Determining the relationship of Green HRM towards Environmental Performance of Manufacturing Sector in Pakistan

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Abstract: The primary aim of current study was to determine the relationship of Green Human Resource Management (GHRM) practices with environmental performance. Using the AMO (Ability, Motivation, and Opportunity) theory as a base, an alternative mediating model was developed. According to this paradigm, GHRM influences environmental performance by organizational citizenship behavior towards environment (OCBE) and organizational culture. A sample comprising 183 employees from manufacturing firms located in Rawalpindi and Islamabad, Pakistan, was selected using convenience sampling to test the hypotheses empirically. The study validated hypotheses using Smart PLS 3 and bootstrap techniques. The results showed that OCBE and culture enhance GHRM's impact on environmental performance. The findings also showed that manufacturing organizations can foster sustainable corporate citizenship and an ecologically conscious culture by adopting GHRM practices. This research substantially enhances comprehension regarding GHRM practices, OCBE, and organizational culture, particularly catering to stakeholder's keen on advancing environmental sustainability within organizational contexts. Through empirical validation of the relationships delineated within the AMO theory framework, this study underscores the significance of incorporating environmentally conscious HRM strategies into organizational policies and practices. Such integration is crucial for attaining heightened environmental performance and cultivating a culture oriented towards sustainability.

Keywords: Green human resource management, Organization citizenship behavior towards environment, Organizational culture, Environmental performance

1. Introduction

In the contemporary global business landscape, the quest for sustainable and environmentally responsible practices has become a paramount concern (Ansari, Farrukh, & Raza, 2021; Luo et al., 2023). The manufacturing sector, as a key player in economic development, is under increasing pressure to balance industrial growth with ecological preservation (Fang, Liu, & Putra, 2022; Ghisellini, Cialani, & Ulgiati, 2016). This study delves into the complex chain of relationships between GHRM, OCBE, and Organizational culture and how they impact the environmental performance of manufacturing firms in Pakistan. We recognize the intricacy of this undertaking and strive to gain a deeper comprehension of it. The Manufacturing Sector in Pakistan has experienced noteworthy expansion in recent years, contributing significantly to the national economy (Ehsan et al., 2023; Saleem, Zhang-Zhang, Gopinath, & Malik, 2023; Wassan, Memon, Mari, & Kalwar, 2023). However, this growth has been accompanied by

environmental challenges, including resource depletion, pollution, and a growing carbon footprint. As the global discourse on sustainability gains momentum, organizations are compelled to adopt practices that not only ensure economic viability but also align with ecological responsibility (Adjei-Bamfo, Bempong, Osei, & Kusi-Sarpong, 2020). GHRM has emerged as a strategic methodology that incorporates environmental aspects into the conventional HRM framework. GHRM goes beyond greening HR processes including hiring, performance evaluation, and worker involvement (Aburahma, Amuna, & Aqel, 2020; Veerasamy, Joseph, & Parayitam, 2023). The objective of this method is to engage individuals in sustainability initiatives and cultivate a workplace atmosphere that prioritizes environmental accountability. Organizational culture strongly influences employee environmental sustainability attitudes and behaviors (Al-Swidi, Gelaidan, & Saleh, 2021; Rossmannek & Rank, 2019). An organizational culture that emphasizes and esteems ecological accountability is inclined to cultivate a favorable association between GHRM practices and organizational results. In order to develop individualized interventions that are in line with the particular cultural milieu of manufacturing firms in Pakistan, understanding organizational culture's significance as a mediator between GHRM and environmental performance is crucial.

The term "OCBE" refers to employees taking initiatives outside their job duties to improve the organization's environmental sustainability (Asghar et al., 2022). OCBE components encompass actions beyond job duties that benefit the environment. These include recycling initiatives, energy conservation efforts, volunteering for environmental causes, and advocating sustainable practices (Ostertag, 2023; Piacun, 2018; Sarmad, Pirzada, & Iqbal, 2023). Promoting such conduct cultivates environmental awareness, enriches corporate social responsibility endeavors, and nurtures a more environmentally conscious organizational ethos, thereby benefiting society at large. To comprehend organizations sustainability over the long term, examine OCBE's as a mediating construct between GHRM and environmental performance. The recognition of the significance of GHRM in promoting environmentally sustainable practices is increasing. However, there is a noteworthy deficiency in comprehending the practical implementation of these practices within the manufacturing sector of Pakistan. Limited knowledge exists regarding the distinct obstacles and prospects encountered by manufacturing firms in Pakistan as they endeavor to enhance their environmental efficacy by adopting GHRM, fostering a conducive corporate culture, and advocating for OCBE.

