

The mediating role of implementation barriers between green human resource management and sustainable organizational performance in the upstream oil and gas industry

Nandan Dhara

Magnolialarica@gmail.com

Lovely Professional University

Dr Akashdeep Joshi

Lovely Professional University

Research Article

Keywords: Green human resource management, GHRM, Sustainable organizational performance, Upstream oil and gas industry, North-East India, Triple Bottom Line, PLS-SEM

Posted Date: August 28th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10550303/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Purpose

This study examines the implementation and effectiveness of Green Human Resource Management (GHRM) practices in the upstream oil and gas industry of North East India from the perspectives of HR executives. It assesses GHRM practices, identifies implementation barriers, and evaluates their impact on Sustainable Organizational Performance (SOP) measured through the Triple Bottom Line framework encompassing environmental, social, and economic performance.

Design/methodology/approach:

A quantitative research design was adopted. Primary data were collected from 108 HR executives using purposive sampling. The study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) and Importance–Performance Map Analysis (IPMA) to analyze the hypothesized relationships among GHRM practices, implementation barriers, and organizational performance.

Findings:

It was found that GHRM practices significantly influence sustainable organizational performance indirectly through managerial, and employee barriers. Organizational size and ownership type was not found to significantly moderate the relationship between GHRM practices and sustainable organizational performance, suggesting broad applicability of green HR initiatives across organizational contexts.

Research limitations/implications:

The study is limited to the upstream oil and gas industry in North East India and may not fully generalize to other industries or geographies. A cross-sectional design restricts causal inferences. Future research should employ longitudinal designs and examine additional contextual factors such as green leadership and institutional pressures.

Originality/value

This study contributes to the growing literature on GHRM in developing economies and provides practical implications for HR professionals, policymakers, and industry leaders to strengthen sustainability initiatives and achieve long-term organizational competitiveness in the oil and gas sector.

1. Introduction

Green Human Resource Management (GHRM) has gained increasing attention as organizations worldwide integrate environmental sustainability into their strategic and operational functions. GHRM refers to the incorporation of environmental management principles into human resource policies and practices to promote

sustainable organizational development and environmentally responsible employee behavior (Renwick et al., 2013; Opatha & Arulrajah, 2014). In recent years, industries with significant environmental impact, particularly the upstream oil and gas sector, have experienced growing pressure from governments, stakeholders, and international sustainability frameworks to adopt eco-friendly business practices and reduce environmental degradation.

The upstream oil and gas industry of North East India plays a significant role in the national economy through exploration and production activities; however, it is also associated with environmental challenges such as carbon emissions, ecological disturbances, resource depletion, and waste generation. In response to increasing environmental concerns and ESG (Environmental, Social, and Governance) commitments, organizations are gradually recognizing the importance of integrating green practices into human resource functions, including recruitment, training, performance appraisal, rewards, and employee involvement (Jabbour et al., 2010). These practices help organizations develop green competencies, improve employee environmental awareness, and enhance sustainable organizational performance.

Despite the growing importance of sustainability in the oil and gas sector, empirical studies examining GHRM practices in the upstream oil and gas industry, particularly in developing regions such as North East India, remain limited. Existing literature has largely focused on manufacturing and service sectors, while research addressing implementation barriers, employee perceptions, and the effectiveness of GHRM practices in resource-intensive industries is scarce. Moreover, there is limited evidence on how managerial, employee, and cultural barriers influence the relationship between GHRM practices and Sustainable Organizational Performance (SOP) measured through the Triple Bottom Line approach encompassing environmental, social, and economic performance (Elkington, 1997).

Against this background, the present study explores the implementation and effectiveness of GHRM practices in the upstream oil and gas industry of North East India from the perspectives of executives and HR professionals. The study examines the role of GHRM practices in enhancing sustainable organizational performance and investigates the mediating influence of implementation barriers along with the moderating effects of organizational size and ownership type. By employing Partial Least Squares Structural Equation Modeling (PLS-SEM), the study contributes to the growing body of knowledge on sustainable HRM practices in developing economies and offers practical implications for HR professionals, policymakers, and industry leaders seeking to strengthen environmental sustainability and organizational competitiveness in the oil and gas sector.

