

Green HRM Practices and Environmental Performance: Green Leadership as a Boundary Condition

 Amal Ben Cheikh¹

 Zhanat Zhussupova²

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Abstract

Our study examines the effect of green human resource management (GHRM) practices on environmental performance directly and through organizational citizenship behavior for the environment and green values. In addition, they investigate the moderating role of green leadership on these relationships. Partial least squares structural equation modeling (PLS-SEM) was employed to analyze data collected from 173 small and medium-sized enterprises, aiming to confirm the hypotheses. Results postulate that GHRM significantly enhances environmental performance and green values, and organizational citizenship behavior for the environment, serving as mediators. Furthermore, green leadership plays a moderating role in these relationships. Grounded in the ability-motivation-opportunity (AMO) theory, the results underscore the importance of employee capabilities, motivation, and opportunities in achieving environmental sustainability.

Keywords: Green HRM, Environmental Performance, Green Values, AMO theory, Organizational Citizenship Behavior for Environment, Green Leadership

1 Introduction

The preservation of the natural environment and resources has become a great concern globally in recent decades. As a result, customers and employees are now more sensitive and demand that organizations undertake environmental responsibility (Boiral et al., 2018). For fulfilling this responsibility, organizations are shifting their operational models from traditional to environmentally sustainable ones by taking green initiatives (Wagner, 2011). This serves as a source of competitive advantage for the organizations (Jackson & Seo, 2010). Scholars argue that organizations may fulfil environmental responsibility by designing and implementing environment sensitive human resource management system refers to green HRM (Zaid et al., 2018), emphasizing the necessity of employee behaviors aligned with organizational environmental objectives. Accordingly, studies suggested that strategically aligned HRM with environmental vision (i.e., GHRM) play a vital role in motivating employees to participate in green initiatives

¹Assistant professor in Marketing, ISG Tunis, Tunisia

Corresponding Author: amalbencheikhsg@gmail.com

²Head of Scientific Research Management Center, K. Sagadiev University of International Business



that reflect the organization's commitment to the environmental responsibility (Adegoke et al., [2024](#); Renwick et al., [2016](#)). GHRM is defined as a collection of practices adopted and implemented by organizations to achieve environmental sustainability (Jackson & Seo, [2010](#)).

Contemporary literature posits that strategically aligned HRM practices i.e., GHRM plays an important role in promoting pro-environmental behaviors (Umrani et al., [2020](#); Xie et al., [2023](#)). GHRM commonly involves eco-friendly HR practices in recruitment and selection, training and development, performance appraisal and rewards, and compensation and benefits (Jerónimo et al., [2020](#); Kim et al., [2019](#)). Such practices help enhance environmental management opportunities and achieve a business's pro-environment goals (Paillé, [2024](#); Pham et al., [2019](#)). Contemporary literature posits that GHRM's has a positive effect in promoting green commitment (Ren et al., [2021](#)), green innovative work behavior (Aboramadan, [2022](#)) and corporate social responsibility (Freitas et al., [2020](#)). GHRM practices encompasses; green goals, conducting pro-environment training, and rewarding green behaviors (Dumont et al., [2017](#)) that equip employees with necessary knowledge, skills, abilities (KSAs), and motivation (Roscoe et al., [2019](#)).

Literature on the role of HRM posits that environment friendly HRM practices help organizations to promote a shared perception among employees that organization is committed to fulfil the environment related social responsibility (Roscoe et al., [2019](#)). Scholars assert that that environment-friendly HRM practices play a significant role in promoting employees' values, beliefs, and shape pro-environmental behaviors (Roscoe et al., 2019). By using the same assertion, scholars postulate that incorporating sustainability aspect in HR practices is crucial for fostering employee behaviors that support sustainable development (Roscoe et al., [2019](#)). Similarly, Su et al. ([2024](#)), explain the importance of promoting green values and organizational citizenship behavior for the environment (OCBE) that help the organizations to achieve sustainable outcomes.