The manufacturing landscape in Pakistan is characterized by diverse challenges, including resource constraints, regulatory complexities, and a dynamic socio-cultural environment. The impact of GHRM on organizational culture, OCBE, overall environmental performance may vary in this context. Hence, exploring these associations within the Pakistani manufacturing sector is imperative for customizing sustainable approaches to address the particular requirements and obstacles encountered by this industry in the region.

1.2 Significance of Study

The current research involved in important academic and practical consequences. It adds to the literature on sustainable development, OCBE, and GHRM in academia. The findings contribute to theoretical frameworks on Governance, as well as GHRM practices, organizational culture, and OCBE in Pakistani manufacturers. On a practical level, the research furnishes actionable recommendations for policymakers, human resources practitioners, and business executives to advance sustainable practices, thereby nurturing a cooperative relationship between economic advancement and environmental management in Pakistan's manufacturing domain.

1.3 Research Questions
a) What is the relationship between GHRM and environmental performance?
b) Is organizational culture mediates the relationship between GHRM and environmental performance?
c) Is OCBE mediates the relationship between GHRM and environmental performance?

1.4 Research Objectives
a) To investigate the relationship between GHRM and environmental performance.
b) To investigate the mediation effect of organizational culture between GHRM and environmental performance.
c) To investigate the mediation effect of OCBE between GHRM and environmental performance.

2. Theoretical Development

When GHRM practices and CSR are examined within the frameworks of the AMO model and theory, it is possible to achieve a deeper level of comprehension of these concepts (Boselie, Dietz, & Boon, 2005). Furthermore, fostering employee motivation, enhancing workforce productivity, and improving overall organizational performance can be facilitated by integrating green initiatives and CSR practices. Consequently, this could lead to an elevation in OCBE (Appelbaum, 2000). Employee performance assessment commonly involves evaluating actual achievements against predetermined targets. Practices aimed at enhancing employee participation, such as involvement, information exchange, and autonomy, constitute a set of strategies that can improve performance. Scholars have investigated the application of GHRM in diverse sectors, such as the textile industry, utilizing the AMO model as a framework (Cheema & Javed, 2017), in the automobile industry (Pham, Tučková, & Jabbour, 2019; Pinzone, Guerci, Lettieri, & Redman, 2016; Ragas, Tantay, Chua, & Sunio, 2017; Yu, Chavez, Feng, Wong, & Fynes, 2020) and in several private industries etc. The incorporation of GHRM elements into a holistic theoretical framework that elucidates the impacts that these dimensions have on sustainable performance is a significant step that highlights the importance of these characteristics. This study addresses the mediation of organizational culture and OCBE in GHRM practices and environmental performance to fill a gap in the existing literature of GHRM. The AMO framework serves as the foundation for this study. By undertaking this inquiry, the study offers a significant contribution towards enhancing comprehension of the AMO theory.

When it comes to the pursuit of environmentally responsible business practices, the notion of GHRM is an essential component. This is because it combines The HR approach with environmental performance (Yusoff, Nejati, Kee, & Amran, 2020). There is a significant body of literature that places an emphasis on the role that GHRM plays in fostering organizational dedication to ecological responsibility (Pimenta, Duarte, & Simões, 2024; Tremblay, Cloutier, Simard, Chênevert, & Vandenberghe, 2010; Ujma & Ingram, 2019). GHRM define as an extension of conventional HRM, integrating environmentally friendly practices into recruitment, training, and overall employee engagement (Renwick, Redman, & Maguire, 2013). The AMO theory suggests that an organization's environmental performance is depends on employees' Ability, Motivation, and Opportunity (Akhtar, Khan, Atlas, & Irfan, 2022). This framework underscores the importance of cultivating skills and knowledge, fostering motivation for sustainability, and providing supportive conditions such as resources and leadership to promote eco-friendly practices and outcomes. The implementation of GHRM has resulted in enhanced environmental performance, hence illustrating the program's ability to align individual and organizational objectives with enduring sustainability goals (Bhatti, Saleem, Murtaza, & Haq, 2022; Razab, Udin, & Osman, 2015). Moreover, the literature suggests a link between GHRM and OCBE, where employees actively contribute to environmentally responsible actions beyond their formal roles (Anwar et al., 2020; He & Kim, 2021; Luu, 2019). Current study shows that GHRM is an integrated methodology that improves environmental performance and creates an organizational culture of environmental consciousness and dedication.

