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ROLE OF ORGANIZATIONAL CITIZENSHIP BEHAVIOUR TOWARDS THE ENVIRONMENT ON THE RELATIONSHIP BETWEEN GREEN HUMAN RESOURCES MANAGEMENT, CORPORATE SOCIAL RESPONSIBILITY AND SUSTAINABLE PERFORMANCE

Jahanzeb Jumani[*1], Hammad Zafar[2], Shaikh Muhammad Fakhr E Alam Siddiqui[3]

[*1]*Research Scholar, Karachi University Business School, University of Karachi, Pakistan.*
[2]*Lecturer, Karachi University Business School, University of Karachi, Pakistan.*
[3]*Assistant Professor, Karachi University Business School, University of Karachi, Pakistan.*

[*1]jahanzebkhowaja40@gmail.com, [2]hammad.zafar@uok.edu.pk, [3]fakhrealam@uok.edu.pk

Corresponding Author: *

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ABSTRACT

The manufacturing sector is a significant contributor to both economic growth and environmental pollution. This study, grounded in the ability-motivation-opportunity theory, investigates the mediating role of organizational citizenship behaviour towards the environment in the relationship between green human resource management (GHRM) practices (such as green recruitment and selection, green training, green rewards, and green performance evaluation), corporate social responsibility (CSR), and sustainable performance (including economic, social, and environmental performance). Utilizing a quantitative survey research design, yielding cross-sectional data, with participants. 102 responses were analysed. Data analysis was performed using Smart PLS-SEM (partial least square structural equation modelling). Both the measurement and structural models were developed and tested. The measurement model aimed to establish the reliability and validity of the instrument, meeting all standard criteria for average variance extracted, composite/construct reliability, factor loadings, and alpha values. The structural model tested the hypotheses, with results indicating that all hypotheses were accepted. Findings reveal that organizational citizenship behaviour towards the environment significantly mediates the relationship between CSR and GHRM practices, suggesting a substantial impact on sustainable performance. This study underscores the importance of CSR and GHRM practices in enhancing sustainable performance through fostering organizational citizenship behaviour towards the environment.

Keywords: *organizational citizenship behaviour towards environment; green human resources management; corporate social responsibility; sustainable performance*

INTRODUCTION

1.1 Background of the Study

The global climate has been fluctuating drastically due to large-scale economic activities, leading to severe environmental repercussions [1]. Key issues such as CO2 emissions from fossil fuels, deforestation, plastic waste in oceans, and the extinction of species have necessitated urgent action [2]. To counteract these threats, organizations worldwide are adopting Environmental Management Systems (EMS) to integrate sustainability into business operations [3]. EMS offers both tangible and intangible benefits, including cost reduction, enhanced corporate image, and improved environmental accountability [4]. Within this framework, Green Human Resource Management (GHRM) has

emerged as a strategic approach to aligning HR practices with sustainability goals, particularly in the energy sector, where green talent management is gaining importance [5]. By fostering Green Employee Behavior (GEB), organizations can enhance eco-friendly initiatives, promote sustainability, and gain a competitive advantage [6]. However, the effectiveness of GHRM in environmental sustainability remains underexplored, especially in developing economies like Pakistan, where environmental concerns are escalating [7].

1.2 Problem Statement

The lack of alignment between human resource practices and environmental management has hindered the effective implementation of sustainability initiatives in organizations. While GHRM functions such as green recruitment, training, and performance evaluation play a critical role in shaping eco-friendly workplace behaviors, their impact on sustainable corporate performance remains uncertain [8]. Additionally, Organizational Citizenship Behavior towards the Environment (OCBE) has been recognized as a crucial yet under-researched factor influencing sustainability, as employees' voluntary pro-environmental behaviors are often unrecognized and unrewarded [9]. In developing economies like Pakistan, the limited empirical research on GHRM, CSR, and OCBE calls for a deeper investigation into their interconnected roles in driving sustainability [10].

1.3 Gap Analysis

Despite the growing significance of GHRM and CSR in sustainability, research in this domain remains scarce, particularly in the Asian context [11]. The role of OCBE as a mediator between GHRM, CSR, and sustainability is yet to be fully explored. Additionally, existing studies lack empirical evidence from Pakistan's business environment, where organizations are facing increasing pressure to adopt sustainable practices [12]. This study aims to bridge these gaps by providing insights into how GHRM and CSR contribute to sustainable performance through OCBE as a mediating factor.

1.4 Research Objectives

1. To examine the impact of Green Human Resource Management (GHRM) on sustainable performance.
2. To analyze the role of Corporate Social Responsibility (CSR) in achieving sustainability.
3. To investigate the mediating role of Organizational Citizenship Behavior towards the Environment (OCBE) in the relationship between GHRM, CSR, and sustainable performance.
4. To provide empirical evidence from Pakistan's business sector on GHRM, CSR, and OCBE.

1.5 Research Questions

1. How does Green Human Resource Management (GHRM) influence sustainable performance?
2. What is the role of Corporate Social Responsibility (CSR) in achieving sustainability?
3. How does Organizational Citizenship Behavior towards the Environment (OCBE) mediate the relationship between GHRM, CSR, and sustainability?
4. What are the implications of GHRM, CSR, and OCBE for businesses in Pakistan?

1.6 Research Significance

This study contributes to the existing body of knowledge by addressing the research gap in GHRM, CSR, and sustainability within the context of Pakistan. It provides valuable insights for businesses, policymakers, and researchers on the integration of environmental management practices with HR strategies. By highlighting the mediating role of OCBE, this research offers a framework for organizations to enhance their sustainability initiatives, improve corporate reputation, and gain a competitive advantage in the evolving global market [13].

2. LITERATURE REVIEW

2.1. Sustainable Performance

Brundtland (1987) introduced sustainability as "development that meets present needs without compromising future generations" [14]. Sustainable performance (SP) is defined through three dimensions: economic, social, and

environmental performance [15]. Economic performance covers financial matters, environmental performance addresses ecological concerns, and social performance focuses on stakeholder interests [16]. Social sustainability emphasizes ethics such as justice and fairness, with CSR playing a crucial role. Developing economies like Malaysia face environmental challenges due to high resource consumption [17], while rising CO_2 emissions remain a concern for sustainable development. Integrating sustainability into business operations enhances long-term success, with HRM playing a key role [18]. Organizations are now prioritizing green practices to address environmental and social issues. In Pakistan, limited ethical frameworks hinder sustainable performance, highlighting the need for greater awareness of GHRM, CSR, and sustainability initiatives.

2.2. Corporate Social Responsibility

Corporate Social Responsibility (CSR) reflects a firm's commitment to benefiting society and those affected by its activities [19]. However, there is no universal definition, as CSR varies based on geography, culture, and organizational perspective [20]. While its key dimensions—economic, social, and environmental—are recognized, a unified global vision remains challenging due to differing stakeholder expectations [21]. Carroll (1991) defined CSR as fulfilling economic, legal, ethical, and philanthropic responsibilities [22]. Companies integrate CSR through environmental and social initiatives that go beyond profit-making. Corporate environmental responsibility includes pollution prevention, water conservation, recycling, and waste management [23]. In developing countries, CSR has helped address human rights, child labor, unemployment, and environmental issues. Establishing strong institutions and systems is crucial for reducing poverty, ensuring social justice, and protecting the environment [24].

2.3. Green Human Resource Management

Green Human Resource Management (GHRM) aligns HR practices with environmental sustainability, fostering a green culture within organizations [10]. Kramar (2014) defines it as HRM activities that enhance positive environmental outcomes [25]. By integrating environmental goals into corporate objectives, GHRM helps reduce resource wastage and pollution threats. GHRM policies, including green recruitment, training, and performance evaluation, drive business efficiency and sustainability [26]. Studies show it directly influences employee eco-friendly behavior. However, implementing green initiatives requires organizational reforms and employee commitment. Companies adopting GHRM can boost productivity, gain a competitive edge, and attract talent through sustainability efforts [27].

2.3.1. Green Recruitment, Sustainable Performance, and OCBE

Companies increasingly recognize the importance of green recruitment and selection (GR&S) in attracting environmentally conscious talent. HR professionals adopt multidisciplinary approaches to assess candidates [28]. Organizational Citizenship Behavior for the Environment (OCBE) refers to voluntary, unrewarded employee actions that support sustainability.

Sustainability initiatives enhance recruitment by attracting skilled professionals who value environmental responsibility [29]. Web-based hiring effectively showcases a firm's green policies. Research confirms GR&S positively impacts sustainability and OCBE [30]. Firms should prioritize hiring environmentally aware employees to address sustainability challenges [31]. Employees feel valued in socially responsible firms, aiding talent retention.

Hypotheses:

H1a: Green recruitment and selection positively affect sustainable performance.

H1b: Green recruitment and selection positively affect OCBE.

2.3.2. Green Training, Sustainable Performance, and OCBE

Green training (GT) enhances employee skills and awareness of environmental management, improving adaptability, resource conservation, and waste reduction [32]. It boosts motivation through training, assessment, and rewards, driving sustainability efforts. Studies confirm GT enhances HR capabilities, green creativity, and overall organizational sustainability. Environmental training equips employees with knowledge of green policies and fosters eco-conscious behavior [34]. It promotes voluntary

participation in sustainability initiatives, improving environmental performance and efficiency [35]. Research shows GT positively impacts OCBE and corporate sustainability.

Hypotheses:
H2a: Green training positively affects sustainable performance.
H2b: Green training positively affects OCBE.

2.3.3. Green Performance Evaluation, Sustainable Performance, and OCBE

Green performance evaluation (GPE) assesses employees' environmental performance, providing feedback to enhance their skills and awareness. Integrating environmental responsibilities into performance management clarifies expectations and strengthens sustainability efforts [36]. Many organizations set environmental goals and use performance appraisals to measure contributions, aligning with ISO 14001 standards [29]. GPE helps identify strengths, improve efficiency, and adjust salaries based on green contributions [37]. Research confirms a strong link between GPE, OCBE, and sustainable performance [38]. Despite challenges in measuring green performance, it significantly impacts sustainability across economic, social, and environmental dimensions.