Contemporary literature underscores the importance to study environmental performance in SMEs as majority of organizations across the globe are SMEs (Lutfi et al., [2023](#); Rehman et al., [2022](#)). Accordingly, scholars are investigating the role of GHRM in promoting environmental performance in SMEs through different mediating variables (Asad et al., [2023](#); Dzikriansyah et al., [2023](#)). Similarly, this study argues that GHRM practices promote green values in OCBE in SMEs, that in turn contribute to superior environmental performance.

In recent years, scholars highlighted the interdependence of HRM and leadership, however, majority of literature investigated them separately, neglecting their combined effect on individual and organizational outcomes (Canterino et al., [2024](#); Jada et al., [2023](#); Zhao et al., [2023](#)). Accordingly, contemporary literature examined the synergetic effect of HRM and leadership and highlighted that strategic fit between HRM and leadership enhances the effect of each other on individual and organizational outcome (Rasheed et al., [2025](#)). On the same lines, this study argues that the effect of GHRM on green values, OCBE and environmental performance is contingent on the alignment of leadership. Green leadership (GL) plays a critical role in promoting shared perception in SMEs (Huo, Safdar, et al., [2022](#)). GL explained as behaviors of leaders who motivate followers to achieve environmental goals and inspire followers to perform beyond expected levels of environmental performance (Chen & Chang, [2013](#)). Though, scholars postulate the importance of strategic fit between HRM and leadership, the role of green leadership in enhancing the effect of GHRM on green values and OCBE remains limited (Khan et al., [2023](#)). This is an important void in the literature (Rashid et al., [2023](#); Wang et al., [2023](#)), which this study aims to fill by investigating the moderating role of green leadership in enhancing the effect of GHRM on green values and OCBE in SMEs.

Our research made significant contributions to the literature. First, the study extends the literature on sustainability by investigating the role of strategically aligned HRM i.e., GHRM practices in achieving superior environmental performance (Iftikar et al., [2022](#); Sobaih et al., [2020](#)). Second,

by explaining the underlying mechanisms of green values and OCBE in transferring the effect of GHRM on environmental performance using ability-motivation-opportunity (AMO) theory (Appelbaum, 2000), our study extends literature on ‘black-box’ between HRM and performance (Caputo et al., 2022; Demortier et al., 2014). Third, the study contributes to the emerging literature on the role of leadership in HRM (Rasheed et al., 2025; Zhao et al., 2023) by investigating the strategically aligned HRM and leadership i.e., GHRM and green leadership on promoting green values and OCBE for achieving superior environmental performance.

2 Hypothesis development and Literature Review

2.1 Theoretical foundation

AMO theory (Appelbaum, 2000) has emerged as prominent theoretical perspective to investigate the HRM – performance relationship (Bos-Nehles et al., 2023). AMO theory explains that the achievement of superior performance is dependent on the three interdependent and interrelated components i.e., ability, motivation, and opportunity to contribute (Appelbaum, 2000). Based on the AMO theory, scholars explained the HRM systems encompasses ability-enhancing, motivation-enhancing and opportunity-enhancing practices which help organizations to recruit human resources with requisite knowledge, skills and abilities (KSAs), promote proactive behaviors and reward these behaviors to achieve strategic goals (Jiang, Lepak, Han, et al., 2012). By using the assertions of AMO theory, this study argues that GHRM practices enable SMEs to recruit human resources with environmental knowledge through green recruitment and selection practices (Saeed et al., 2019). Further, green training and development practices enhance the environmental knowledge of employees (Chan et al., 2014). Similarly, green performance appraisal and reward practices motivate employees to apply environmental knowledge to achieve superior environmental performance. Green opportunity enhancing practices encourage employees to indulge in environmentally friendly behaviors (Dumont et al., 2017; Renwick et al., 2013). Thus, this study proposes that GHRM practices promote a shared values among employees that organization is committed to achieve environmental goals (green values) and motivate them to engage in extra-role behavior for environment, that contribute to superior SME’s environmental performance. Thus, green HRM aims to increase employees’ environmental knowledge, enabling them to perform OCBE and develop green values. In line with the contemporary literature on the role of leadership in HRM, this study suggests that green leadership further enhances the effects of GHRM practices on green values and OCBE.