The mediation effect of organizational culture between GHRM and environmental performance has been studied by previous scholars. The literature also shows that GHRM like green training, recruiting, and communication reflects organizational culture. (Ahmad, Al Mamun, Masukujjaman, Makhbul, & Ali, 2023). Scholars emphasize that a supportive organizational culture acts as a mediating mechanism, influencing the translation of GHRM practices into tangible improvements in environmental performance (Abou-AL-Ross & Abu Mahadi, 2021; Shahzad, Jianguo, & Junaid, 2023). Other studies suggest that an organizational culture emphasizing environmental values and responsibilities enhances the effectiveness of GHRM practices. For comprehension of this association, the AMO theory suggests that GHRM practices' environmental impact depends on their compatibility with and acceptability across the organizational culture. This is a concept that may be used to obtain a better knowledge of the correlation (Maheshwari, Kaur, & Renwick, 2024). Comprehending the mediating function of organizational culture is paramount for discerning the contextual intricacies that shape the efficacy of GHRM endeavors. As organizations maneuver through the intricate terrain of sustainability, recognizing the interaction between GHRM and organizational culture becomes essential for attaining a comprehensive and consequential enhancement in environmental performance.

Most research on GHRM and environmental performance has concentrated on OCBE (Anwar et al., 2020; Ziyadeh,

Othman, & Zaid, 2024). OCBE denotes voluntary, environmentally beneficial actions demonstrated by employees that extend beyond their prescribed job responsibilities (Zientara & Zamojska, 2018). Abundant scholarly inquiry indicates that GHRM practices significantly influence employees' attitudes and behaviors, ultimately nurturing OCBE (Ababneh, 2021). This study found that HRM policies that emphasize environmental sustainability motivate workers to engage in environmental sustainability processes like waste reduction and energy conservation. OCBE functions as a reflection of the successful integration of GHRM practices, underscoring that employees' internalization of environmentally responsible values contributes to broader organizational sustainability goals (Liu, Mei, & Guo, 2021). Acknowledging OCBE as a mediator highlights its importance in translating GHRM initiatives into concrete environmental performance outcomes, thus emphasizing the comprehensive influence of incorporating environmentally friendly practices into human resource management strategies.

Based on above discussion following hypothesis postulated:

H₁: *There is direct and significant relationship between Green HRM and environmental performance.*
H₂: *There is direct and significant relationship between Green HRM and organization citizenship behavior towards environment.*
H₂ₐ: *Green HRM and environmental performance is meditated by organization citizenship behavior towards environment.*
H₃: *There is direct and significant relationship between Green HRM and organizational culture.*
H₃ₐ: *Green HRM and environmental performance is meditated by organizational culture.*
H₄: *There is direct and significant relationship between organization citizenship behavior towards environment and environmental performance.*
H₅: *There is direct and significant relationship between organizational culture and environmental performance.*
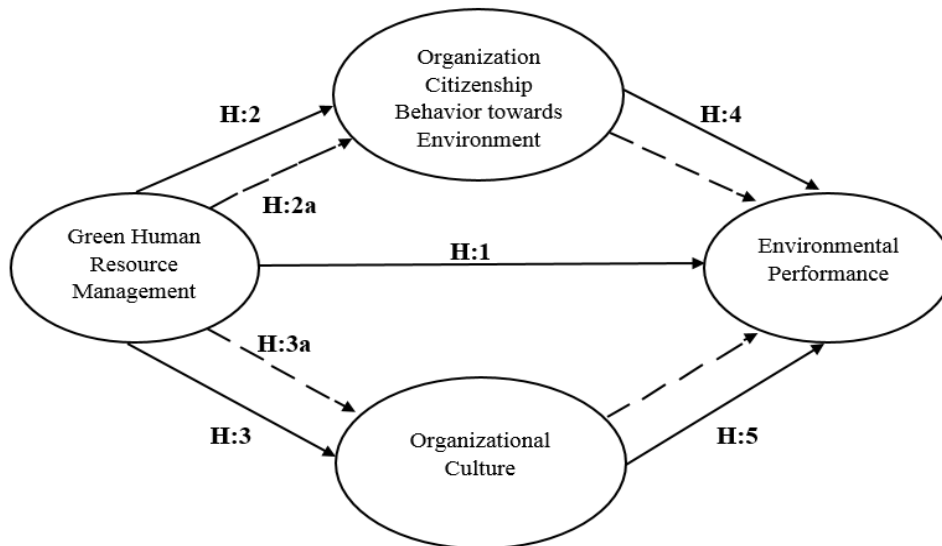