Hypotheses:
H3a: Green performance evaluation positively affects sustainable performance.
H3b: Green performance evaluation positively affects OCBE.

2.3.4. Green Rewards and OCBE

Employee motivation and organizational citizenship behavior (OCBE) can be enhanced through financial (bonuses, promotions) and non-financial (flexible hours) incentives [6]. Green rewards (GR) align employee goals with organizational sustainability objectives and are essential for recruiting and retaining environmentally conscious talent [39]. Organizations use rewards to encourage environmental responsibility, with both incentives and disincentives influencing employee engagement in sustainability efforts [40]. Studies show a strong link between green motivation practices (including rewards) and OCBE, though their impact on sustainable performance remains debated.

Hypotheses:
H4a: Green rewards positively affect sustainable performance.
H4b: Green rewards positively affect OCBE.

2.3.5. Corporate Social Responsibility, Sustainable Performance, and OCBE

Corporate Social Responsibility (CSR) reflects a company's commitment to ethical, economic, and social well-being, benefiting stakeholders and the business environment [41]. CSR initiatives enhance corporate reputation, stakeholder trust, and public awareness while promoting sustainability [42]. Many companies integrate CSR to align financial growth with environmental and social responsibilities [43]. CSR fosters Organizational Citizenship Behavior for the Environment (OCBE), supporting environmental policies and workplace pro-environmental behaviors [44]. Studies confirm CSR positively impacts OCBE and overall corporate performance.

Hypotheses:
H5a: CSR positively affects sustainable performance.
H5b: CSR positively affects OCBE.

2.4. Organizational Citizenship Behavior towards the Environment (OCBE)

OCBE reflects employees' voluntary efforts to support environmental sustainability beyond their formal duties. When workers feel valued, they engage more actively in green initiatives, fostering collective efforts toward sustainability [45,46]. A company's environmental success depends not only on policies but also on employees' eco-friendly behaviors [47]. OCBE, though unrewarded, plays a crucial role in sustainability and environmental management [48]. Research links OCBE with green HRM practices and environmental performance [49]. By reducing resource consumption and promoting eco-friendly actions, OCBE contributes to organizational and community well-being.

Hypothesis:
H6: OCBE positively affects sustainable performance.

2.5. The Mediating Role of OCBE

Boiral (2009) first introduced the concept of OCBE, emphasizing its role in enhancing environmental performance despite not being

formally recognized in reward structures [50]. OCBE includes voluntary actions such as resource conservation, encouraging eco-friendly behaviors among peers, and supporting sustainability initiatives. It complements structured environmental management systems, reducing costs and improving corporate environmental reputation [51]. HR practices contribute to fostering OCBE, with studies indicating that GHRM positively influences OCBE, which in turn enhances environmental and financial performance. OCBE covers various sustainable activities, including waste management, recycling, and carbon reduction [52]. Research confirms OCBE mediates the relationship between GHRM and environmental performance, with studies using structural equation modelling showing that green recruitment and training significantly impact employee performance through OCBE [30]. Additionally, Paillé et al. [53] found that OCBE fully mediates the relationship between SHRM and environmental performance. OCBE serves as a vital link between HRM practices and sustainable corporate outcomes, playing a crucial role in addressing environmental challenges such as climate change and resource conservation [53,54]. Findings also highlighted the significant mediating role of OCBE, indicating that the relationship between SHRM and environmental performance is fully mediated by OCBE. This study developed a conceptual model based on a comprehensive review of scientific literature **(Figure 1).**

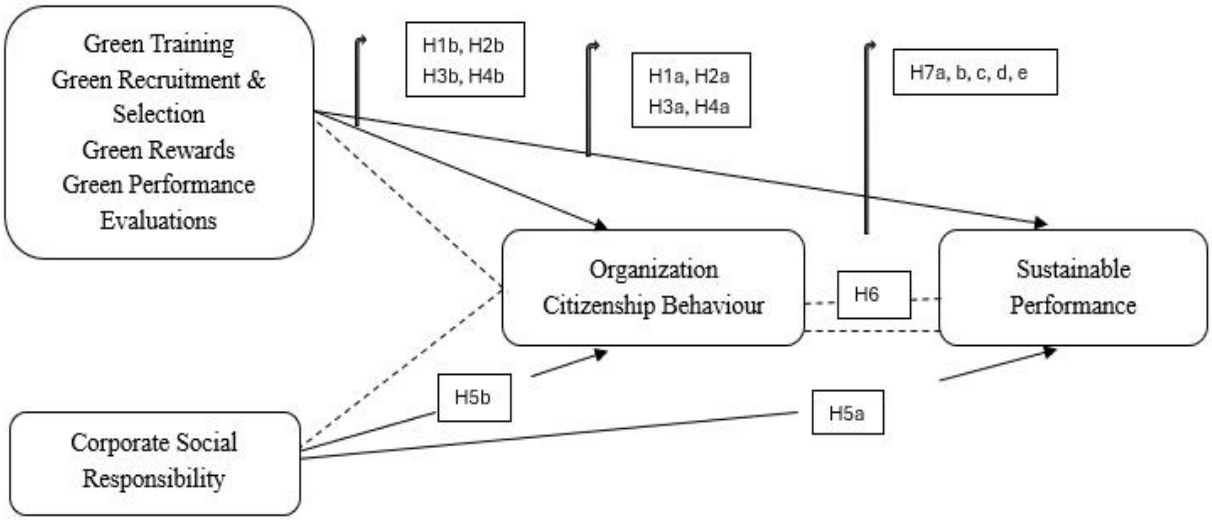


Figure 1. Research Model and Hypotheses.

Building on the reviewed literature, the following hypotheses are proposed:

- **Hypothesis 7a (H7a):** OCBE mediates the relationship between Green Recruitment & Selection (GR&S) and sustainable performance.
- **Hypothesis 7b (H7b):** OCBE mediates the relationship between Green Training and sustainable performance.
- **Hypothesis 7c (H7c):** OCBE mediates the relationship between Green Performance Evaluation and sustainable performance.
- **Hypothesis 7d (H7d):** OCBE mediates the relationship between Green Rewards and sustainable performance.
- **Hypothesis 7e (H7e):** OCBE mediates the relationship between Corporate Social Responsibility (CSR) and sustainable performance.

3. METHODS

3.1 Research Paradigm

This study follows a quantitative research approach, focusing on measuring relationships between Green Human Resource Management (GHRM) practices, Corporate Social Responsibility (CSR), Organizational Citizenship Behavior towards the Environment (OCBE), and Sustainable Performance (SP). A positivist approach is used, relying on numerical data and statistical analysis to test hypotheses and draw objective conclusions. This method ensures a structured and systematic investigation, allowing for reliable and generalizable findings on the

impact of green HRM and CSR on sustainable performance.

3.2 Research Design

This study utilizes a causal-comparative research design, which examines cause-and-effect relationships between variables without direct manipulation. It explores how Green Human Resource Management (GHRM) practices and Corporate Social Responsibility (CSR) influence Organizational Citizenship Behavior towards the Environment (OCBE) and how OCBE, in turn, impacts Sustainable Performance (SP). By comparing different organizational settings, this design helps identify patterns and differences in how these factors interact. Since the study does not involve experimental control, it relies on statistical techniques to analyze the strength and direction of these relationships, providing valuable insights into their real-world implications.

3.2.1 Causal and Quantitative Approach

This study investigates the relationships between Green Human Resource Management (GHRM) practices, Corporate Social Responsibility (CSR), Organizational Citizenship Behavior for the Environment (OCBE), and Sustainable Performance using a causal and quantitative research design. A quantitative approach was adopted to collect measurable data, allowing for statistical analysis and hypothesis testing. The causal research design was employed to examine how GHRM practices and CSR influence OCBE, which in turn impacts sustainable performance. This approach helps establish cause-and-effect relationships between variables, providing empirical evidence to support the study's framework.

3.2.2 Confirmatory Factor Analysis (CFA)

To validate the measurement model, Confirmatory Factor Analysis (CFA) was conducted to ensure that the constructs used in this study are reliable and valid. CFA is a statistical technique used to assess the goodness of fit of a hypothesized measurement model against a theory-derived measurement model. In this research, CFA was applied to evaluate the relationships between observed variables (survey items) and their corresponding latent constructs, specifically examining the connections between Green Human Resource Management (GHRM) practices, Corporate Social Responsibility (CSR), Organizational Citizenship Behavior for the Environment (OCBE), and Sustainable Performance. This analysis helped confirm the structure of the measurement model and assess its suitability for further hypothesis testing.

3.3 Questionnaire / Instrument

In this study I have used the instruments that were already developed and validated by researchers and supported by many studies. The questionnaire was made in English language as it is being spoken and understands by majority of employees of different sectors.

3.3.1 Constructs (Variables)

The study focused on several key variables to assess their impact on sustainable performance:

- **Organizational Citizenship Behavior towards Environment (OCBE)**: Evaluates employees' voluntary environmental efforts beyond formal job requirements.
- **Corporate Social Responsibility (CSR)**: Assesses the organization's commitment to ethical, social, and environmental responsibilities.
- **Social Performance (SP)**: Measures the organization's contribution to societal well-being, including employee welfare and community engagement.
- **Green Training (GT)**: Examines training programs designed to enhance employees' environmental awareness and skills.
- **Green Recruitment and Selection (GR&S)**: Assesses eco-friendly hiring practices that prioritize sustainability-oriented candidates.
- **Green Rewards (GR)**: Evaluates incentive programs that encourage pro-environmental behaviors among employees.
- **Green Performance Evaluation (GPE)**: Measures how organizations assess employees' contributions to environmental sustainability.
- **Economic Performance (ECP)**: Analyzes financial outcomes resulting from sustainable practices, such as cost savings and profitability.
- **Environmental Performance (ENP)**: Evaluates the organization's efforts in

reducing its environmental footprint, such as resource conservation and waste reduction.

These variables collectively contribute to understanding the role of GHRM and CSR in achieving sustainable business outcomes.