2.2 Green HRM and Environmental Performance

HRM has long been strategically vital for businesses across various key areas (Channa et al., 2019; Pereira et al., 2018), playing a particularly significant role in enhancing organizational performance by improving practices and business efficiency (Kim et al., 2019; Podgorodnichenko et al., 2020). Scholar asserts that HRM practices aligned with strategic goal of environmental sustainability i.e., GHRM practices help SMEs to foster environment friendly culture, that play critical role in amplifying environmental performance. For instance, Guerci et al. (2016) shows that that green HRM practices such as; green recruitment and selection, training, and performance and reward systems boost environmental performance. Moreover, Renwick et al. (2013) found the positive association between HRM practices and environmental performance. In addition, pro-environmental HRM practices i.e., green training and development initiatives, and rewarding green behaviors, motivate employees to indulge in green initiatives (Pham et al., 2020). The combination of these practices, known as GHRM, help SMEs to create a share perception among employees regarding the strategic goals i.e., environmental performance. As a result, employees put their efforts to involve in green behaviors (Jerónimo et al., 2020; Yong et al., 2020), which substantially improve environmental performance (Al-Hajri, 2020; Islam et al., 2021).

Using AMO theory (Appelbaum, 2000), this study argues that GHRM practices help SMEs to

recruit human resources with green KSAs, develop their environment-related KSAs through green training and development initiatives and motivate them to indulge in green behaviors. Empirical evidence confirmed that GHRM practices play important role in boosting environmental performance (Azam & Jamil, [2024](#); Huo, Azhar, et al., [2022](#); Shafaei et al., [2020](#)). Another study by Sarfo et al. ([2024](#)) also confirmed positive effect of GHRM on environmental performance. Thus, we propose:

H1: GHRM practices positively associated with environmental performance.

2.3 Role of Organizational Citizenship Behavior for Environment as a mediator

Given its prosocial nature, green behavior holds social and environmental significance for employees (Chou, [2014](#)). Ramus and Killmer ([2007](#)) suggest that workplace green behaviors encompass both required (in-role) and voluntary (extra-role) actions that contribute to value creation. Employees possess varying levels of workplace discretion, influencing when and how they exhibit discretionary behaviors (Hoffman & Dilchert, [2012](#)). OCBE is a voluntary behavior defined as "individual and discretionary social behaviors that are not explicitly recognized by the formal reward system and that contribute to a more effective environmental management by organizations" (Boiral, [2009](#)). Lamm et al. ([2013](#)) posit that OCBE involves a sense of sustainability both within and outside the organization, potentially aiding in the achievement of green objectives. Boiral and Paillé ([2012](#)) argue that organizations can promote employee engagement in environmental improvement activities like OCBE through green empowerment. This empowerment can involve mandating green actions, such as prohibiting the disposal of toxic waste into water bodies or instructing careful handling of hazardous materials, alongside implementing GHRM practices (Robertson & Barling, [2013](#)). For instance, Khan et al. ([2021](#)) assert that OCBE acts as a mechanism through which GHRM practices can enhance sustainable performance, directly impacting sustainability-related organizational outcomes. A study by Ma et al. ([2024](#)) demonstrates that various organizational factors, including GHRM, significantly foster OCBE, which in turn positively contributes to EP. Therefore, we propose:

H2: OCBE mediates the relationship between GHRM and EP

2.4 Role of Green values as a mediator

Individual green values (GV) refer to personal principles and beliefs that prioritize environmental sustainability and guide pro-environmental behaviors (Chou, [2014](#)). Scholars postulate that individual green values and beliefs has significant effect on employees' behaviors (Davidov et al., [2008](#)). It is further highlighted that individuals' concern for environmental values encourage employees to take eco-friendly actions (Chou, [2014](#)). On the other hand, literature has pointed out that green values substantially improve environmental performance (Chou, [2014](#); Schultz et al., [2005](#)). Accordingly, Ali et al. ([2024](#)) postulated that GHRM practices promote a sustainability-oriented environment by promoting employee green behaviors and supporting organizational sustainability. Previous literature also investigated the mediating role of green values in transferring the effect of GHRM practices on environmental outcomes (Islam et al., [2021](#)) and as a result green values help to achieve sustainable performance (Wong et al., [2015](#)). Studies conducted by Chang's ([2019](#)) and Yousaf's ([2021](#)) confirmed that green motives and dynamic capabilities promote green innovation thought green values. Hence, this study proposes that green values play a mediating role between GHRM practices and environmental performance. We propose:

H3: Green values serve as a mediator between GHRM practices and environmental performance.