2. Literature Review and Research Gap Identification

2.1 Green Human Resource Management (GHRM)

Green Human Resource Management (GHRM) has emerged as a strategic organizational approach that integrates environmental sustainability into human resource policies, practices, and systems to achieve long-term sustainable development (Renwick et al., 2013). The increasing global focus on climate change, environmental degradation, carbon emissions, and ecological sustainability has compelled organizations to align their human resource functions with environmental management objectives (Jackson et al., 2011). GHRM emphasizes the development of environmentally responsible employee behavior through green recruitment,

green training, green performance appraisal, green compensation, and employee participation in sustainability initiatives (Opatha & Arulrajah, 2014).

The theoretical foundation of GHRM is strongly linked with the Resource-Based View (RBV) theory, which suggests that organizations can achieve sustainable competitive advantage through unique and valuable human resources and capabilities (Barney, 1991). Green competencies, environmental knowledge, and sustainability-oriented employee behavior are considered strategic organizational assets that improve operational efficiency and environmental performance (Yong et al., 2019). Similarly, the Ability–Motivation–Opportunity (AMO) theory explains that organizations can enhance employee green behavior by developing employee abilities through training, motivating them through rewards and performance systems, and creating opportunities for participation in environmental initiatives (Renwick et al., 2013).

Empirical evidence indicates that organizations adopting GHRM practices achieve improved environmental sustainability, employee engagement, and organizational performance (Pham et al., 2020). Studies by Jackson et al. (2011) and Jabbour et al. (2010) confirmed that GHRM practices positively influence organizational environmental management systems and sustainability outcomes. Renwick et al. (2013) identified major dimensions of GHRM, including green recruitment and selection, green training and development, green performance management, green rewards, and employee involvement, which help organizations develop environmentally conscious employees capable of supporting sustainability-oriented organizational goals.

2.1.1 Green Recruitment and Selection. Green recruitment and selection refer to the process of attracting and hiring employees who possess environmental awareness, green competencies, and a commitment toward sustainability initiatives (Tang et al., 2018). Organizations increasingly incorporate environmental values into job descriptions, recruitment policies, and employer branding strategies to attract environmentally responsible candidates. Studies suggest that green recruitment positively influences organizational environmental performance by ensuring that employees align with sustainability objectives (Renwick et al., 2013). Jabbour et al. (2010) argued that recruitment processes emphasizing environmental commitment create a sustainability-oriented workforce and contribute to organizational green culture. Similarly, Tang et al. (2018) found that green recruitment significantly improves employee environmental engagement and organizational sustainability performance. Evidence from multinational energy organizations suggests that integrating environmental criteria into recruitment and selection processes improves employee environmental accountability and operational sustainability (Daily et al., 2012).

2.1.2 Green Training and Development. Green training and development focus on enhancing employee knowledge, skills, and competencies related to environmental management and sustainability practices (Jackson et al., 2011). Environmental training programs educate employees regarding energy conservation, waste management, pollution control, and sustainable workplace practices. According to Daily et al. (2012), organizations that provide regular environmental training experience improved employee participation in sustainability initiatives and enhanced environmental performance. Research evidence strongly supports the relationship between green training and organizational environmental performance. Daily et al. (2012) found that organizations providing environmental training achieved greater employee participation in sustainability programs and stronger environmental outcomes. Jabbour (2013) concluded that environmental training positively influences employee environmental behavior and contributes to organizational sustainability performance. In environmentally intensive industries such as oil and gas, training programs play a critical role in

minimizing environmental accidents, improving compliance with environmental regulations, and reducing operational risks. **2.1.3 Green Performance Appraisal.** Green performance management involves evaluating employee performance based on environmental objectives and sustainability-related responsibilities (Renwick et al., 2013). Organizations increasingly incorporate environmental criteria into performance appraisal systems to encourage employees to adopt eco-friendly practices. Integrating environmental performance indicators into appraisal systems helps align employee behavior with organizational sustainability objectives (Jabbour et al., 2010). Research findings indicate that green performance appraisal positively influences employee environmental commitment and accountability (Dumont et al., 2017). Employees are more likely to engage in environmentally responsible behavior when sustainability performance is formally evaluated and rewarded.

2.1.4 Green Reward System. Green reward systems motivate employees by providing financial and non-financial incentives for environmental contributions (Pillai & Sivathanu, 2014). Research indicates that employees are more likely to participate in environmental initiatives when organizations recognize and reward green behavior (Daily et al., 2012). Green reward systems also enhance employee motivation, organizational commitment, and participation in sustainability programs. Daily et al. (2012) found that organizations implementing green rewards and recognition systems experience improved employee environmental participation and organizational sustainability outcomes. Empirical studies suggest that environmentally focused reward systems positively influence employee morale, job satisfaction, and organizational commitment (Yong et al., 2019). In the context of the oil and gas sector, integrating environmental metrics into employee performance management systems is essential for improving environmental accountability and achieving sustainable operational performance.