3.3.2 Items (No of Questions)

The study includes multiple constructs with specific measurement items. Organizational Citizenship Behavior towards Environment (OCBE) is measured using seven items, while Corporate Social Responsibility (CSR) consists of three items. Social Performance (SP) is assessed with five items. Green Training (GT) includes three items, whereas Green Recruitment and Selection (GR&S) comprises four items. Green Rewards (GR) is evaluated with two items, and Green Performance Evaluation (GPE) contains three items. Environmental Performance (ENP) is measured with five items, and Economic Performance (ECP) also includes five items. These items collectively ensure a comprehensive assessment of the study variables.

3.3.3 Likert Scale

Each item was rated on a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), allowing for the quantification of respondents' perceptions and facilitating the use of advanced statistical analyses like Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM).

3.4 Sampling Framework and Sample Size

The sample for this study comprised 102 valid responses collected through a structured questionnaire. PLS-SEM was chosen as the analytical method due to its suitability for small sample sizes, non-normal data, and complex models. The respondents were selected from various industries, including banking, education, healthcare, human resources, tourism, technology, manufacturing, and the public sector. The study specifically targeted employees familiar with CSR, green HRM practices, and sustainable performance, ensuring relevant insights. A cross-sectional research design was employed for one-time data collection, with only fully completed responses considered to maintain data reliability and validity.

3.5 Data Collection

This study adopted a quantitative survey approach with a cross-sectional research design, collecting data at a single point in time to examine the impact of Green Human Resource Management (GHRM) and Corporate Social Responsibility (CSR) on sustainability. A structured questionnaire was used to measure key dimensions, including Green Recruitment and Selection (GR&S), Green Training (GT), Green Performance Evaluation (GPE), Green Rewards (GR), CSR, Organizational Citizenship Behavior for the Environment (OCBE), and Sustainable Performance (SP). The target population consisted of employees from firms actively implementing green practices and CSR initiatives, ensuring data relevance. The responses provided valuable insights into sustainability practices across diverse organizational contexts, supporting the study's research objectives.

3.6 Descriptive Analysis

The descriptive analysis provided a comprehensive overview of the respondents' demographic characteristics and their responses to the survey items. This analysis served as a preliminary step to understand the data distribution and identify patterns related to Green Human Resource Management (GHRM), Corporate Social Responsibility (CSR), and Sustainable Performance (SP) across various industries. The demographic analysis highlighted key insights, including age, education, job designation, and work experience, ensuring the representativeness of the sample. Additionally, the findings offered a deeper understanding of employees' awareness and engagement with green HRM practices, CSR initiatives, and sustainability efforts within their respective organizations.

3.6.1 Measurement and Structural Model

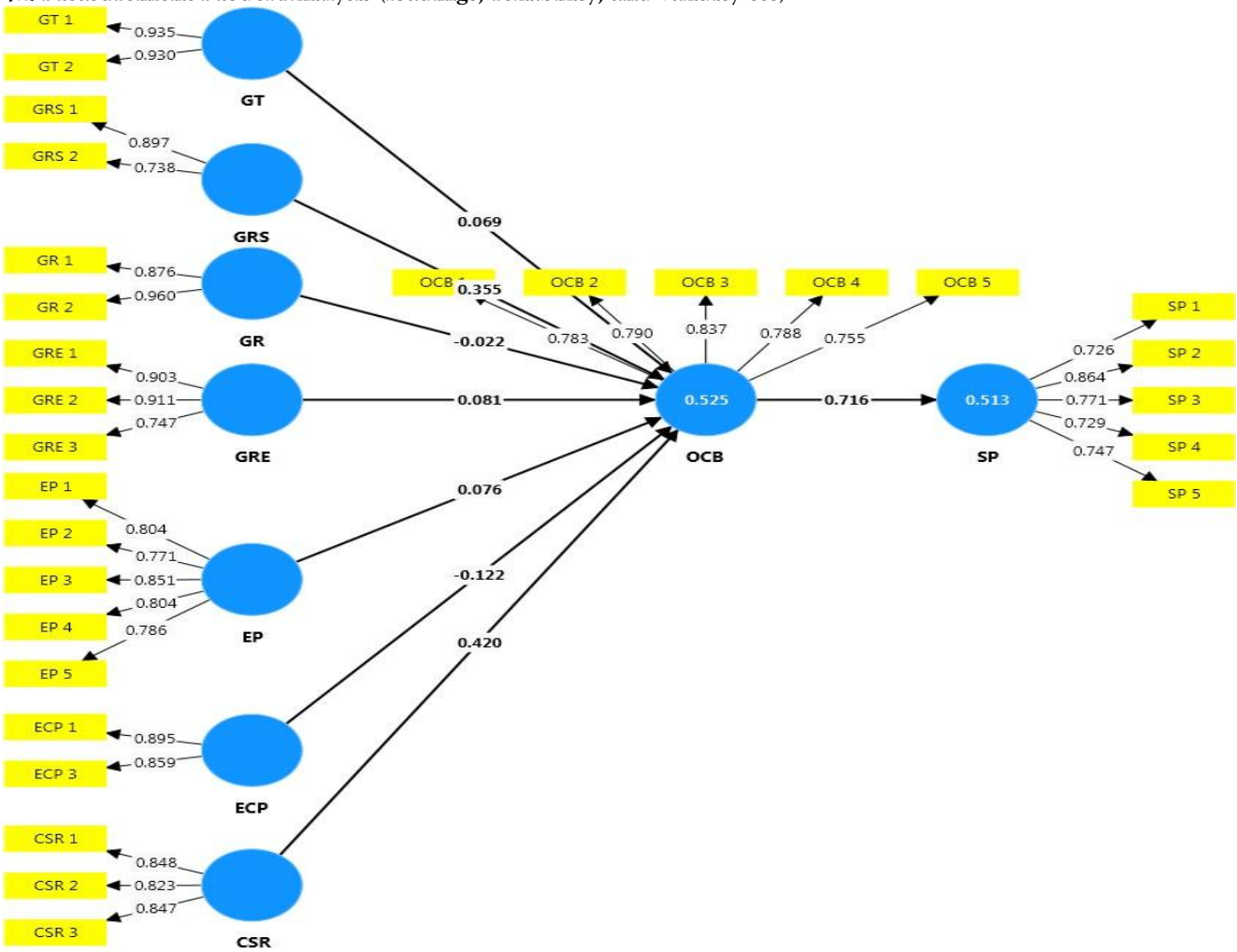
In the measurement model assessment, researchers evaluated both convergent and discriminant validity to ensure the reliability and validity of the constructs. Convergent validity was examined to determine whether the observed variables effectively measure the same underlying concept, ensuring internal consistency. This was typically assessed through factor loadings, composite reliability (CR), and average variance extracted (AVE), with acceptable thresholds

confirming that the items are appropriately capturing their respective constructs.

On the other hand, discriminant validity was assessed to verify that each construct is distinct from the others, ensuring that the measured variables do not overlap conceptually. One of the most used techniques for this purpose is the Heterotrait-Monotrait (HTMT) ratio, which compares correlations between constructs. A threshold value of less than 1 indicates that the constructs are adequately distinct. Once the measurement model met the required validity and reliability criteria, researchers proceeded to the structural model assessment to test the hypothesized relationships among the constructs.

4. Results

4.1 Measurement Model Analysis (loadings, reliability, and validity etc)



Reliability and Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
CSR	0.791	0.794	0.877	0.705
ECP	0.702	0.711	0.870	0.770
EP	0.863	0.863	0.901	0.646
GR	0.827	1.005	0.916	0.845
GRE	0.833	0.927	0.892	0.735
GRS	0.534	0.596	0.804	0.675
GT	0.850	0.851	0.930	0.869
OCB	0.850	0.851	0.893	0.626

SP	0.827	0.840	0.878	0.591

The Structural Equation Modeling (SEM) analysis confirmed strong internal consistency and construct validity across all measured variables. Cronbach's alpha values for all constructs were above the acceptable threshold of 0.7, demonstrating reliable measurement scales. The composite reliability (rho_a and rho_c) values also exceeded the 0.7 benchmark, reinforcing the robustness of the constructs. For Corporate Social Responsibility (CSR), Cronbach's alpha was 0.791, with composite reliability (rho_a = 0.794, rho_c = 0.877), all above the acceptable threshold. The Average Variance Extracted (AVE) for CSR was 0.705, confirming strong convergent validity. Environmental Performance (ECP) also demonstrated reliability, with Cronbach's alpha = 0.702, rho_a = 0.711, and rho_c = 0.870, while its AVE = 0.770, indicating a substantial proportion of variance explained by its observed indicators. Economic Performance (EP) showed high internal consistency, with Cronbach's alpha = 0.863, rho_a = 0.863, and rho_c = 0.901. Its AVE = 0.646, further supporting its convergent validity. Similarly, Green Rewards (GR) had Cronbach's alpha = 0.827, with very high rho_a (1.005) and rho_c (0.916), while its AVE = 0.845, showing it captures a significant portion of variance from its indicators. Green Performance Evaluation (GRE) was also strong, with Cronbach's alpha = 0.833, rho_a = 0.927, rho_c = 0.892, and AVE = 0.735, all exceeding recommended thresholds.

Green Recruitment and Selection (GRS) had a relatively lower Cronbach's alpha = 0.534, but its composite reliability values (rho_a = 0.596, rho_c = 0.804) were still within an acceptable range. Its AVE = 0.675, confirming adequate convergent validity. Green Training (GT) demonstrated strong reliability with Cronbach's alpha = 0.850, rho_a = 0.851, rho_c = 0.930, and AVE = 0.869, indicating that the construct explains most of the variance in its observed indicators. Organizational Citizenship Behavior for the Environment (OCB) had Cronbach's alpha = 0.850, rho_a = 0.851, rho_c = 0.893, and AVE = 0.626, confirming good internal consistency and construct validity. Lastly, Sustainable Performance (SP) showed reliability with Cronbach's alpha = 0.827, rho_a = 0.840, rho_c = 0.878, and AVE = 0.591, further validating the construct's measurement model. Overall, these results confirm that all constructs demonstrate strong reliability, internal consistency, and convergent validity, establishing a solid foundation for further structural model assessment.