2.5 Moderating Role of Green Leadership

Contemporary literature highlighted the importance of strategic fit between HRM and leadership to examine the synergetic effect of HRM and leadership on employee and organizational outcomes (Rasheed et al., 2025). Accordingly, the present study proposes that green leadership (GL) in alignment with GHRM further enhance the effect of GHRM on green values, OCBE and environmental performance. Cop et al. (2021) explained that GL has a positive effect on green innovation, that in turn, amplify environmental outcomes. In another study, Nisar et al. (2017) explained the positive effect of GL on green performance. Moreover, Luu (2019) showed that environment-focused servant leadership positively influence the effect of GHRM practices on individual and collective green crafting and OCBE. Empirical evidence of studies conducted by Robertson and Barling (2017) and Li et al. (2022) showed positive effect of GL on organizational environmental culture, and innovative environmental performance. In addition, Ahmad et al. (2021) showed the positive effect of GHRM practices on OCBE through environmental passion. Further, the study also explained that transformational leadership further amplify the effect of GHRM practices on OCBE. The study postulates the importance of green leadership in organizations to promote green values and behaviors in organizations. Another study of Palupiningtyas and Wahono (2023) support the combined effect of GHRM practices and leadership on employee's commitment to environmental objectives. Similarly, Al-Serhan (2020), highlighted that GL promote green values and beliefs across the organization that help to promote green values and OCBE. Thus, we propose that.

H4. Green leadership positively moderate the relationship between GHRM and OCBE.

H5. Green leadership positively moderate the relationship between GHRM and GV.

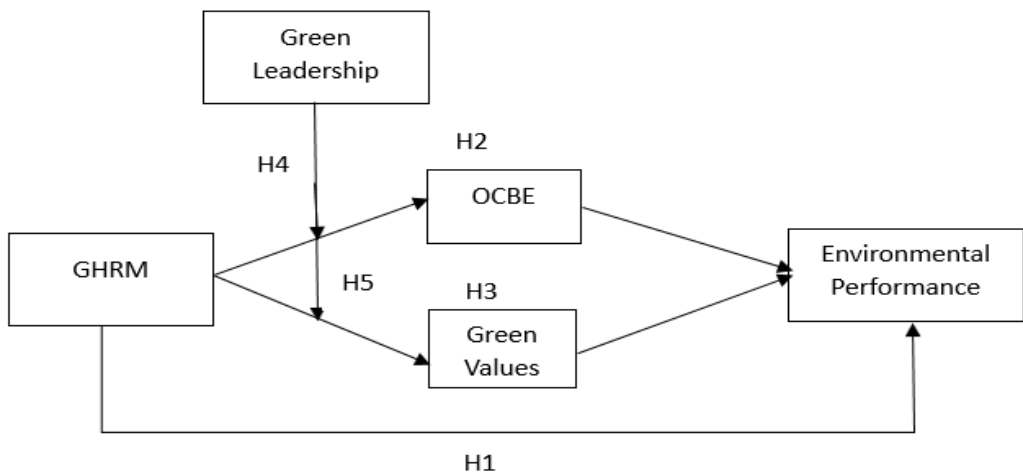


Figure 1: Theoretical Model

3 Research methodology

Data for this study were collected from 500 small and medium enterprises (SMEs) across Pakistan. The definition of SMEs was adopted from Small and Medium Enterprises Development Authority (SMEDA) as organizations having a maximum of 250 employees or rupees 400 million annual sales turnover in Pakistan's currency (SMEDA, 2007). A structured, self-administered questionnaire was distributed online to 800 SMEs listed with SMEDA and various chambers of commerce and industry associations in Pakistan. The questionnaire provided information about the study's objective, an invitation to participate, and a link to the online survey. Heads of departments were targeted as respondents due to their expected comprehensive understanding of GHRM practices, green values (GV), organizational citizenship behavior towards the environment

(OCBE), green leadership (GL), and environmental performance (EP) within their organizations. The study achieved a response rate of 34%, which aligns with previous research conducted on Pakistani SMEs (Rasheed et al., [2024](#)). A total of 173 responses were received; however, three were excluded due to incomplete information, resulting in a final usable sample size of 170 responses.