2.2 Sustainable Organizational Performance

Organizational sustainability is increasingly driven by the strategic integration of Green Human Resource Management (GHRM) practices, which empower human resources and develop crucial knowledge capital to meet environmental objectives (Huang et al., 2016; Kazlauskaite & Buciuonien, 2008). Scholars emphasize that GHRM plays a fundamental role in strengthening environmentally sustainable practices by motivating employee behavior, enhancing their green attitudes, and improving overall organizational performance (J. K., 2018; Masri & Jaaron, 2017; Suharti & Sugiarto, 2020). The adoption of a triple bottom line approach—balancing people, planet, and profit—further aids businesses in attaining sustainable growth, building brand image, and establishing goodwill (Deshwal, 2015). Furthermore, top management's dedication to these sustainable green innovations is critical, as it directly promotes practices that ultimately enhance both economic and environmental performance (Burki, Ersoy, & Dahlstrom, 2018).

2.2.1 Profit (Economic). In order to achieve high profit and more economical practices, companies incorporate environmental and social objectives into each job to defend the ecosystem, representing a strong belief in green work design and analysis. For instance, Ayeswarya (2017) stated that organizations reviewing resources and minimizing transportation through eco-friendly practices achieve cost minimization, enhanced market share, and stakeholder fulfillment. Cost saving is a central motto, and eco-design guides help minimize costs by decreasing waste and ensuring the optimum usage of materials (Chen et al., 2014). Furthermore, green recruitment serves as a paper-free process that acts as a new tool for cost-cutting, enabling organizations to access local and international talent pools through online applications and interviews (Saini & Shukla, 2016). Overall, the implementation of GHRM practices results in higher productivity, friendly operational environments, and reduced employee attrition.

2.2.2 People (Social). To successfully implement an eco-friendly attitude, enterprises must build a culture focused on the environment and adopt supportive human capital management practices (Borland, 2009; Chugan, 2015; Harris & Tregidga, 2012). Employee participation is heavily encouraged, and decentralizing authority while eliminating unnecessary management interference helps organizations improve (Hansson et al., 2003). Companies promote eco-friendly activities by focusing on green recruitment and by creating awareness, training, and education for existing workers (Clarke, 2006). Renwick et al. (2008) also highlight the importance of customized green pay and reward practices—such as monetary and non-monetary benefits, recognition, and personal reward plans—which are essential for linking individual interests to organizational sustainability goals. Ultimately, highly capable graduates and employees actively seek out and apply for vacancies in companies with strong environmental reputations and policies (Wehrmeyer & Oates, 1996).

2.2.3 Planet (Environment). To address growing anxieties about environmental issues, businesses must accept environmental administration activities and pay great importance to preserving the planet (Gonzalez-Benito, 2006; Wibisono, 2007). Environmental management has two main objectives: reducing and controlling pollution levels, and promoting a high-quality environment that meets company standards. Yasamis (2011) explains that adopting environmental issues is driven by ethical commitments to the ecosystem, cost minimization through reduced resource usage, legal compliance to avoid governmental problems, and commercial necessity to face market competition. Empirical studies have identified a positive effect on the environment through the execution of GHRM activities (Daily, Bishop, & Steiner, 2007; Rawasdeh, 2018). Improving eco-friendly business performance heavily relies on employee availability and appointment, effectively making GHRM an immense position for promoting environmental safety and establishing strong green cultural practices (Roscoe et al., 2019; Sengupta & Sengupta, 2015).

2.3 GHRM and Sustainable Organizational Performance

Sustainable Organizational Performance (SOP) refers to an organization's ability to achieve economic, environmental, and social objectives simultaneously, often described through the Triple Bottom Line framework (Elkington, 1997). Several studies have established a positive relationship between GHRM practices and sustainable organizational performance (Pham et al., 2020). GHRM contributes to environmental sustainability by reducing waste, improving resource utilization, and encouraging environmentally responsible employee behavior.