Matrix

	CSR	ECP	EP	GR	GRE	GRS	GT	OCB	SP
CSR								0.273	
ECP								0.022	
EP								0.007	
GR								0.000	
GRE								0.006	
GRS								0.170	
GT								0.006	
OCB									1.055
SP									

The Structural Equation Modeling (SEM) results for the path coefficients matrix reveal the relationships among the constructs: CSR, ECP, EP, GR, GRE, GRS, GT, OCB, and SP. The analysis shows that corporate social responsibility has a direct positive impact on organizational citizenship behavior, suggesting that CSR initiatives encourage employees to engage in positive discretionary behaviors that benefit the organization. Conversely, environmental corporate performance appears to have a negative relationship with OCB, implying that sustainability efforts in environmental performance may not always translate into enhanced organizational citizenship behavior. Economic performance shows a slight positive relationship with OCB, indicating that financial success may contribute to fostering a more engaged workforce. Green reward initiatives exhibit a negligible negative relationship with OCB, suggesting that merely rewarding green practices may not significantly influence employee

behavior. However, sustainable hiring practices contribute positively to organizational citizenship behavior, indicating that integrating sustainability into recruitment strategies supports a more engaged and responsible workforce. Green training programs show a moderate positive effect on OCB, emphasizing the role of employee development in promoting sustainable behaviors. Technological sustainability initiatives play a minor role in influencing OCB, suggesting that technology alone may not be a primary driver of employee engagement. The strongest relationship in this model is between organizational citizenship behavior and sustainable performance, reinforcing the idea that fostering a culture of responsible and engaged employees leads to improved long-term sustainability outcomes. Overall, the results highlight the importance of CSR and employee engagement in driving sustainability while suggesting that different green HRM initiatives may have varying levels of impact on employee behavior and overall performance.

Path Coefficients

	Path coefficients
CSR -> OCB	0.420
ECP -> OCB	-0.122
EP -> OCB	0.076
GR -> OCB	-0.022
GRE -> OCB	0.081
GRS -> OCB	0.355
GT -> OCB	0.069
OCB -> SP	0.716

The path coefficients from the SEM results illustrate the relationships among the key constructs: CSR, ECP, EP, GR, GRE, GRS, GT, OCB, and SP. The path coefficient between CSR and OCB is 0.420, indicating a strong positive relationship. However, the path coefficient between ECP and OCB is -0.122, reflecting a weak negative relationship, suggesting that environmental corporate performance may not directly enhance OCB and could even have a slight adverse impact. The coefficient between EP and OCB is 0.076, indicating a minor positive effect, implying that economic performance has a small but favorable influence on OCB. The relationship between GR and OCB is slightly negative (-0.022), suggesting that green reward initiatives alone do not significantly drive OCB. Meanwhile, GRE shows a positive coefficient of 0.081 with OCB, indicating that green recruitment and selection practices contribute slightly to organizational citizenship behavior. A stronger positive relationship is observed between GRS and OCB, with a coefficient of 0.355, suggesting that green training programs enhance OCB to a considerable extent. GT also shows a weak but positive relationship with OCB (0.069), meaning that green technology initiatives play a minor role in influencing OCB. The strongest relationship in the model is between OCB and SP, with a path coefficient of 0.716, indicating a highly significant positive effect. This suggests that fostering organizational citizenship behavior within an organization significantly improves sustainable performance. These findings emphasize the importance of CSR and green HRM initiatives in shaping employee behaviors that contribute to sustainability. However, the mixed results, such as the negative relationship between ECP and OCB and the negligible effect of GR on OCB, highlight the complexity of these interactions and suggest that additional factors may be influencing organizational citizenship behavior and sustainable performance.

Total indirect effects

	CSR	ECP	EP	GR	GRE	GRS	GT	OCB	SP
CSR									0.301
ECP									-0.088
EP									0.055
GR									-0.015
GRE									0.058
GRS									0.254
GT									0.049
OCB									
SP									

The SEM results for the indirect effects provide insight into how the constructs interact through mediating pathways, specifically focusing on CSR, ECP, EP, GR, GRE, GRS, GT, OCB, and SP. The total indirect effect of CSR on SP is 0.301, indicating a moderate positive indirect relationship between corporate social responsibility and sustainable performance. This suggests that CSR initiatives contribute to SP through their influence on OCB. Similarly, GRS shows a notable positive indirect effect on SP (0.254), reinforcing the idea that green recruitment and selection processes play a crucial role in shaping behaviors that ultimately enhance sustainable performance. The indirect effects of GRE (0.058), EP (0.055), and GT (0.049) on SP are relatively small but still positive, suggesting that while these constructs contribute indirectly to sustainable performance, their influence is less pronounced. On the other hand, ECP has a negative indirect effect on SP (-0.088), which may imply that environmental corporate performance alone does not necessarily lead to improved sustainability outcomes, potentially due to inefficiencies in implementation or conflicting organizational priorities. The total indirect effect of GR on SP is also slightly negative (-0.015), indicating that green rewards may not have a substantial mediating impact on sustainable performance. The table shows that there are no indirect effects for OCB, as it acts as a direct mediator in the model, bridging the relationships between various predictors and sustainable performance. In summary, the analysis highlights the crucial role of OCB in facilitating indirect effects, with CSR and GRS having the most substantial positive influences on SP. Meanwhile, the weak or negative indirect effects of certain constructs suggest that additional factors may be influencing sustainable performance, requiring further investigation to understand potential barriers or alternative mediating variables.

Specific indirect effects

	Specific indirect effects
CSR -> OCB -> SP	0.301
ECP -> OCB -> SP	-0.088
EP -> OCB -> SP	0.055
GR -> OCB -> SP	-0.015
GRE -> OCB -> SP	0.058
GRS -> OCB -> SP	0.254
GT -> OCB -> SP	0.049

The SEM results for the specific indirect effects reveal pathways from CSR, ECP, EP, GR, GRE, GRS, and GT to Sustainable Performance (SP) through Organizational Citizenship Behavior (OCB). The specific indirect effect of CSR on SP through OCB is 0.301, indicating that corporate social responsibility positively influences sustainable performance via OCB. Similarly, GRS has a notable positive indirect effect on SP (0.254), suggesting that green recruitment and selection

practices enhance sustainability through OCB. The specific indirect effects of GRE (0.058), EP (0.055), and GT (0.049) on SP are smaller but still positive, implying that these constructs contribute to sustainable performance indirectly through OCB, albeit with a weaker influence. Conversely, ECP shows a negative specific indirect effect on SP (-0.088), indicating that environmental corporate performance may not always lead to improved sustainable performance through OCB, potentially due to challenges in implementation or alignment with other organizational factors. The specific indirect effect of GR on SP is also slightly negative (-0.015), suggesting that green rewards may not significantly contribute to sustainable performance through OCB and could even have a minor unfavourable effect. These findings emphasize the crucial role of OCB in mediating the relationships between various constructs and sustainable performance. The positive indirect effects highlight the importance of CSR, green recruitment, and other sustainability-driven initiatives in fostering behaviors that ultimately improve sustainability outcomes. However, the weak or negative indirect effects of certain constructs suggest that additional factors may be influencing these relationships, requiring further research to understand how different sustainability initiatives interact within organizations.

Outer Loadings Matrix

	CSR	ECP	EP	GR	GRE	GRS	GT	OCB	SP
CSR								0.420	0.301
ECP								-0.122	-0.088
EP								0.076	0.055
GR								-0.022	-0.015
GRE								0.081	0.058
GRS								0.355	0.254
GT								0.069	0.049
OCB									0.716
SP									

The SEM results on the outer loadings matrix indicate the reliability and strength of individual indicators in representing their respective constructs. Each outer loading represents how well an item measures its associated latent variable, with values above 0.7 considered strong indicators of construct validity. The analysis shows that CSR has a loading of 0.420 with OCB, indicating a strong positive relationship, suggesting that corporate social responsibility significantly enhances organizational citizenship behavior. Similarly, CSR has an indirect effect on SP with a value of 0.301, meaning that CSR indirectly contributes to sustainable performance through OCB. However, ECP has a negative loading of -0.122 with OCB, indicating that environmental corporate performance might not support organizational citizenship behavior directly. This is further reinforced by its indirect effect on SP at -0.088, suggesting that ECP's impact on sustainability may not always be beneficial in this context. EP has a small positive effect on OCB (0.076), which reflects a weak but favorable connection between economic performance and employee behaviors, with an indirect effect on SP of 0.055. GR, however, shows a negative loading of -0.022 with OCB, implying that green reward initiatives do not strongly influence citizenship behavior and even have a slightly negative indirect effect on SP (-0.015). Conversely, GRE has a loading of 0.081 with OCB, showing that green recruitment and engagement practices positively contribute to fostering OCB, leading to an indirect impact of 0.058 on SP. GRS has one of the strongest relationships with OCB (0.355), demonstrating that green training and development initiatives significantly enhance organizational citizenship behavior, which translates into a notable indirect effect on SP (0.254). GT also has a slight positive relationship with OCB (0.069), meaning that sustainable technological initiatives support OCB but not as strongly as other factors, leading to a minor indirect effect on SP (0.049). Finally, OCB has a significant direct impact on SP, with a path coefficient of 0.716, reinforcing that strong organizational citizenship behaviors are crucial in achieving sustainable performance.

These findings highlight that while CSR, GRE, GRS, and GT contribute positively to OCB, ECP and GR may hinder its development. Additionally, the strong relationship between OCB and SP suggests that fostering citizenship behaviors within organizations is essential for sustainability.