Figure 1: Theoretical Framework

3. Methodology

Personnel working in Pakistan's manufacturing industry, particularly in the cities of Rawalpindi and Islamabad, was the main focus of our study. Based on a sample size of 183 individuals, the first response rate attained was 91.5%. Data was gathered using a questionnaire survey, a quantitative research technique. Various techniques exist for primary data collection, such as case studies, questionnaires, and interviews; however, our study opted for convenience sampling and snowball sampling methods to gather responses. Conducting a questionnaire survey within the manufacturing sector posed challenges due to management reluctance to share information. Hence, we

targeted employees and managers of manufacturing companies in Rawalpindi and Islamabad. The questionnaire comprised 33 items (refer to Table 1), distributed among 200 respondents, with 183 completed questionnaires returned. Data collection involved visiting each organization at predetermined dates and times, administering structured questionnaires. The measurement of GHRM included four items, consistent with previous study (Hsiao, Chuang, Kuo, & Yu, 2014). As with earlier iterations, OCBE was measured using ten items (Boiral & Paillé, 2012). Five items that were taken from an earlier study were used to measure organizational culture (Jabbour, Santos, & Nagano, 2010) and (Masri & Jaaron, 2017). Environmental performance consisted of fourteen items, adopted from a previous study (Larrán Jorge, Herrera Madueño, Calzado, & Andrades, 2016). Each variable response was measured using a five-point Likert scale.

4. Results
4.1 Demographic Information of Respondents
Gender, age and managerial level were assessed.

Table 1: Demographic Profile

Category	N	Percentage
Gender		
Male	102	56
Female	81	44
Age	-	-
20 to 25	39	21
26 to 30	58	32
31 to 50	86	47
Managerial Level	-	-
Entry Level	33	18
Junior Level	41	22
Middle Manager	44	24
Senior manager	65	36
Total	**183**	**100**

4.2 Data Analysis
This study used PLS-SEM and SMART PLS 3.0 for data analysis. This method was chosen due to the investigative and predictive scope of the study, the complexity of the framework, and the ease of use of PLS-SEM in formulating the model and evaluation (Joe F Hair, Ringle, & Sarstedt, 2011). Contrary to ordinary least squares regression, which assumes the precise observation and measurement of all variables (Haenlein & Kaplan, 2004), Because it has the potential to effectively overcome these restrictions and produce more exact variable predictions than depending solely on theory testing, PLS path analysis is the approach that is recommended when it is practicable to do so (F. Hair Jr, Sarstedt, Hopkins, & G. Kuppelwieser, 2014). Few studies have examined GHRM, OCBE, organizational culture, and environmental performance.
First, the assessment of the measurement model was checked. The framework's reliability, validity was checked. To

test hypotheses, structural model was applied.