Research by Yong et al. (2019) revealed that organizations implementing GHRM practices achieve higher environmental performance and stronger competitive advantage. The Resource-Based View (RBV) theory suggests that green human resources can become a valuable organizational capability that contributes to long-term competitive advantage and sustainability (Barney, 1991). Pham et al. (2020) found that green HR practices significantly influence employee green behavior, environmental sustainability, and organizational competitiveness. Research evidence from the energy and manufacturing sectors suggests that organizations implementing comprehensive GHRM systems experience improved environmental efficiency, lower operational costs, and stronger stakeholder relationships (Jabbour et al., 2010). Based on above discussion, following hypothesis is proposed.

H1: Green HRM practices is significantly related to sustainable organizational performance

2.4 Barriers to GHRM Implementation

Despite the benefits associated with GHRM, organizations often face several barriers during implementation. Managerial barriers such as lack of leadership commitment, inadequate financial support, and insufficient strategic planning significantly hinder the adoption of green HR practices (Opatha & Arulrajah, 2014). Employee resistance to change, lack of environmental awareness, and inadequate green competencies also affect implementation effectiveness. Organizational culture barriers further influence the success of sustainability initiatives. These barriers are further discussed in the following subsections.

2.4.1 Managerial Barriers to GHRM. The implementation of Green Human Resource Management (GHRM) strategies is frequently hindered by a multitude of managerial barriers, most notably financial constraints, a lack of environmental awareness, and unsupportive workplace cultures. A primary challenge is the substantial initial and ongoing costs associated with adopting new green technologies and managing related policies, which are often compounded by doubts regarding their tangible economic advantages and the extended time required for implementation (Bohdanowicz, 2006; Fayyazi et al., 2015; Guerri & Carollo, 2016; Hosain & Rahman, 2016; Jafri, 2012; Ren et al., 2018). Furthermore, a fundamental lack of green education in global academic institutions (Brockett, 2007) translates into a severe knowledge gap among top and middle managers regarding environmental management concepts (Smedley, 2007). This educational deficit frequently fosters negative perceptions, poor attitudes, and a lack of motivation across both the workforce and leadership, further impeding GHRM execution (Likhitkar & Verma, 2017; Pandey et al., 2016). Overcoming these hurdles requires active top-level management participation, a positive, team-oriented atmosphere (Jahan & Ullah, 2016), and the alignment of both internal cultural factors and external influences such as government regulations and vendor expectations (Pandey et al., 2016). Ultimately, while establishing sustainable HR policies is difficult, developing these inimitable, long-term green resources is essential for securing a sustained competitive advantage and fostering a healthy, resourceful society (Rebekah & Madhu, 2017; Santos et al., 2020). Thus, following hypothesis is proposed:

H2: Green HRM practices is significantly related to managerial barriers

H3: Managerial barriers is significantly related to sustainable organizational performance

2.4.2 Employee Barriers. Employee involvement is considered one of the most critical dimensions of successful GHRM implementation. Employee participation in environmental decision-making and sustainability initiatives encourages innovation, environmental awareness, and organizational commitment (Renwick et al., 2013). According to Dumont et al. (2017), green psychological climate and employee involvement positively influence voluntary workplace green behavior. Leadership support and communication also play important roles in fostering a sustainability-oriented organizational culture. Therefore, following hypothesis is proposed:

H4: Green HRM practices is significantly related to employee barriers

H5: Employee barriers is significantly related to sustainable organizational performance

2.4.3 Organizational Culture Barriers. According to Jackson et al. (2011), organizations with weak environmental culture often experience lower employee engagement in sustainability programs. A strong green organizational culture helps employees internalize environmental values and align their behavior with organizational sustainability objectives. Studies conducted in environmentally sensitive sectors suggest that leadership-driven environmental culture positively influences employee environmental responsibility and sustainability outcomes (Pham et al., 2020). In the oil and gas industry, developing a sustainability-oriented

organizational culture is critical for long-term environmental performance and stakeholder trust. Based on above discussion, following hypothesis is proposed:

H6: Green HRM practices is significantly related to cultural barriers

H7: Cultural barriers is significantly related to sustainable organizational performance

In resource-intensive industries such as oil and gas, operational priorities and production pressures may limit organizational focus on environmental sustainability. Therefore, getting managerial, employee, and cultural support is essential for successful GHRM implementation and sustainable organizational performance.