The sample comprised SMEs with varying operational durations: 64% had been in operation for over 8 years, 20% between 4–5 years, and 16% between 1–2 years. Sector-wise, 69% of these SMEs operated within the services sector, while 31% were part of the manufacturing sector. In terms of organizational size, 38% of SMEs employed between 100 and 150 individuals, 28% had 50–100 employees, and 26% had fewer than 50 employees. Regarding the respondents' professional experience, 31% had 0–2 years, 26% had 2–5 years, 21% had 5–10 years, and 22% had over 10 years of experience. Educational qualifications among respondents were as follows: 22% held a bachelor's degree, 50% had a master's degree, and 23% possessed an MPhil qualification, with 95% having at least 14 years of formal education.

3.1 Instruments

For data collection and analysis, this study utilized adapted scales from previous research. Green human resource management (GHRM) was assessed with a six-item adapted from Dumont et al. ([2017](#)). OCBE was measured using a thirteen-item scale developed by Boiral and Paillé ([2012](#)), whereas, green values were measured using three-item scale of Chou ([2014](#)). Green leadership was assessed using a six-item scale of Chen and Chang ([2013](#)). Environmental performance was measured using a seven-item scale developed by Kim et al. ([2019](#)). The respondents were asked to rate on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

3.2 Common method bias

Scholars highlighted that self-reported and single source data collection may raise the issue of common method bias (CMB) (Podsakoff et al., [2003](#)). Accordingly, Podsakoff et al. ([2012](#)) suggested strategies at designing and data analysis phases i.e., collection time-lagged data and applying statistical measures to confirm the presence of CMB. For testing the potential issue of CMB, we applied variance inflation factors (VIFs). VIF values below 3.3, indicating that CMB is not a significant concern (Kock et al., [2021](#)).

4 Data analysis and Results

The hypothesized model was tested using a partial least squares structural equation modeling (PLS-SEM) in Smart PLS 4. In the PLS-SEM, measurement model was used to establish construct reliability, convergent and discriminant validity, whereas, structural model was used to confirm the hypotheses. Recently, PLS-SEM has emerged as prominent statistical technique in human resource management to test complex models (Legate et al., [2023](#); Rasheed et al., [2024](#), [2025](#)). PLS-SEM uses non-parametric evaluation criteria to estimate the outcomes of both measurement and structural models (Hair et al., [2019](#)). Accordingly, the step-by-step guidelines of Hair et al. ([2019](#)) was followed to confirm convergent and discriminant validity and hypotheses testing.

4.1 Measurement Model

PLS algorithm in SmartPLS was used to establish reliability, convergent and discriminant validity through factor loadings, composite reliability, average variance extracted, and Heterotrait-Monotrait (HTMT) ratio (Hair, et al., [2017](#); Hair et al., [2019](#)). Table 1 presents factor loadings of the measurement items of all the variables, that are within the acceptable range of 0.64 to 0.95 (Hair et al., [2019](#)). The CR values (Table 1), ranging from 0.87 to 0.96 indicate good internal consistency for all variables (Hair et al., [2019](#)). Convergent validity refers to the degree to which a construct's items converge to explain its variance, was assessed using the AVE for each

construct's items. Table 1 presents the values of AVE (GHRM=0.51; EP=0.63; OCBE=0.62; GV=0.56; GL=0.64), which are higher than the minimum threshold of 50% confirming convergent validity (Hair et al., 2019).