4.2.1 Measurement Model

The measurement model is evaluated for latent variable reliability, convergent validity, and discriminant validity. Table 2 shows factor loadings, composite reliability, Cronbach's alpha, and AVE for all model constructs. Consistent reviews are acceptable. Consensus suggests Cronbach's α and composite reliability (CR) should exceed 0.7 for reliability (Chin, Marcolin, & Newsted, 2003). Table 2 shows great convergent validity and good internal reliability for the tested constructs. Cranbach's alpha ranges from 0.734 to higher values, while CR scores are 0.763 to higher. These findings indicate strong measurement internal consistency. Convergent validity is assessed by examining each concept's indicator AVE. This is crucial for assessing measurement scale-related construct coherence. Every AVE score—including the lowest, 0.619—is over the stated limit of 0.5. Strong convergent validity across conceptions shows the measuring instruments' reliability (Pavlou & Fygenson, 2006). Additionally, AVE's cutoff point is 0.50 (Joe F Hair et al., 2011). All constructs had AVEs over 0.50. Cronbach's Alpha and CR values in Table 2 indicate that all study constructs have acceptable reliability values. GHRM scores composite reliability 0.763, OCBE 0.799, organizational culture 0.783, and environmental performance 0.816. The items used for each construct in this research have acceptable reliability.

Table 2: Measurement Model Results

Constructs	Indicators	Factor Loading	Cronbach Alpha	Composite Reliability	AVE
GHRM	GHRM1	0.723	0.744	0.763	0.622
	GHRM2	0.711			
	GHRM3	0.788			
	GHRM4	0.761			
OCBE	OCBE1	0.743	0.783	0.799	0.641
	OCBE2	0.739			
	OCBE3	0.788			
	OCBE4	0.811			
	OCBE5	0.730			
	OCBE6	0.742			
	OCBE7	0.777			
	OCBE8	0.777			
	OCBE9	0.789			
	OCBE10	0.755			
	OC1	0.732	0.734	0.783	0.619
OC	OC2	0.784			
	OC3	0.793			
	OC4	0.796			
	OC5	0.783			
EP	EP1	0.788	0.836	0.816	0.636
	EP2	0.763			
	EP3	0.731			
	EP4	0.834			
	EP5	0.753			
	EP6	0.734			
	EP7	0.852			

EP8	0.738	
EP9	0.832	
EP10	0.769	
EP11	0.801	
EP12	0.861	
EP13	0.818	
EP14	0.722	

4.2.2 Discriminant Validity

Discriminant validity evaluates a construct's distinctiveness within a research model and its alignment with its intended measurement. It ensures constructs differ significantly from others and accurately represent their intended concepts. Statistical techniques like comparing correlations and AVE values validate this uniqueness, enhancing research rigor (Joseph F Hair, Risher, Sarstedt, & Ringle, 2019). The HTMT ratio threshold of 0.90 assesses construct distinctiveness. It compares correlations within constructs to those between constructs, aiding in discriminant validity assessment in research models (Joseph F Hair et al., 2019; Ramayah, Cheah, Chuah, Ting, & Memon, 2018). According to the Fornell-Larcker criterion, a construct's average square root of variance extraction should surpass its correlation with other latent variables, ensuring discriminant validity in SEM (Joseph F Hair, Ringle, & Sarstedt, 2013). Fornell and Larcker suggest discriminant validity is achieved when square root of average variance above off-diagonal correlations. This study employs two criteria—HTMT ratio and Fornell-Larcker—to establish discriminant validity rigorously, scrutinizing correlations within and between constructs in SEM analysis (Joseph F Hair et al., 2013; Henseler, Ringle, & Sinkovics, 2009). Discriminant validity with Fornell-Larcker and HTMT ratio acceptable ratio is shown in Tables 3 and 4. Hence, the measurement model shows acceptable discriminant validity, indicating reliability of all constructs.