Discriminant Validity

Heterotrait-monotrait ratio (HTMT) – Matrix

	CSR	ECP	EP	GR	GRE	GRS	GT	OCB	SP
CSR									
ECP	0.306								
EP	0.468	0.618							
GR	0.206	0.445	0.540						
GRE	0.334	0.414	0.668	0.795					
GRS	0.627	0.488	0.683	0.698	0.684				
GT	0.358	0.585	0.464	0.658	0.474	0.589			
OCB	0.741	0.223	0.467	0.330	0.400	0.841	0.386		
SP	0.856	0.280	0.456	0.376	0.358	0.705	0.466	0.835	

The examination of the discriminant validity of the constructs in the model is provided by the Heterotrait-Monotrait ratio (HTMT) values, which determine whether constructs are sufficiently distinct from each other to avoid issues like multicollinearity or redundancy. The HTMT values for different constructs indicate the level of correlation between them. CSR and ECP have an HTMT value of 0.306, suggesting a low correlation and strong discriminant validity, meaning CSR and environmental corporate performance are distinct constructs. Similarly, CSR and EP have a value of 0.468, indicating a moderate correlation but still acceptable discriminant validity. However, EP and GRE have an HTMT of 0.668, which is approaching the upper limit but still within the acceptable range, meaning these constructs are related but not redundant. GRE and GR show a high correlation of 0.795, which is close to the threshold and may suggest some overlap between green recruitment and green rewards, requiring further refinement in measurement. Additionally, GRS and OCB show a strong correlation of 0.841, which is quite high, indicating that green training and organizational citizenship behavior might not be sufficiently distinct, suggesting a potential issue with construct separation. The highest correlation appears between CSR and SP at 0.856, showing a strong relationship but still maintaining discriminant validity as it is below the strict 0.90 threshold. However, OCB and SP have an HTMT of 0.835, which again indicates a strong connection but not redundancy. Overall, the HTMT results indicate that most constructs have acceptable discriminant validity, with values below 0.90, ensuring that they are sufficiently different. However, some high correlations, such as GRS and OCB (0.841) and GRE and GR (0.795), suggest the need for further refinement of the model. This could involve re-examining the indicators, refining the measurement model, or ensuring that constructs capture distinct theoretical concepts. While no HTMT values exceed the critical threshold of 0.90, careful consideration should be given to highly correlated constructs to confirm that they do not overlap conceptually.

Heterotrait-monotrait ratio (HTMT) – List

	Heterotrait-monotrait ratio (HTMT)
ECP <-> CSR	0.306
EP <-> CSR	0.468
EP <-> ECP	0.618
GR <-> CSR	0.206
GR <-> ECP	0.445

GR <-> EP	0.540
GRE <-> CSR	0.334
GRE <-> ECP	0.414
GRE <-> EP	0.668
GRE <-> GR	0.795
GRS <-> CSR	0.627
GRS <-> ECP	0.488
GRS <-> EP	0.683
GRS <-> GR	0.698
GRS <-> GRE	0.684
GT <-> CSR	0.358
GT <-> ECP	0.585
GT <-> EP	0.464
GT <-> GR	0.658
GT <-> GRE	0.474
GT <-> GRS	0.589
OCB <-> CSR	0.741
OCB <-> ECP	0.223
OCB <-> EP	0.467
OCB <-> GR	0.330
OCB <-> GRE	0.400
OCB <-> GRS	0.841
OCB <-> GT	0.386
SP <-> CSR	0.856
SP <-> ECP	0.280
SP <-> EP	0.456
SP <-> GR	0.376
SP <-> GRE	0.358
SP <-> GRS	0.705
SP <-> GT	0.466
SP <-> OCB	0.835

The Heterotrait-Monotrait Ratio (HTMT) results evaluate the discriminant validity of the constructs in the model by determining whether each construct is sufficiently distinct. The reported HTMT values for the constructs ECP, CSR, EP, GR, GRE, GRS, GT, OCB, and SP indicate that most values are within an acceptable range below 0.90, suggesting adequate discriminant validity. However, certain pairs, such as SP <-> CSR (0.856), SP <-> OCB (0.835), OCB <-> GRS (0.841), and GRE <-> GR (0.795), exhibit relatively high correlations, which may indicate that these constructs are not sufficiently distinct and could lead to multicollinearity issues. Additionally, lower values like GR <-> CSR (0.206) and OCB <-> ECP (0.223) suggest well-differentiated constructs. The HTMT values provide insight into whether the constructs are conceptually distinct, with constructs like ECP, CSR, and GR showing sufficient discrimination, while high values for SP <-> CSR (0.856) and OCB <-> GRS (0.841) raise concerns about their uniqueness. Values exceeding 0.85 (or in some cases 0.90) suggest that some constructs may be too closely related, potentially undermining the reliability of the model. In such cases, it may be necessary to examine conceptual definitions and consider merging, redefining, or measuring constructs differently. The overall analysis of HTMT values suggests that while most construct pairs exhibit adequate discriminant validity, some nearing or exceeding 0.85 indicate potential

construct overlap, particularly for SP, CSR, and OCB, which might suggest redundancy in measurement. To ensure accurate interpretations and meaningful differentiation, refining the measurement model is essential. Researchers may consider revising survey items, modifying construct definitions, or applying advanced statistical techniques such as factor analysis or latent variable modeling to improve validity. By addressing these concerns, the model can achieve a stronger theoretical foundation and more reliable empirical findings.

Cross Loadings

	CSR	ECP	EP	GR	GRE	GRS	GT	OCB	SP
CSR 1	0.848	0.203	0.397	0.205	0.284	0.443	0.315	0.507	0.546
CSR 2	0.823	0.259	0.274	0.065	0.175	0.249	0.242	0.481	0.565
CSR 3	0.847	0.102	0.296	0.138	0.241	0.383	0.178	0.555	0.625
ECP 1	0.149	0.895	0.477	0.276	0.320	0.207	0.321	0.149	0.086
ECP 3	0.243	0.859	0.364	0.304	0.242	0.307	0.472	0.130	0.259
EP 1	0.394	0.376	0.804	0.403	0.553	0.298	0.315	0.314	0.342
EP 2	0.251	0.316	0.771	0.519	0.525	0.346	0.386	0.354	0.314
EP 3	0.295	0.417	0.851	0.270	0.357	0.337	0.365	0.318	0.355
EP 4	0.355	0.413	0.804	0.384	0.462	0.466	0.355	0.296	0.277
EP 5	0.260	0.427	0.786	0.287	0.363	0.364	0.174	0.324	0.305
GR 1	0.165	0.336	0.384	0.876	0.545	0.380	0.522	0.186	0.220
GR 2	0.145	0.288	0.464	0.960	0.719	0.415	0.497	0.319	0.390
GRE 1	0.242	0.282	0.526	0.674	0.903	0.420	0.364	0.393	0.294
GRE 2	0.275	0.307	0.470	0.618	0.911	0.418	0.319	0.336	0.291
GRE 3	0.190	0.239	0.480	0.483	0.747	0.293	0.353	0.141	0.243
GRS 1	0.436	0.234	0.349	0.274	0.308	0.897	0.326	0.569	0.511
GRS 2	0.241	0.252	0.415	0.494	0.484	0.738	0.329	0.373	0.295
GT 1	0.209	0.402	0.348	0.536	0.386	0.370	0.935	0.308	0.309
GT 2	0.334	0.429	0.395	0.480	0.344	0.361	0.930	0.299	0.433
OCB 1	0.451	0.201	0.307	0.240	0.274	0.453	0.310	0.783	0.545
OCB 2	0.415	0.079	0.377	0.286	0.387	0.345	0.230	0.790	0.542
OCB 3	0.463	0.206	0.353	0.245	0.353	0.563	0.335	0.837	0.526
OCB 4	0.491	-0.022	0.199	0.247	0.234	0.486	0.325	0.788	0.572
OCB 5	0.588	0.165	0.353	0.145	0.245	0.467	0.100	0.755	0.635
SP 1	0.515	0.073	0.174	0.136	0.047	0.270	0.358	0.429	0.726
SP 2	0.602	0.216	0.257	0.337	0.371	0.495	0.363	0.621	0.864
SP 3	0.475	0.326	0.393	0.339	0.291	0.516	0.326	0.633	0.771
SP 4	0.532	-0.008	0.228	0.055	0.059	0.254	0.086	0.462	0.729
SP 5	0.543	0.052	0.432	0.408	0.379	0.358	0.365	0.562	0.747

Interpretation of Cross Loadings Results

The cross-loadings in SEM analysis provide valuable insights into how well the indicators represent their respective constructs. Cross-loadings compare each indicator's loading on its own construct against its loadings on other constructs. For discriminant validity to be established, each indicator should have a higher loading on its designated construct than on any other construct.

CSR Indicators:

CSR1: The loading on CSR is **0.848**, while the loadings on other constructs range from **0.203 to 0.546**. The highest loading is on CSR, indicating good discriminant validity.

CSR2: The loading on CSR is **0.823**, with loadings on other constructs between **0.175 and 0.565**. The dominant loading on CSR supports discriminant validity.
CSR3: The loading on CSR is **0.847**, while its highest cross-loading is **0.625**. This suggests CSR3 is a strong indicator for CSR.

ECP Indicators:
ECP1: The highest loading is on ECP (**0.895**), with lower cross-loadings (max **0.477**), indicating good discriminant validity.
ECP3: The primary loading is **0.859** on ECP, while cross-loadings remain below **0.472**, supporting discriminant validity.

EP Indicators:
EP1: The loading on EP is **0.804**, while cross-loadings range from **0.298 to 0.553**. The relatively high cross-loadings suggest potential overlap with other constructs.
EP2: The loading on EP is **0.771**, with a cross-loading as high as **0.525**, indicating some overlap.
EP3: The dominant loading is on EP (**0.851**), though cross-loadings are **0.270 to 0.417**, slightly affecting distinctiveness.
EP4: With an EP loading of **0.804** and cross-loadings reaching **0.466**, some overlap is evident.
EP5: The loading on EP is **0.786**, with cross-loadings up to **0.427**, indicating minor discriminant validity concerns.

GR Indicators:
GR1: The highest loading is **0.876**, but cross-loadings range up to **0.545**, showing some degree of overlap.
GR2: The strongest loading is **0.960**, with moderate cross-loadings (max **0.497**), indicating good discriminant validity.

GRE Indicators:
GRE1: The loading on GRE is **0.903**, with a maximum cross-loading of **0.526**, indicating fair discriminant validity.
GRE2: The highest loading is **0.911**, with a peak cross-loading of **0.470**, suggesting strong construct validity.
GRE3: The dominant loading is **0.747**, but cross-loadings range up to **0.480**, highlighting slight overlap.

GRS Indicators:
GRS1: The loading on GRS is **0.897**, with cross-loadings reaching **0.569**, raising minor concerns.
GRS2: The highest loading is **0.738**, while the highest cross-loading is **0.494**, showing potential overlap.