Table1: Factor loading, reliability and convergent validity

Construct	Items	Loadings	Cronbach's α	CR	AVE
Green HRM	GHRM1	0.67	0.93	0.94	0.51
	GHRM2	0.70			
	GHRM3	0.71			
	GHRM4	0.75			
	GHRM5	0.69			
	GHRM6	0.73			
Environmental Performance	EP1	0.89	0.81	0.87	0.63
	EP2	0.88			
	EP3	0.75			
	EP4	0.64			
	EP5	0.73			
	EP6	0.79			
	EP7	0.79			
Organizational Citizenship Behavior for Environment	OCBE1	0.81	0.84	0.89	0.62
	OCBE2	0.88			
	OCBE3	0.79			
	OCBE4	0.74			
	OCBE5	0.70			
	OCBE6	0.89			
	OCBE7	0.94			
	OCBE8	0.93			
	OCBE9	0.90			
	OCBE10	0.89			
	OCBE11	0.90			
	OCBE12	0.95			
	OCBE13	0.94			
Green Values	GV1	0.86	0.95	0.96	0.56
	GV2	0.77			
	GV3	0.73			
Green Leadership	GL1	0.71	0.94	0.95	0.64
	GL2	0.75			
	GL3	0.74			
	GL4	0.70			
	GL5	0.66			
	GL6	0.73			

Note: GHRM: green human resource management, OCBE: organizational citizenship behavior for environment, GV: green values, EP: environmental performance, GL: green leadership, CR: Composite reliability, AVE: Average variance extracted

On the other hand, discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) ratio of correlations which is more reliable than the Fornell-Larcker criterion (Henseler et al., 2015). The HTMT ratio in Table 2 confirmed the discriminant validity as the HTMT value are below the maximum threshold value of 0.85.

Table 2: Heterotrait-Monotrait ratio

	GHRM	OCBE	GV	EP	GL
GHRM					
OCBE	0.60				
GV	0.65	0.61			
EP	0.62	0.64	0.63		
GL	0.53	0.73	0.56	0.60	

Note: GHRM: green human resource management, OCBE: organizational citizenship behavior for environment, GV: green values, EP: environmental performance, GL: green leadership

4.2 Structural Model and Hypothesis Testing

PLS-SEM with 5000 bootstrapping was employed to confirm hypotheses. PLS-SEM adheres to established assessment criteria, including the coefficient of determination (R^2) and effect size (f^2) (Hair et al., 2019), to validate findings. The R^2 value quantifies the variance explained in each endogenous construct, reflecting the model's explanatory power (Hair, et al., 2017). In our model, the R^2 values indicate a substantial coefficient of determination, with the exogenous variables collectively explaining 47%, 43%, and 41% of the variance in environmental performance (Hair, et al., 2017; Hair et al., 2019).

Furthermore, the effect size (f^2) was evaluated, which represents the contribution of an independent variable to the R^2 of the dependent variables (Hair, et al., 2017). According to Cohen (2013) guidelines, effect sizes are classified as small (0.02), medium (0.15), and large (0.35). The f^2 values, detailed in Table 3, reveal a large effect of OCBE on EP. On the other hand, GHRM demonstrated a medium effect on both OCBE and GV. Similarly, the effect of GV on EP was also of medium size. Additionally, the Q^2 test was conducted to assess the predictive accuracy of the PLS path model using a blindfolding procedure (Stone, 1974). Consistent with established criteria, the Q^2 values indicate a moderate level of predictive relevance for our PLS path model (Hair et al., 2019). To further examine the model's predictive power, the PLS predict assessment method was employed, calculating the Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE) (Shmueli et al., 2016). Adhering to Shmueli et al. (2016) recommendations, the MAE and RMSE values from our PLS-SEM analysis were compared to those from a linear regression model (LM) benchmark. The results confirm the high predictive power of our model, as both the MAE and RMSE values for the LM were higher than those obtained from the PLS-SEM analysis.

To assess the structural model, Partial Least Squares Structural Equation Modeling (PLS-SEM) was conducted using Smart PLS software. This method allows for the examination of direct and indirect relationships among independent, mediating, and dependent variables, yielding t-values and path coefficients similar to standardized beta coefficients in regression analysis (Henseler et al., 2009). Following the recommendations of Hair et al. (2017), and Hair et al. (2014), a bootstrapping procedure with 10,000 resampling iterations was performed to determine beta coefficients and t-values. Bootstrapping, a non-parametric technique, evaluates the stability of parameter estimates by creating numerous subsamples from the original data (Hair et al., 2019). Employing a larger number of bootstrap subsamples, such as 10,000, enhances the robustness and stability of confidence interval estimates. In this analysis, a t-value exceeding 1.96 and a p-value below 0.05 indicate a statistically significant relationship at the 95% confidence level (Hair et al., 2014; Hair, et al., 2017).