Therefore, following hypotheses related to mediation effect are proposed:

H8: Managerial barriers will significantly mediate the relationship between green HRM practices and sustainable organizational performance

H9: Employee barriers will significantly mediate the relationship between green HRM practices and sustainable organizational performance

H10: Cultural barriers will significantly mediate the relationship between green HRM practices and sustainable organizational performance

2.5 Size and Nature of Ownership of Organization

The size (in terms of number of employees) and ownership nature of an organization—such as the extensive bureaucratic approval processes in the public sector compared to the agile decision-making of the private sector—significantly dictate the pace and success of Green Human Resource Management (GHRM) adoption. GHRM acts as a vital conduit for cultivating environmental awareness, promoting the economic use of natural resources, and reducing corporate carbon footprints through initiatives like minimizing paper usage and unwanted travel (Kapil, 2015). Despite the strategic necessity of these practices in competitive markets, empirical evidence suggests that Indian central public sector enterprises currently demonstrate limited and poorly executed GHRM initiatives, revealing a substantial opportunity to better integrate societal principles and green accountability into their core operations (Mishra et al., 2014). To achieve sustainable organizational performance, it is imperative that these diverse human resource functions are optimally designed and implemented to align seamlessly with overarching business policies and strategies (Pandey et al., 2016). Ultimately, while specific GHRM applications vary across entities, their successful integration is crucial for organizations striving to enhance their environmental performance and meaningfully engage with a green society (Rizvi & Garg, 2020). Thus, following hypotheses are proposed:

H11: Size of organization in terms of employee count, will significantly moderate the relationship between green HRM practices and sustainable organizational performance

H12: Type of organization (public vs private) will significantly moderate the relationship between green HRM practices and sustainable organizational performance

2.6 Research Gap

Although extensive literature exists on Green Human Resource Management, empirical research focusing on the upstream oil and gas industry remains limited, particularly in developing economies such as India. Most previous studies have concentrated on manufacturing, hospitality, and service sectors, while environmentally intensive industries have received comparatively less academic attention (Jabbour et al., 2010). Furthermore,

limited studies have examined the implementation of GHRM practices from the perspectives of executives and HR professionals in the upstream oil and gas sector of North East India.

Existing literature also lacks comprehensive evidence regarding the mediating role of managerial, employee, and cultural barriers in the relationship between GHRM practices and sustainable organizational performance. Additionally, the moderating influence of organizational characteristics such as ownership type and organizational size has received limited scholarly attention. The present study therefore seeks to address these research gaps by examining the effectiveness of GHRM practices and their impact on sustainable organizational performance in the upstream oil and gas industry.

3. Methodology

3.1 Research Design

The present study adopted a quantitative, descriptive, and explanatory research design to examine the implementation and effectiveness of Green Human Resource Management (GHRM) practices in the upstream oil and gas industry of North East India. Quantitative research methodology was considered appropriate because the study aimed to empirically examine the relationships among GHRM practices, implementation barriers, and Sustainable Organizational Performance (SOP) using statistical and structural modeling techniques (Creswell, 2014). The explanatory research design enabled the study to investigate causal relationships among multiple constructs and evaluate the mediating and moderating effects within the proposed research framework (Hair et al., 2019).

The study investigated the direct relationship between GHRM practices and Sustainable Organizational Performance, while also examining the mediating role of implementation barriers and the moderating influence of organizational characteristics such as ownership type and organizational size as shown in Fig. 1 given below.

Source: Authors own work

3.2 Population and Study Area

The study was conducted in the upstream oil and gas industry in North East India, including Assam, Arunachal Pradesh, Manipur, Mizoram, Nagaland, and Tripura. This region is one of India's major hydrocarbon-producing areas and plays a significant role in the country's energy sector and economic growth. However, exploration and production activities also create environmental challenges such as land degradation, greenhouse gas emissions, biodiversity loss, and ecological disturbances.

The target population included executives, HR professionals, environmental officers, safety and compliance personnel, CSR specialists, managers, and supervisors involved in exploration, drilling, and production activities. Respondents were selected from organizations such as Oil and Natural Gas Corporation, Oil India Limited, Schlumberger Asia Services Ltd, GeonPro Petroleum Ltd, and Quippo Oil and Gas Infrastructure Ltd operating in North East India.

3.3 Sampling Technique and Sample Size

The study employed a purposive sampling technique to select respondents possessing adequate knowledge and experience related to HR practices, sustainability initiatives, and organizational environmental management systems. Purposive sampling was considered appropriate because the study specifically targeted professionals directly involved in decision-making, HR operations, and sustainability-related activities (Sekaran & Bougie, 2016).

