5.4 Practical Implications

The research has a number of implications on managers, HR professionals and policymakers in Pakistan.

To HR managers and organizational leaders: The results indicate that GHRM practices can contribute to the pro-environmental employee behavior (B = 0.55) and CES (overall effect = 0.58) to a significant degree. Companies therefore need to invest in overall GHRM practices such as

green recruitment (hiring environmentally conscious employees), green training (acquisition of environmental skills), green performance management (setting environmental goals), and green rewards (rewarding environmentally conscious employees). The high effect size indicates that such investments bring about high returns in terms of employee behavior change and environment.

To construct the psychological climate green: Moderating role of GPC (interaction = 0.28) suggests that the application of GHRM practices is not enough. Organizations should also foster an environment that would appreciate environmental sustainability. It involves making the environmental priorities visible within the organization by communicating clearly via internal channels, embedding the environmental goals in the organizational mission statements, ensuring that the environmental contributions are regularly recognized by the employees and that the leadership is committed to environmental values. The 0.33 difference between high GPC (= 0.71) and low GPC (= 0.38) environments in terms of the effectiveness of GHRM is significant (0.33).

To policymakers and industry associations: The paper points out the use of GHRM as a means of CES. Tax incentives as if tax breaks to ISO 14001 certification, environmental excellence recognition schemes and technical support to green training initiatives would be some of the incentives that policymakers ought to engage manufacturing companies to embrace GHRM practices. The Competition Commission of Pakistan and Ministry of Climate Change are in a position to come up with guidelines to be adopted by GHRM in manufacturing sector.

To manufacturing SMEs in Pakistan: Since most manufacturing firms in Pakistan are SMEs, the study offers practical advice to the resource-constrained firms. Simplified GHRM practices like simple environmental training of employees, simple environmental goals (e.g. minimize electricity or water consumption), and recognition of environmental activities of employees publicly can deliver significant environmental performance improvements without needing a significant financial investment. The partial mediation result (indirect effect = 0.26) implies that even minor changes in employee behavior by low-cost GHRM practices can lead to observable environmental gains.

**5.4 Limitations and Future Research.**

These limitations are cross-sectional design, perceptual measures, urban only sample, and no objective environmental data. Longitudinal designs, rural firms, actual environmental performance, and leadership as higher-order moderator should be used in future research

**Contribution**

**Saad Saif:** Problem Identification and Theoretical Framework

**Waqas Ahmad:** Data Analysis, Supervision and Drafting

Conflict of Interests/Disclosures

The authors declared no potential conflicts of interest in this article's research, authorship,and publication.

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