The findings, detailed in Table 3, indicate that GHRM has a positive and statistically significant effect on EP ($\beta = 0.41$, $t = 6.13$, $p < 0.00$), thus supporting H1. Additionally, both OCBE and GV significantly mediate the relationship between GHRM and EP. Specifically, the indirect effects are: GHRM→OCBE→EP ($\beta = 0.11$, $t = 2.08$, $p < 0.01$) and GHRM→GV→EP ($\beta = 0.08$, $t = 2.15$, $p < 0.01$), providing support for hypotheses H2 and H3. Finally, GL significantly moderates the relationship between GHRM and OCBE ($\beta = 0.15$, $t = 4.04$, $p < 0.00$) and between GHRM and GV ($\beta = 0.14$, $t = 2.97$, $p < 0.02$), leading to the acceptance of H4 and H5.

Table 3: Path analysis and hypothesis testing

	Relationship	β	SD	t	P	LL	UL	Decision
H1	GHRM → EP	0.41	0.07	6.13	0.00	0.29	0.49	Supported
H2	GHRM → OCBE → EP	0.11	0.04	2.08	0.01	0.03	0.13	Supported
H3	GHRM → GV → EP	0.08	0.03	2.15	0.01	0.02	0.14	Supported
H4	GHRM*GL → OCBE	0.15	0.04	4.04	0.00	0.08	0.20	Supported
H5	GHRM*GL → GV	0.14	0.05	2.97	0.02	0.21	0.05	Supported

Note: n=170 teams. GHRM: green human resource management, OCBE: organizational citizenship behavior

for environment, GV: green values, EP: environmental performance, GL: green leadership.

Bootstrap confidence intervals were constructed using 10,000 resamples, R^2 = Determination coefficients; Q^2 = Predictive relevance of endogenous.

R^2 OCBE = 0.47; GV = 0.43; EP = 0.41

Q^2 OCBE = 0.21; GV = 0.31; EP = 0.37

f^2 GHRM $\rightarrow$ OCBE = 0.27; GHRM $\rightarrow$ GV = 0.18; OCBE $\rightarrow$ EP = 0.36; GV $\rightarrow$ EP = 0.21

* $p < .05$, ** $p < .01$, *** $p < .001$.

R^2 considered weak (>0.25), moderate (>0.50), and substantial (>0.75). Effect size (f^2) is considered small (>0.02), medium (>0.15), and large (>0.35). $Q^2 > 0$ indicate predictive relevance.

5 Discussion

This study aimed to explore the underlying mechanisms of the relationship between GHRM and environmental performance (EP) in SMEs. We proposed that green values and organizational citizenship behavior towards the environment (OCBE) act as potential pathways through which GHRM influences SME environmental performance. Consistent with prior research, our findings revealed a positive impact of GHRM on environmental performance ($\beta = 0.41$) in SMEs, aligning with existing studies that demonstrate GHRM's positive role in enhancing environmental performance (Awan et al., 2023; Azam & Jamil, 2024; Sobaih et al., 2020). While previous literature generally supports GHRM's positive influence on green values (Al Doghan et al., 2024) and OCBE (Lu et al., 2023), this study advances this understanding by identifying the differential impact of GHRM on these two constructs within the SME context. Specifically, our results indicate that GHRM has a stronger influence on OCBE ($\beta = 0.11$) compared to green values ($\beta = 0.08$). This suggests that while GHRM is important for both green values and OCBE, it is particularly effective in fostering OCBE within SMEs. This finding aligns with the AMO theory (Appelbaum, 2000), suggesting that GHRM practices instill green values and pro-environmental behaviors, motivating individuals to adopt a positive perspective towards nature and their surroundings, thereby enhancing SMEs' environmental performance.