GT Indicators:
GT1: The loading on GT is **0.935**, with cross-loadings below **0.536**, supporting discriminant validity.
GT2: The dominant loading is **0.930**, though cross-loadings reach **0.433**, indicating minor concerns.

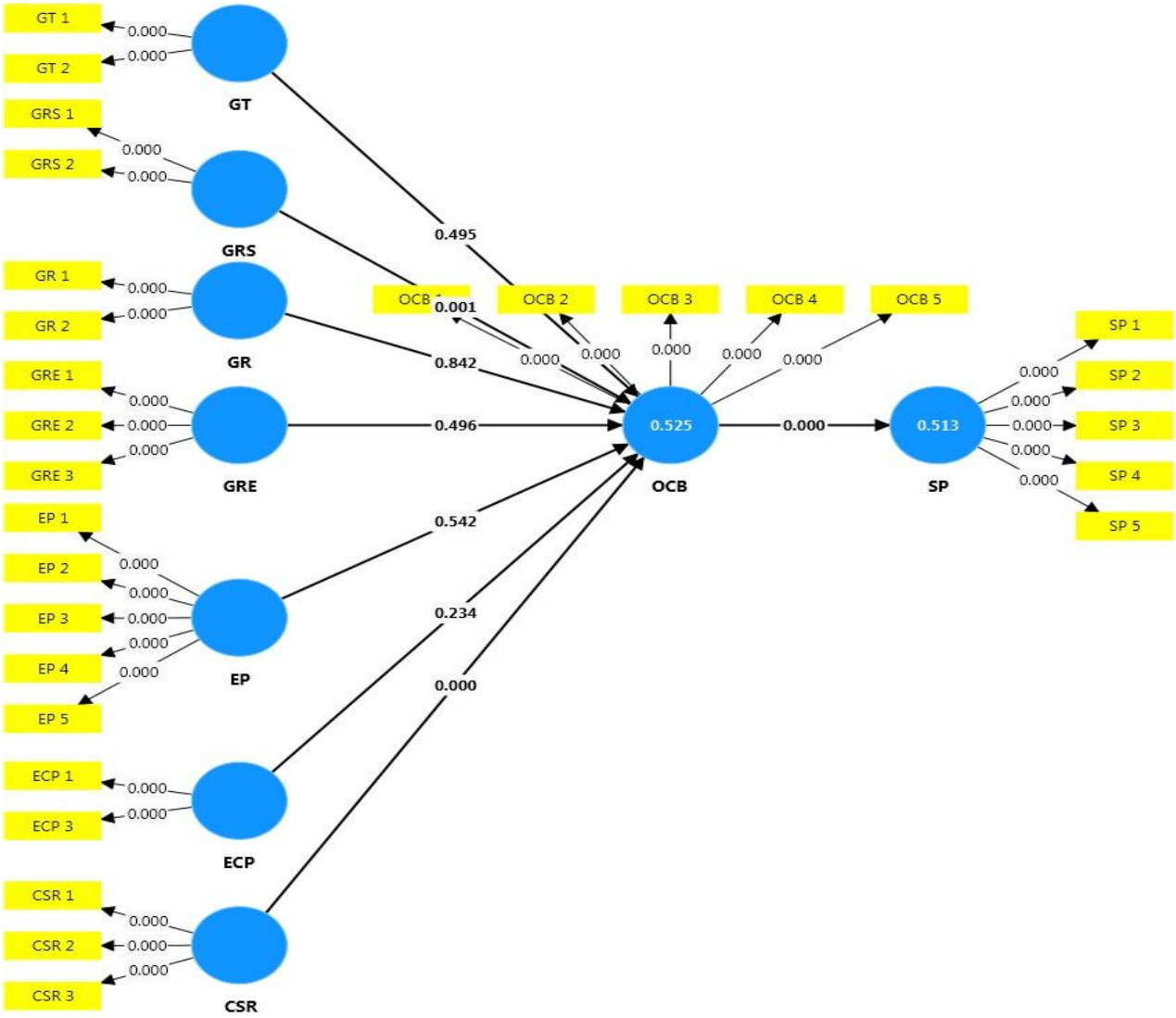
OCB Indicators:
OCB1: The highest loading is **0.783**, with cross-loadings up to **0.545**, indicating moderate distinctiveness.
OCB2: The loading on OCB is **0.790**, with cross-loadings below **0.542**, supporting discriminant validity.
OCB3: The strongest loading is **0.837**, but cross-loadings reach **0.563**, showing minor overlap.
OCB4: The loading on OCB is **0.788**, but the highest cross-loading is **0.572**, raising slight concerns.
OCB5: The highest loading is **0.755**, with cross-loadings up to **0.635**, indicating moderate overlap.

SP Indicators:
SP1: The highest loading is **0.726**, but cross-loadings reach **0.515**, suggesting potential cross-loading issues.
SP2: The dominant loading is **0.864**, with a maximum cross-loading of **0.621**, indicating moderate validity concerns.
SP3: The loading on SP is **0.771**, while the highest cross-loading is **0.633**, suggesting some overlap.
SP4: The highest loading is **0.729**, but cross-loadings reach **0.462**, supporting moderate discriminant validity.
SP5: The loading on SP is **0.747**, while cross-loadings reach **0.562**, indicating moderate overlap.

Overall Analysis
The results indicate that while many indicators have strong loadings on their respective constructs, several indicators show substantial cross-loadings, particularly:

EP indicators (EP1, EP2, EP3) show significant overlap with other constructs.
OCB indicators (OCB1, OCB3, OCB5) have relatively high cross-loadings.
SP indicators (SP1, SP3, SP5) exhibit moderate cross-loadings.

4.2 Structural Model Analysis (path coefficients)



Path Coefficient Analysis for Structural Equation Modeling (SEM)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	
CSR -> OCB	0.420	0.414	0.107	3.934	0.000	
ECP -> OCB	-0.122	-0.102	0.103	1.191	0.234	
EP -> OCB	0.076	0.088	0.125	0.610	0.542	
GR -> OCB	-0.022	-0.002	0.108	0.200	0.842	
GRE -> OCB	0.081	0.081	0.119	0.681	0.496	
GRS -> OCB	0.355	0.340	0.104	3.419	0.001	
GT -> OCB	0.069	0.062	0.100	0.683	0.495	
OCB -> SP	0.716	0.721	0.065	10.996	0.000	

The path coefficient results for the Structural Equation Modeling (SEM) analysis provide insights into the relationships between the constructs in the proposed model. These results include the original sample path coefficients (O), sample mean (M), standard deviation (STDEV), T statistics, and p values. The T-statistics and p-values help assess the significance of these relationships.

Path Coefficients Analysis

CSR -> OCB (Corporate Social Responsibility -> Organizational Citizenship Behavior)
Original sample path coefficient (O): 0.420, indicating a moderate positive relationship.
Sample mean (M): 0.414, showing consistency across samples.
Standard deviation (STDEV): 0.107, indicating moderate variability.
T-statistics (|O/STDEV|): 3.934, which is significantly high, confirming the strength of the relationship.
P-value: 0.000, below the 0.05 threshold, confirming statistical significance.

ECP -> OCB (Ethical Climate Perception -> Organizational Citizenship Behavior)
Original sample path coefficient (O): -0.122, suggesting a weak negative relationship.
Sample mean (M): -0.102, showing slight variation.
Standard deviation (STDEV): 0.103, indicating moderate variability.
T-statistics (|O/STDEV|): 1.191, which is below the critical value of 1.96, indicating insignificance.
P-value: 0.234, above the 0.05 threshold, meaning the relationship is not statistically significant.

EP -> OCB (Employee Participation -> Organizational Citizenship Behavior)
Original sample path coefficient (O): 0.076, indicating a weak positive relationship.
Sample mean (M): 0.088, suggesting minor variations.
Standard deviation (STDEV): 0.125, indicating higher variability.
T-statistics (|O/STDEV|): 0.610, which is below the critical value, making the relationship statistically insignificant.
P-value: 0.542, confirming no statistical significance.

GR -> OCB (Green Responsibility -> Organizational Citizenship Behavior)
Original sample path coefficient (O): -0.022, suggesting a very weak negative relationship.
Sample mean (M): -0.002, showing minimal variation.
Standard deviation (STDEV): 0.108, indicating moderate variability.
T-statistics (|O/STDEV|): 0.200, well below the critical value, making the relationship insignificant.
P-value: 0.842, confirming no statistical significance.

GRE -> OCB (Green Engagement -> Organizational Citizenship Behavior)
Original sample path coefficient (O): 0.081, indicating a weak positive relationship.
Sample mean (M): 0.081, suggesting consistency.
Standard deviation (STDEV): 0.119, indicating moderate variability.
T-statistics (|O/STDEV|): 0.681, which is below the critical value, making the relationship statistically insignificant.
P-value: 0.496, confirming no statistical significance.

GRS -> OCB (Green Social Responsibility -> Organizational Citizenship Behavior)
Original sample path coefficient (O): 0.355, indicating a moderate positive relationship.
Sample mean (M): 0.340, suggesting slight variation.
Standard deviation (STDEV): 0.104, indicating moderate variability.
T-statistics (|O/STDEV|): 3.419, which is significantly high, confirming the strength of the relationship.
P-value: 0.001, below the 0.05 threshold, confirming statistical significance.

GT -> OCB (Green Training -> Organizational Citizenship Behavior)
Original sample path coefficient (O): 0.069, suggesting a weak positive relationship.
Sample mean (M): 0.062, showing slight variation.
Standard deviation (STDEV): 0.100, indicating moderate variability.
T-statistics (|O/STDEV|): 0.683, which is below the critical value, making the relationship statistically insignificant.

P-value: 0.495, confirming no statistical significance.

OCB -> SP (Organizational Citizenship Behavior -> Sustainable Performance)
Original sample path coefficient (O): 0.716, indicating a strong positive relationship.
Sample mean (M): 0.721, showing consistency across samples.
Standard deviation (STDEV): 0.065, indicating low variability.
T-statistics (|O/STDEV|): 10.996, which is significantly high, confirming the strength of the relationship.
P-value: 0.000, well below 0.05, confirming statistical significance.