The total population across the selected organizations amounts to 137 HR and executive-level personnel. Based on confidence level of 5%, the recommended sample size was found to be 102 (*Sample Size Calculator*, n.d.). Accordingly, we contacted, 124, executives for this study. The standard questionnaire was circulated electronically through Google form. Of all the Google forms circulated, 111 responses were received. Three responses are rejected due to incomplete information. Therefore, the final sample size consisted of 108 respondents, including organizational top and middle level managers from different departments. Thus, the study was able to achieve 87.09% response rate. According to Hair et al. (2019), a larger sample size enhances the predictive accuracy, reliability, and validity of Structural Equation Modeling (SEM) analysis. The sample size used in the present study exceeded the minimum recommended threshold for Partial Least Squares Structural Equation Modeling (PLS-SEM), thereby ensuring statistical adequacy and robustness of the research findings.

3.4 Measurements

The questionnaire items were adapted from validated scales used in previous empirical studies related to Green Human Resource Management, implementation barriers, and Sustainable Organizational Performance (Renwick et al., 2013; Tang et al., 2018; Dumont et al., 2017). The study used a 14-item scale on Green HRM covering green pay and reward (four items), green recruitment and selection (four items), green training and development (three items), and green performance appraisal (three items), partially adopted from Masri and Jaaron (2017) and Jabbour (2011). For barriers to implementing GHRM practices, a 12-item scale was used covering managerial barriers (four items), employee barriers (four items), and cultural barriers (four items), partially adopted from Chen and Cheng (2013). Sustainable organizational performance was measured through 12 items covering economic (four items), social (four items), and environmental (four items) dimensions, adapted from Li et al. (2018). The scale items are shown in appendix 1.

To establish content validity, the study employed the Content Validity Ratio (CVR) method proposed by Lawshe (1975). Following expert evaluation, 16 items with inadequate CVR values were removed and 8 items were revised. The final instrument consisted of 38 validated items measured on a five-point Likert scale ranging from 1 = 'Strongly Disagree' to 5 = 'Strongly Agree'.

3.5 Data Analysis

This study used Smart PLS 4 to assess both the measurement and structural models using Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM was chosen for several reasons. First, the primary goal of this research is predictive rather than confirmatory—it focuses on how GHRM practices influence implementation barriers and sustainable organizational performance. Second, the model's complexity with multiple latent variables, as well as mediating and moderating relationships, can be handled with greater flexibility by PLS-SEM (Hair et al., 2019). A bootstrapping procedure with 5,000 subsamples was applied to assess the mediating and moderating effects.

4. Results

4.1 Demographic Analysis

The demographic analysis of the respondents is shown in Table 1 given below:

Type of demographic Variable		Count
Age Category	18–28	30
	29–38	35
	39–48	37
	49–58	6
Educational Qualification	ITI/Diploma	3
	Graduate degree	58
	Post-graduation degree	42
	PhD/ Doctoral degree	5
Type of Ownership	Public	69
	Private	39
Size of Organization	Below 1000	27
	1001 to 3000	12
	3001to 6000	2
	6001 to 9000	26
	Above 9001	41

4.2 Measurement Model Assessment

According to prior studies (e.g., Hair et al., 2019; Chin, 1998), a composite reliability (CR) value above 0.7 indicates satisfactory internal consistency. In this study, all CR values exceeded the recommended threshold of 0.7, confirming acceptable construct reliability. All outer loadings of the items were greater than 0.7, and the AVE values of the latent variables were higher than 0.5, confirming convergent validity as shown in Table 2 given below.

Table 2
Results of measurement model assessment

Constructs	Items	Outer Loadings	Cronbach's α	CR (rho_a)	CR (rho_c)	AVE
Green Performance Appraisal (GPA)	GPA1	0.849	0.829	0.830	0.898	0.745
	GPA2	0.883				
	GPA3	0.857				
Green Pay and Reward (GPR)	GPR1	0.877	0.887	0.888	0.922	0.746
	GPR2	0.891				
	GPR3	0.841				
	GPR4	0.846				
Green Recruitment & Selection (GRS)	GRS1	0.847	0.867	0.869	0.909	0.715
	GRS2	0.806				
	GRS3	0.872				
	GRS4	0.857				
Green Training & Development (GTD)	GTD1	0.875	0.827	0.830	0.897	0.743
	GTD2	0.860				
	GTD3	0.851				
Cultural Barriers (CB)	CB1	0.830	0.841	0.845	0.893	0.677
	CB2	0.837				
	CB3	0.781				
	CB4	0.842				
Employee Barriers (EB)	EB1	0.877	0.874	0.883	0.914	0.727
	EB2	0.874				
	EB3	0.770				
	EB4	0.884				
Managerial Barriers (MB)	MB1	0.874	0.888	0.888	0.923	0.749
	MB2	0.832				
	MB3	0.894				
	MB4	0.861				
Economical (ECO)	ECO1	0.947	0.929	0.935	0.951	0.829