In essence, as GHRM practices improve efficiency and value creation with an environmental focus, they stimulate green values and pro-environmental behavior, which in turn drives environmental performance. Consequently, this study provides crucial empirical insights into GHRM practices and their role in fostering pro-environmental behavior and cultivating employee beliefs towards the environment and community, which ultimately bolsters efforts enabling SMEs to mitigate their adverse environmental impacts and predict environmental performance

Furthermore, we hypothesized that green leadership strengthens the relationship between GHRM and both green values and organizational citizenship behavior towards the environment within SMEs. This study advances this understanding by identifying the significant moderating impact of GL on these relationships specifically within the SME context. For example, our findings indicate that GL has a slightly stronger moderating effect on the GHRM-OCBE relationship ($\beta = 0.15$) compared to the GHRM-green values relationship ($\beta = 0.14$). This suggests that while GL enhances the impact of GHRM on both green values and OCBE, its influence is marginally more pronounced for OCBE in SMEs. This finding aligns with the ability-motivation-opportunity (AMO) theory (Appelbaum, 2000), which posits that SME top leadership plays a crucial role in shaping employees' abilities, motivation, and opportunities to contribute to achieving EP (Rizvi & Garg, 2021; Sun et al., 2022).

5.1 Implications

While prior research suggests a positive relationship between GHRM and environmental

performance (Awan et al., [2023](#); Azam & Jamil, [2024](#); Sobaih et al., [2020](#)), the specific mechanisms driving this connection warrant further exploration. This study contributes to this understanding by examining employee OCBE and green values as mediating factors in the relationship between GHRM and environmental performance within SMEs. In doing so, this research addresses a crucial gap linking GHRM and environmental performance. Furthermore, it expands the ongoing discussion regarding the role of OCBE and green values in organizational outcomes (Al Doghan et al., [2024](#); Lu et al., [2023](#)), particularly within the SME context (Lutfi et al., [2023](#); Rehman et al., [2022](#)).

Study also contributes to the AMO theory (Appelbaum, [2000](#)) by expanding its theoretical scope to illustrate that GHRM significantly fosters employee OCBE and green values (Al Doghan et al., [2024](#); Lu et al., [2023](#)), which subsequently enhances environmental performance in SMEs (Rizvi & Garg, [2021](#); Sun et al., [2022](#)). By elucidating how GHRM can facilitate pro-environmental outcomes in SMEs through employee OCBE and green values, this research offers valuable insights into pro-environmental management frameworks within SMEs in a developing country like Pakistan.

The findings of this study yield direct practical implications for the economic and commercial performance of SMEs. The results indicate that GHRM practices foster employee OCBE and green values, which subsequently contribute to enhanced environmental performance within SMEs. When employee OCBE and green values are effectively supported by organizational leaders and the SMEs themselves, they are likely to facilitate the improvement and introduction of novel pro-environmental initiatives, thereby elevating performance outcomes. Consequently, it is imperative for SMEs to align the interests of their employees with those of the firm and its stakeholders to cultivate motivation and encourage the adoption of OCBE and green values.

Public policy professionals can leverage these findings to design pro-environmental practices and environmental management development programs aimed at enhancing SMEs' capacity to achieve competitive advantage. Organizations seeking to implement effective GHRM practices must foster green leadership attributes within their management levels. To attract, develop, and retain employees aligned with the organization's commitment to environmental sustainability, human resource departments may strategically integrate GHRM practices across all functions. Consequently, to maintain market relevance and competitiveness, GL must cultivate an organizational climate that supports individuals possessing green abilities and motivation, providing them with opportunities to realize their environmental potential. The adoption of GHRM and GL practices, along with employees' pro-environmental behaviors, can potentially enhance the performance and economic contribution of the SME sector.

5.2 Limitations and Future Directions

This study's limitations offer avenues for future research. Firstly, employing a cross-sectional design restricts the ability to observe causal relationships over time. Future studies could adopt a longitudinal approach to better capture the transformative effects of leadership on innovation. Secondly, while this research examined the mediating roles of Organizational Citizenship Behavior for the Environment (OCBE) and Green Values (GV) between Green Human Resource Management (GHRM) and Environmental Performance (EP), there remains a need to identify additional mediating and moderating variables. Exploring constructs such as organizational pride (Jones, [2010](#)), human capital, and other motivational perspectives (Jiang, Lepak, Hu, et al., [2012](#)) may provide deeper insights into these relationships. Additionally, investigating the moderating role of organizational learning culture can further enrich the proposed model.

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