Table 3: Fornell-Larcker Criterion

Constructs	GHRM	OCBE	OC	EP
GHRM	0.747*			
OCBE	0.577	0.786*		
OC	0.589	0.666	0.801*	
EP	0.517	0.632	0.681	0.769*

Note: GHRM= Green Human Resource Management
OCBE= Organization Citizenship Behavior towards Environment
OC= Organizational Culture
EP= Environmental Performance

Table 4: HTMT Criterion Results

Constructs	GHRM	OCBE	OC	EP
GHRM	0.782*			

OCBE	0.566	**0.733***		
OC	0.514	0.629	**0.739***	
EP	0.531	0.599	0.671	**0.786***

Note: GHRM= Green Human Resource Management

OCBE= Organization Citizenship Behavior towards Environment

OC= Organizational Culture

EP= Environmental Performance

4.2.3 Hypothesis Analysis

The structural model assesses hypotheses formulated in research studies, elucidating the relationships between constructs. Hypothesis findings are scrutinized using three criteria: significant P-values (<0.05), T-values exceeding 1.96, and bootstrapped confidence intervals. The latter ensures no zero value falls within the 2.5% lower limit (LL) and 97.5% upper limit (UL) range. These stringent criteria provide robust evaluation, affirming the strength and nature of relationships between constructs and bolstering the validity and reliability of the study's findings. According to Table 5 and Figure 2, the structural model shows the direct relationships among the variables and demonstrates that the direct effect of GHRM on OCBE, GHRM on OC, GHRM on EP, OCBE on EP, OC on EP is significant and positive with path coefficient path coefficient as 0.371, 0.347, 0.411, 0.278, 0.380 respectively and T-value for GHRM on OCBE, GHRM on OC, GHRM on EP, OCBE on EP and OC on EP was reported as 21.120, 7.563, 11.389, 10.201 and 11.706 respectively which is greater than 1.96. And P-value for all direct paths is less than 0.05. Lastly, bootstrapped confidence interval was reported no zero value for paths. Therefore, it does fulfill all criteria of path analysis. Hence, H1, H2, H3, H4 and H5 for the current study have been accepted.

Table 5: Direct Hypothesis Results

HYP	Path	Path Coefficient	SE	T-values	P-Values	Bootstrapped Confidence Interval 2.5%	97.5%
H1	GHRM → EP	0.371	0.011	21.120	0.000	0.011	0.222
H2	GHRM → OCBE	0.347	0.027	7.563	0.000	0.032	0.152
H3	GHRM → OC	0.411	0.027	11.389	0.000	0.020	0.263
H4	OCBE → EP	0.278	0.034	10.201	0.000	0.027	0.124
H5	OC → EP	0.380	0.057	11.706	0.000	0.014	0.267

Note: GHRM= Green Human Resource Management
OCBE= Organization Citizenship Behavior towards Environment
OC= Organizational Culture
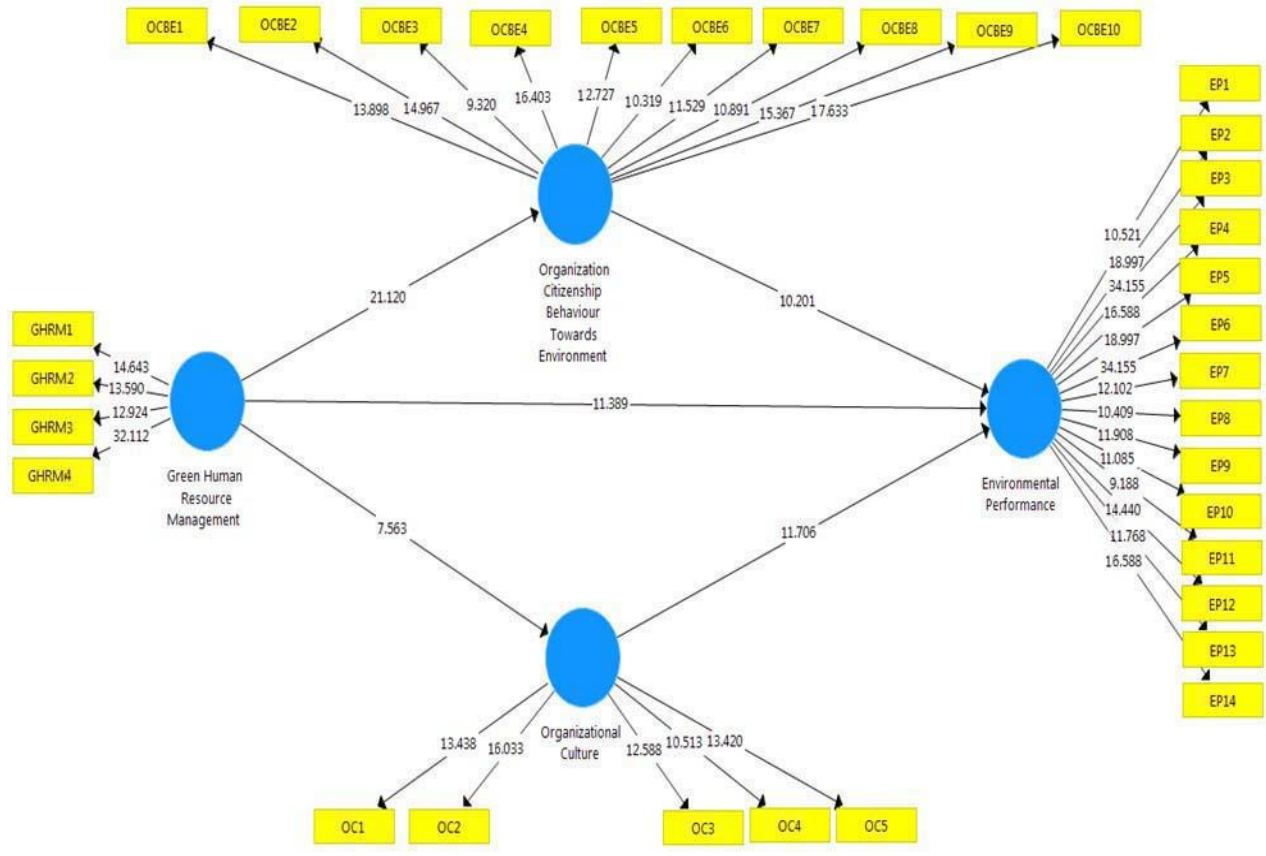EP= Environmental Performance