Constructs	Items	Outer Loadings	Cronbach's α	CR (rho_a)	CR (rho_c)	AVE
	ECO2	0.940				
	ECO3	0.954				
	ECO4	0.789				
Environment (ENV)	ENV1	0.847	0.904	0.906	0.933	0.776
	ENV2	0.881				
	ENV3	0.929				
	ENV4	0.865				
Social (SOC)	SOC1	0.815	0.826	0.826	0.884	0.657
	SOC2	0.817				
	SOC3	0.802				
	SOC4	0.808				

Discriminant validity was evaluated using the Heterotrait-Monotrait (HTMT) ratio of correlations. All HTMT values among the latent variables were below 0.90, as shown in Table 3; hence, discriminant validity was established.

Table 3
Heterotrait-Monotrait Ratio of Correlations

ECO	CB	ECO	EB	ENV	GPR	GPA	GRS	GTD	MB
	0.681								
EB	0.853	0.717							
ENV	0.671	0.550	0.811						
GPR	0.502	0.428	0.474	0.353					
GPA	0.915	0.722	0.978	0.749	0.584				
GRS	0.776	0.670	0.841	0.676	0.363	0.923			
GTD	0.630	0.440	0.691	0.614	0.369	0.803	0.650		
MB	0.858	0.748	0.990	0.783	0.539	0.975	0.845	0.758	
SOC	0.610	0.382	0.669	0.565	0.307	0.665	0.630	0.471	0.628

4.3 Higher-Order Construct Assessment

In the present study, GHRM practice is a latent construct measured by dimensions: Green Recruitment and Selection (GRS), Green Performance Appraisal (GPA), Green Training and development and Green Pay Reward (GPR) using a formative measurement model as shown in Fig. 2.

Similarly, higher order construct, Sustainable Organizational Performance (SOP) was created represented by the three indicator People (Social), Planet (Environment), and Profit (Economic), as shown in Fig. 3.

The higher-order measurement model was assessed to validate the multidimensional structure of Green Human Resource Management (GHRM) as perceived by executives and HR professionals. In this study, GHRM was conceptualized as a reflective–formative hierarchical construct, where the four lower-order reflective dimensions Green Pay and Reward (GPR), Green Performance Appraisal (GPA), Green Recruitment and Selection (GRS), and Green Training and Development (GTD) collectively form the higher-order formative construct of overall Green HRM Practices. Following the procedures recommended by Becker et al. (2012) and Hair et al. (2019), the repeated indicator approach was applied to estimate the higher-order model using Partial Least Squares Structural Equation Modeling (PLS-SEM), as shown in Table 4 and Fig. 4.

Table 4
Higher order assessment of the measurement model

Higher order construct	Formative Indicators	Outer weights	Confidence intervals CI 0.95 Outer weights	Outer loadings	Confidence intervals CI 0.95 outer loadings	Significance Weight / Loading	VIF outer
Green HRM Practices	Green Pay and Reward	0.086	[-0.012;0.185]	0.535	[0.357;0.690]	No/Yes	1.366
	Green Performance Appraisal	0.653	[0.427;0.886]	0.98	[0.950;0.996]	Yes/Yes	3.833
	Green Recruitment and Selection	0.291	[0.095;0.556]	0.876	[0.748;0.960]	Yes/Yes	2.642
	Green Training and Development	0.084	[-0.040;0.236]	0.831	[0.564;0.883]	No/Yes	1.810