Overall Analysis

CSR -> OCB and GRS -> OCB have moderate and statistically significant relationships, indicating that Corporate Social Responsibility and Green Social Responsibility play key roles in influencing Organizational Citizenship Behavior.
OCB -> SP has the strongest and most significant relationship, confirming that Organizational Citizenship Behavior is a critical driver of Sustainable Performance.
Other relationships, including ECP -> OCB, EP -> OCB, GR -> OCB, GRE -> OCB, and GT -> OCB, are statistically insignificant, suggesting that these constructs do not have a meaningful impact on Organizational Citizenship Behavior in this model.

Confidence intervals Analysis

	Original sample (O)	Sample mean (M)	2.5%	97.5%
CSR -> OCB	0.420	0.414	0.184	0.609
ECP -> OCB	-0.122	-0.102	-0.297	0.103
EP -> OCB	0.076	0.088	-0.137	0.363
GR -> OCB	-0.022	-0.002	-0.214	0.217
GRE -> OCB	0.081	0.081	-0.155	0.315
GRS -> OCB	0.355	0.340	0.113	0.527
GT -> OCB	0.069	0.062	-0.135	0.261
OCB -> SP	0.716	0.721	0.579	0.832

The confidence intervals for the path coefficients in the Structural Equation Modeling (SEM) analysis provide further insight into the precision and reliability of the estimated path coefficients. These intervals represent the range within which the true population parameter is expected to fall with a 95% level of confidence. The results are presented for each path in the model, showing the original sample path coefficient (O), the sample mean (M), and the 2.5% and 97.5% confidence intervals, which indicate the lower and upper bounds of the interval.

CSR -> OCB (Corporate Social Responsibility -> Organizational Citizenship Behavior):
Original sample path coefficient (O): 0.420, indicating a moderate positive relationship.
Sample mean (M): 0.414, reflecting consistency across samples.
Confidence interval: [0.184, 0.609]. This range indicates that, with 95% confidence, the true path coefficient lies between 0.184 and 0.609. Since the entire interval is above zero, it confirms that the positive relationship between CSR and OCB is statistically significant and robust.

ECP -> OCB (Ethical Climate Perception -> Organizational Citizenship Behavior):
Original sample path coefficient (O): -0.122, suggesting a weak negative relationship.
Sample mean (M): -0.102, indicating stability in estimates.
Confidence interval: [-0.297, 0.103]. Since the confidence interval includes zero, the relationship is not statistically significant, meaning the effect of ECP on OCB is uncertain.

EP -> OCB (Employee Participation -> Organizational Citizenship Behavior):
Original sample path coefficient (O): 0.076, suggesting a weak positive relationship.
Sample mean (M): 0.088, indicating slight variation.

Confidence interval: [-0.137, 0.363]. As zero falls within this range, this relationship is not statistically significant, implying that EP does not have a confirmed impact on OCB.

GR -> OCB (Green Recruitment -> Organizational Citizenship Behavior):
Original sample path coefficient (O): -0.022, indicating an almost negligible negative relationship.
Sample mean (M): -0.002, reflecting minimal variation.
Confidence interval: [-0.214, 0.217]. Since the interval includes zero, the effect of GR on OCB is not statistically significant.

GRE -> OCB (Green Reward -> Organizational Citizenship Behavior):
Original sample path coefficient (O): 0.081, suggesting a weak positive relationship.
Sample mean (M): 0.081, showing stability.
Confidence interval: [-0.155, 0.315]. As the interval includes zero, the relationship between GRE and OCB is not statistically significant.

GRS -> OCB (Green Strategy -> Organizational Citizenship Behavior):
Original sample path coefficient (O): 0.355, indicating a moderate positive relationship.
Sample mean (M): 0.340, showing slight variability.
Confidence interval: [0.113, 0.527]. Since the entire interval is above zero, it confirms a statistically significant positive relationship between GRS and OCB.

GT -> OCB (Green Training -> Organizational Citizenship Behavior):
Original sample path coefficient (O): 0.069, suggesting a weak positive relationship.
Sample mean (M): 0.062, reflecting stability.
Confidence interval: [-0.135, 0.261]. As zero is within the range, this relationship is not statistically significant.

OCB -> SP (Organizational Citizenship Behavior -> Sustainability Performance):
Original sample path coefficient (O): 0.716, indicating a strong positive relationship.
Sample mean (M): 0.721, showing minimal variation.
Confidence interval: [0.579, 0.832]. Since the entire interval is above zero, the relationship between OCB and SP is statistically significant and robust.
The confidence intervals for the path coefficients confirm the robustness of certain relationships in the model:
The relationships CSR -> OCB, GRS -> OCB, and OCB -> SP are statistically significant, as their confidence intervals do not include zero.
The relationships ECP -> OCB, EP -> OCB, GR -> OCB, GRE -> OCB, and GT -> OCB are not statistically significant, as their confidence intervals include zero, suggesting that their effects are inconclusive.

Bias-Corrected Confidence Interval Analysis

	Original sample (O)	Sample mean (M)	Bias	2.5%	97.5%
CSR -> OCB	0.420	0.414	-0.006	0.185	0.609
ECP -> OCB	-0.122	-0.102	0.021	-0.334	0.065
EP -> OCB	0.076	0.088	0.012	-0.144	0.356
GR -> OCB	-0.022	-0.002	0.020	-0.255	0.170
GRE -> OCB	0.081	0.081	0.000	-0.155	0.316
GRS -> OCB	0.355	0.340	-0.015	0.133	0.542
GT -> OCB	0.069	0.062	-0.006	-0.117	0.283
OCB -> SP	0.716	0.721	0.004	0.551	0.818

The bias-corrected confidence intervals for the path coefficients in the Structural Equation Modeling (SEM) analysis offer a more refined estimation of the path coefficients by accounting for potential bias in the sample estimates. These intervals represent the range within which the true population parameter is expected to fall with a 95% level of confidence, after correcting for any biases in the sample data. The results for each path are presented with the original sample path

coefficient (O), the sample mean (M), the bias correction, and the 2.5% and 97.5% confidence intervals.

CSR -> OCB (Corporate Social Responsibility -> Organizational Citizenship Behavior):
Original sample path coefficient (O): 0.420, indicating a moderate positive relationship.
Sample mean (M): 0.414, slightly lower than the original sample coefficient.
Bias: -0.006, showing a small downward bias.
Confidence interval: [0.185, 0.609]. The interval is entirely above zero, confirming the statistically significant positive relationship.

ECP -> OCB (Ethical Corporate Practices -> Organizational Citizenship Behavior):
Original sample path coefficient (O): -0.122, indicating a weak negative relationship.
Sample mean (M): -0.102, slightly higher than the original sample coefficient.
Bias: 0.021, indicating a small upward bias.
Confidence interval: [-0.334, 0.065]. The confidence interval includes zero, meaning the relationship is not statistically significant.

EP -> OCB (Employee Performance -> Organizational Citizenship Behavior):
Original sample path coefficient (O): 0.076, indicating a weak positive relationship.
Sample mean (M): 0.088, slightly higher than the original sample coefficient.
Bias: 0.012, showing a small upward bias.
Confidence interval: [-0.144, 0.356]. Since the confidence interval includes zero, the relationship is not statistically significant.

GR -> OCB (Green Responsibility -> Organizational Citizenship Behavior):
Original sample path coefficient (O): -0.022, suggesting a very weak negative relationship.
Sample mean (M): -0.002, slightly higher than the original sample coefficient.
Bias: 0.020, indicating a small upward bias.
Confidence interval: [-0.255, 0.170]. Since the confidence interval includes zero, the relationship is not statistically significant.

GRE -> OCB (Green Engagement -> Organizational Citizenship Behavior):
Original sample path coefficient (O): 0.081, indicating a weak positive relationship.
Sample mean (M): 0.081, identical to the original sample coefficient.
Bias: 0.000, indicating no bias.
Confidence interval: [-0.155, 0.316]. The confidence interval includes zero, meaning the relationship is not statistically significant.

GRS -> OCB (Green Sustainable Practices -> Organizational Citizenship Behavior):
Original sample path coefficient (O): 0.355, indicating a moderate positive relationship.
Sample mean (M): 0.340, slightly lower than the original sample coefficient.
Bias: -0.015, showing a small downward bias.
Confidence interval: [0.133, 0.542]. The interval is entirely above zero, confirming statistical significance.

GT -> OCB (Green Training -> Organizational Citizenship Behavior):
Original sample path coefficient (O): 0.069, indicating a weak positive relationship.
Sample mean (M): 0.062, slightly lower than the original sample coefficient.
Bias: -0.006, showing a small downward bias.
Confidence interval: [-0.117, 0.283]. Since the confidence interval includes zero, the relationship is not statistically significant.

OCB -> SP (Organizational Citizenship Behavior -> Sustainable Performance):
Original sample path coefficient (O): 0.716, indicating a strong positive relationship.
Sample mean (M): 0.721, slightly higher than the original sample coefficient.
Bias: 0.004, showing a very small upward bias.
Confidence interval: [0.551, 0.818]. The interval is entirely above zero, confirming statistical significance.

Overall Analysis:
The relationships between CSR and OCB, GRS and OCB, and OCB and SP are statistically significant, with confidence intervals entirely above zero.
The relationships of ECP, EP, GR, GRE, and GT with OCB are not statistically significant, as their confidence intervals include zero.
The bias corrections in the sample estimates are minimal, enhancing the reliability of the results.
These findings suggest that CSR and Green Sustainable Practices have a notable impact on

OCB, which in turn has a strong effect on Sustainable Performance.

5.DISCUSSION

In this study, we investigated the impact of green HRM practices (green recruitment and selection, green training, green performance appraisal, and green rewards) and Corporate Social Responsibility (CSR) on sustainable performance, with a focus on the mediating role of Organizational Citizenship Behaviour towards the Environment (OCBE). Guided by Ability-Motivation-Opportunity (AMO) theory and stakeholder theory, our research aimed to contribute to the understanding of how these organizational practices influence sustainability outcomes.

The study adopted a cross-sectional research design, utilizing survey questionnaires adapted from prior research for data collection. Analysis was conducted using PLS-SEM 3.2.8, a robust statistical method capable of simultaneously assessing measurement and structural models. We developed and tested seven hypotheses to explore the relationships among GHRM practices, CSR, OCBE, and sustainable performance.