Figure 2: Direct Hypothesis

The mediating roles of OCBE and organizational culture were examined using bootstrapping (Cheung & Lau, 2008). We assessed the significance of indirect effects by analyzing bias-corrected (BC) 95% confidence intervals (CI). Employing simultaneous mediation analysis, we evaluated each mediator's effect while controlling for the other. Results, inclusive of bias-corrected confidence intervals, demonstrate OCBE mediating the influence of GHRM (β= 0.037; p< 0.05). Similarly, organizational culture (OC) mediated the effect of GHRM (β= 0.025; p< 0.05). Thus, hypotheses H2a and H3a are supported. A summary of these mediation effects is presented in Table 6.

Table 6: Results of Structural Model (Mediation Effect)

Path	Beta Value	SE	T-values	P Values	Bootstrapped Confidence Interval	
					CILL 2.5%	CIUL 97.5%
GHRM → OCBE→ EP	0.037	0.018	9.613	0.000	0.022	0.115
GHRM → OC→ EP	0.025	0.061	11.479	0.000	0.051	0.225

Note: GHRM= Green Human Resource Management
OCBE= Organization Citizenship Behavior towards Environment
OC= Organizational Culture
EP= Environmental Performance

Table 7: Hypothesis Summary

Hypothesis	Accepted/Rejected
Hypothesis 1: *There is direct and significant relationship between GHRM and environmental performance.*	*Accepted*
Hypothesis 2: *There is direct and significant relationship between GHRM and OCBE.*	*Accepted*
Hypothesis 2a: *GHRM and environmental performance is meditated by OCBE.*	*Accepted*
Hypothesis 3: *There is direct and significant relationship between GHRM and organizational culture.*	*Accepted*
Hypothesis 3a: *GHRM and environmental performance is meditated by organizational culture.*	*Accepted*
Hypothesis 4: *There is direct and significant relationship between OCBE and environmental performance.*	*Accepted*
Hypothesis 5: *There is direct and significant relationship between organizational culture and environmental performance.*	*Accepted*

5. Discussion

This study examines how GHRM affects Pakistani manufacturing's environmental performance. Moreover, it elucidates the manner in which organizational culture and OCBE serve as mediators in this association. This

quantitative study employed PLS-SEM approaches to address three primary research questions. According to the results, GHRM is crucial for the industrial sector to significantly improve its environmental performance. GHRM practices are essential to environmental sustainability objectives, as numerous studies have shown (Gilal, Ashraf, Gilal, Gilal, & Channa, 2019; Irani, Kiliç, & Adeshola, 2022; Roscoe, Subramanian, Jabbour, & Chong, 2019). According to the study's findings, manufacturers may develop a workforce that is sensitive to environmental issues and encourage efficiency gains and waste reduction throughout the production process by coordinating HR strategies with sustainability objectives. In addition to improving employee engagement, GHRM efforts like eco-friendly training programs and reward schemes also spur innovation in the direction of greener processes and technology. In the end, GHRM adoption in manufacturing improves operational effectiveness while reducing environmental consequences, establishing businesses as pioneers in sustainable production methods for a future with more environmental responsibility.

Finally, the study reveals that GHRM positively and statistically significantly affects OCBE in organizations, supporting other scholars' conclusions (Anwar et al., 2020; Khalid, Harun, Noor, & Hashim, 2021; Pham et al., 2019; Saputro & Nawangsari, 2021), in order to enhance environmental performance, these findings highlight how crucial it is to promote OCBE and win over top management to environmental policy. Furthermore, our findings show a strong and positive correlation between environmental performance and OCBE, supporting earlier study findings that highlight the critical role that OCBE play in determining environmental outcomes (Alt & Spitzeck, 2016; Memon, Rasli, Dahri, & Hermilinda Abas, 2022). OCBE is critical to GHRM-environmental performance. OCBE is vital in production. OCBE promotes environmental management and volunteerism beyond work to boost GHRM results. It improves environmental performance and promotes sustainability in manufacturing firms.

Third, our data demonstrate that organizational culture plays a mediating role in the link between GHRM and environmental performance. This supports previous research indicating that GHRM practices have a significant influence on influencing organizational culture (Hadjri, Perizade, & Farla, 2019; Muisyo, Qin, Ho, Julius, & Barisoava Andriamandresy, 2022) and organizational culture has significant impact on environmental performance (Adebayo, Worlu, Moses, & Ogunnaike, 2020; Bakhsh Magsi, Ong, Ho, & Sheikh Hassan, 2018; Imran, Arshad, & Ismail, 2021). According to the study, organizational culture influences the GHRM and environmental performance relationship. Thus, organizational culture mediates GHRM practices and environmental performance in manufacturing, stressing its importance in promoting sustainability and favorable environmental results. Manufacturing firms can improve environmental performance by promoting sustainability and GHRM goals. This alignment promotes environmental responsibility, benefiting the organization and the environment.

5.1 Implications

Organizational culture and OCB mediate GHRM and environmental performance, which has imperative implications. This highlights organizational culture's crucial function in molding employee perspectives and actions concerning environmental sustainability efforts within the industry. Manufacturing businesses should incorporate concepts regarding sustainability into their everyday activities and decision-making. Moreover, recognizing OCB as a mediator highlights the significance of employee engagement and proactive involvement in environmental stewardship. Voluntary commitment to the environment can motivate employees in manufacturing to go beyond the scope of their employment duties. This might involve recognizing and rewarding eco-friendly initiatives, providing opportunities for involvement in green projects, and fostering a supportive work environment where employees feel empowered to contribute to sustainability efforts. In addition, the utilization of organizational culture and OCB can enhance the influence of GHRM on environmental performance. By strategically aligning HR strategies with sustainability objectives and cultivating a culture of environmental responsibility, manufacturing firms can harness the collective efforts of their workforce to drive meaningful improvements in environmental performance. In conclusion, these consequences emphasize the significance of incorporating environmental factors into human resources practices and organizational culture in order to attain sustainable results in the manufacturing sector.

5.2 Limitations

This study's limitations are direct for future research. While it seeks to elucidate the relationship between GHRM and environmental performance via combined mediations, reliance on single-point data raises causal uncertainty.

Longitudinal studies could bolster confidence in causal relationships over time, affording researchers greater insight into construct dynamics. Additionally, future investigations should explore alternative intervening mechanisms, potentially employing a serial mediation framework to deepen understanding of variable linkages. Moreover, the study's geographic focus on Pakistan restricts generalizability; hence, future inquiries should encompass diverse contexts to enhance applicability and robustness of findings.

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