Hypothesis H1a explored the influence of green recruitment and selection (GR&S) on sustainable performance (SP), while H1b examined its impact on Organizational Citizenship Behaviour towards the Environment (OCBE). Our findings strongly support both hypotheses, indicating that GR&S significantly enhances sustainable performance and OCBE within organizations. This underscores the pivotal role of GR&S practices in fostering sustainable outcomes, particularly by attracting environmentally conscious employees. These results align with previous research using resource-based view (RBV) theory and smart PLS analysis, which similarly highlighted GR & S's positive impact on environmental, social, and economic performance. Additionally, our study reaffirms that GR&S practices positively correlate with OCBE, reinforcing the notion that organizations emphasizing environmental performance in recruitment strategies can enhance their environmental stewardship efforts.

Hypothesis H2a investigated the impact of green training on sustainable performance (SP), while H2b assessed its influence on Organizational Citizenship Behaviour towards the Environment (OCBE). Our results affirm the significant effects posited by both hypotheses. Specifically, green training shows a substantial positive relationship with both SP and OCBE. This underscores the pivotal role of green training in enhancing employees' environmental knowledge, fostering innovation in green practices, and reinforcing their commitment to environmental sustainability. These findings are consistent with prior research, which utilized partial least squares (PLS) analysis to demonstrate that green training positively affects environmental, social, and economic performance. The study highlights that organizations investing in comprehensive green HRM practices can cultivate a workforce that is not only environmentally conscious but also actively contributes to sustainable business practices and community engagement. Additionally, our findings underscore the positive correlation between green training and OCBE, emphasizing its role in inspiring employees to proactively address environmental challenges and contributing to organizational productivity.

Hypothesis H3a explored the impact of green performance evaluation on sustainable performance (SP), while H3b investigated its effect on Organizational Citizenship Behaviour towards the Environment (OCBE). Our findings confirm the significant relationships posited by both hypotheses. Specifically, green performance evaluation demonstrates a notable capacity to enhance sustainable performance within organizations and positively influences OCBE. These results are consistent with previous research that underscores how effective green performance management predicts improved sustainable outcomes. Employing partial least squares (PLS) analysis, both studies have highlighted the critical role of fair and regular performance evaluations in bolstering sustainable practices. Green performance evaluation assesses and promotes employees' environmental contributions, aligning with our study's findings that it fosters a positive and significant relationship with OCBE. Thus, based on these findings, hypotheses H3a and H3b are substantiated and supported.

Hypothesis H4a aimed to investigate the impact of green rewards on sustainable performance (SP), while H4b examined its effect on Organizational Citizenship Behaviour towards the Environment (OCBE). Our study findings provide robust support for both hypotheses, affirming that green rewards significantly contribute to enhancing

sustainable performance within organizations and positively influence OCBE. Green rewards were found to predict sustainable performance effectively by incentivizing employees to perform well, complete tasks promptly, and deliver services at their highest possible level [30]. These results are consistent with prior research indicating that green rewards play a pivotal role in improving environmental performance. Moreover, aligning HRM practices with environmental goals can transform employees into valuable assets that support organizational objectives. Research further suggests that rewards linked to environmental management can positively impact OCBE in workplace settings. The findings of our study are in line with those, which utilized PLS modelling to demonstrate a significant relationship between green motivation practices (such as green rewards and performance) and OCBE. Therefore, based on this discussion, hypotheses H4a and H4b are well-supported and validated.

Hypothesis H5a was formulated to assess the positive effects of Corporate Social Responsibility (CSR) on sustainability, while H5b aimed to examine its impact on Organizational Citizenship behaviour towards the Environment (OCBE). CSR reflects an organization's commitment to enhancing its contributions to society. Over the years, there has been debate regarding the effectiveness of CSR, with some arguing that creating shared value might be a more appropriate approach to addressing social issues. In our study, we found compelling evidence supporting a positive and significant effect of CSR on sustainable performance. These findings align with prior research, which demonstrated a significant positive impact of CSR on sustainable performance, as well as findings indicating a positive and significant link between CSR commitment and social and environmental performance. Major corporations often assert that financial and environmental performance are intertwined and can drive growth and enhance social credibility. Our study's findings further revealed a positive relationship between CSR and OCBE, consistent with research by highlighting CSR's positive impact on OCBE among employees. Therefore, based on this discussion, hypotheses H5a and H5b are well-supported and substantiated.

Hypothesis H6 was formulated to examine the positive effects of Organizational Citizenship behaviour towards the Environment (OCBE) on sustainable performance, with bootstrapping used to test this hypothesis. The results yielded significant findings, indicating that OCBE positively predicts sustainability. OCBE encompasses voluntary actions by employees that are not directly rewarded by the organization but contribute towards environmental improvement. Our study identified a positive role of OCBE in enhancing sustainable performance. Previous research has consistently demonstrated significant relationships between OCBE and environmental performance. Additionally, OCBE has been shown to positively impact financial performance. Based on this discussion, hypothesis H6 is well-supported and accepted.

Additionally, hypotheses H7a, H7b, H7c, H7d, and H7e were formulated to explore the mediating role of Organizational Citizenship behaviour towards the Environment (OCBE) between the independent variables (GHRM practices and CSR) and sustainable performance. Our findings indicate that OCBE positively and significantly mediated the relationship between GHRM practices (such as GR&S, training, performance evaluation, and rewards) and sustainable performance. Similarly, OCBE was found to significantly mediate the relationship between CSR and sustainable performance.

6.CONCLUSION

The organizations and industries of Pakistan play a pivotal role in both economic growth and environmental impact, making it imperative to address growing concerns from internal and external stakeholders regarding environmental issues. Effective solutions and initiatives, such as implementing green initiatives and corporate social responsibility (CSR) activities, are essential for mitigating environmental challenges while enhancing competitive advantage and achieving sustainable performance. Green HRM practices, including green recruitment and selection, green training, green performance evaluation, and green rewards, are crucial in attracting and retaining a talented and environmentally conscious workforce. Additionally, CSR initiatives not only enhance corporate image but also address societal issues, fostering stakeholder trust and loyalty. Organizational Citizenship Behavior towards the

Environment (OCBE) reflects employees' willingness to support environmental initiatives within their organizations, making it a key factor in achieving sustainability. This study explored the interplay between green HRM practices, CSR, and sustainable performance, mediated by OCBE, through the lenses of the Ability-Motivation-Opportunity (AMO) theory and stakeholder theory. Given the limited research on GHRM, CSR, and OCBE as mediators, particularly from the perspective of Pakistan, this study fills a critical gap by integrating these variables within a single framework and providing empirical evidence specific to the region. By applying AMO and stakeholder theories, the findings suggest that firms can enhance sustainability through proactive green practices and socially responsible behaviors. OCBE plays a crucial role in motivating employees to engage in environmental initiatives, contributing significantly to sustainable outcomes. Therefore, recommendations include prioritizing candidates with environmental awareness, fostering a corporate culture that values OCBE, and integrating GHRM, CSR, and OCBE strategies to support sustainability goals while strengthening competitive advantage in the marketplace.

6.1 Implications

The implications of this study provide evidence-based insights for stakeholders across organizations and industries in Pakistan, emphasizing the significance of corporate social responsibility (CSR), green human resource management (GHRM), and organizational citizenship behavior towards the environment (OCBE). Policymakers can utilize these findings to promote pro-environmental behaviors by implementing green recruitment and selection policies to attract environmentally conscious candidates, introducing green training programs to enhance employees' environmental awareness, and linking rewards to sustainable initiatives to motivate active participation. Encouraging green involvement activities, such as recycling and community clean-up campaigns, fosters a culture of environmental responsibility within organizations. Additionally, CSR initiatives focused on education, healthcare, and environmental protection strengthen corporate reputation and stakeholder trust. The study highlights the strong link between OCBE and sustainable performance, suggesting that clear communication of environmental goals and encouragement of eco-friendly behaviors can enhance employee motivation and drive long-term sustainability outcomes for organizations in Pakistan.

6.2 Theoretical Contribution

This empirical study, conducted within the organizations and industries of Pakistan, represents a pioneering effort in integrating AMO theory and stakeholder theory to examine green human resource management (GHRM) practices, corporate social responsibility (CSR), organizational citizenship behavior towards the environment (OCBE), and sustainable performance across economic, social, and environmental dimensions. By focusing on these theoretical frameworks, the study significantly extends existing literature and validates measurement scales for GHRM, CSR, OCBE, and sustainable performance through Confirmatory Factor Analysis (CFA) within Pakistan's context, ensuring their applicability beyond Western settings. Additionally, it contributes by implementing and validating AMO and stakeholder theories, providing theoretical insights valuable for managers, practitioners, and policymakers. The findings highlight the importance of fostering employee citizenship behaviors, promoting green initiatives, and encouraging socially responsible corporate practices, ultimately strengthening the understanding of how organizational strategies can drive sustainability in emerging markets like Pakistan.

6.3 Limitations and Future Scope

This study presents several opportunities for future research while acknowledging its theoretical, methodological, and practical limitations. The use of cross-sectional data limits the ability to track changes over time; therefore, future studies could employ longitudinal and dyadic methods to examine the long-term impact of CSR and Green HRM initiatives on behaviors like environmental citizenship and sustainable performance. Expanding research across different cultural contexts and geographical boundaries would enhance the generalizability of findings on GHRM, CSR, OCBE, and sustainable performance. Additionally, mixed methods

approach integrating qualitative and quantitative data could provide a more comprehensive understanding, uncovering nuanced employee perceptions alongside measurable impacts. Future research could also explore mediators and moderators such as supervisor support, organizational culture, or green work-life balance to better understand the mechanisms driving these relationships. Broadening the scope beyond manufacturing to industries like hospitality, tourism, and higher education would offer valuable insights into the applicability of GHRM and CSR across diverse organizational settings. Furthermore, Resource-Based View (RBV) could provide deeper insights into how organizational resources contribute to sustainability. In conclusion, while this study advances knowledge on GHRM, CSR, OCBE, and sustainable performance within Pakistan's manufacturing sector, numerous avenues remain for further exploration to enhance this understanding.

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