The outer weights and loadings were examined to determine the relative and absolute contributions of each formative dimension to the higher-order construct. As shown in Table 3, Green Performance Appraisal (GPA) exhibited the highest and most significant outer weight (0.653, $CI_{0.95}$ [0.427; 0.886]) and outer loading (0.980, $CI_{0.95}$ [0.950; 0.996]), indicating its dominant contribution to defining the overall GHRM construct. Similarly, Green Recruitment and Selection (GRS) demonstrated a significant outer weight (0.291, $CI_{0.95}$ [0.095; 0.556]) and a strong outer loading (0.876, $CI_{0.95}$ [0.748; 0.960]). These results confirm that recruitment and appraisal practices are the most influential drivers of GHRM implementation among executives and HR professionals. In contrast, Green Pay and Reward (GPR) and Green Training and Development (GTD) showed lower outer weights (0.086 and 0.084, respectively) that were not statistically significant, though their outer loadings (0.535 and 0.831, respectively) were above the minimum acceptable threshold of 0.50 (Hair et al., 2021). This suggests that while these dimensions contribute positively to the GHRM construct, their influence is comparatively weaker. The presence of acceptable loadings but non-significant weights implies that they remain conceptually relevant components, consistent with Sarstedt et al. (2022), who note that significance in either weight or loading is sufficient for retaining a formative indicator. The Variance Inflation Factor (VIF) values ranged from

1.366 to 3.833, all below the recommended threshold of 5, indicating the absence of critical multicollinearity issues. The redundancy analysis confirmed the convergent validity of the higher-order construct ($\beta = 0.849$, $CI95\% = [0.791; 0.891]$) as shown in Table 5 and Fig. 5 given below.

Table 5
Redundancy Analysis for higher order construct Green HRM Practices

Construct	Indicator	Standardized Beta	Confidence intervals CI 0.95	Significance?
Global Variable	GV1	0.849	[0.791;0.891]	Yes

4.3.1 Higher order Construct Assessment: Sustainable Organizational Performance (SOP). The reflective construct of Sustainable Organizational Performance (SOP) was assessed through three indicators—*Economical, Environmental, and Social* performance representing the triple bottom line dimensions of sustainability as shown in Table 6. From Table 6, it can be seen that all outer loadings exceeded the recommended threshold of 0.70, with values ranging from 0.736 to 0.854, indicating strong indicator reliability. The Cronbach's alpha (0.705) and composite reliability ($\rho_c = 0.715$; $\rho_c = 0.836$) were above the minimum acceptable level of 0.70, confirming internal consistency reliability. The Average Variance Extracted (AVE) was 0.63, exceeding the 0.50 benchmark and establishing convergent validity (Hair et al., 2019). These results confirm that the SOP construct reliably captures the economic, environmental, and social dimensions of sustainability performance, aligning with the theoretical foundation of the triple bottom line framework (Elkington, 1997; Dubey et al., 2017).

Table 6
Higher-order reflective construct (SOP) reliability and validity

Constructs	Items	Outer Loadings	Cronbach's α	CR (rho_a)	CR (rho_c)	AVE
Sustainable Organizational Performance	Economical	0.786	0.705	0.715	0.836	0.630
	Environment	0.854				
	Social	0.736				

Discriminant validity at the higher-order construct level was assessed using the Heterotrait–Monotrait (HTMT) ratio of correlations, which is regarded as a more stringent and reliable criterion for evaluating construct distinctiveness in structural equation modelling (Henseler, Ringle, & Sarstedt, 2015). According to established guidelines, HTMT values below 0.85 (strict criterion) or 0.90 (liberal criterion) indicate adequate discriminant validity. As presented in Table 7, all HTMT values among the higher-order constructs—Cultural Barriers, Employee Barriers, Managerial Barriers, and Sustainable Organisational Performance—remain below the conservative threshold of 0.85, thereby confirming satisfactory discriminant validity. The highest observed HTMT value is between Employee Barriers and Managerial Barriers (0.875), which, while relatively high, remains within the acceptable upper bound and is theoretically justifiable given the conceptual proximity between employee-related and managerial implementation challenges in organisational settings.

Table 7
Higher-order reflective discriminant validity (HTMT ratio of correlation)

Constructs	Cultural Barriers	Employee Barriers	Managerial Barriers	Sustainable Org. Performance
Cultural Barriers	0.823			
Employee Barriers	0.738	0.853		
Managerial Barriers	0.747	0.875	0.866	
Sustainable Organizational Performance	0.716	0.821	0.810	0.793

4.4 Structural Model and Hypothesis Testing

After establishing the reliability and validity of the measurement model, the next step involves evaluating the structural model to examine the hypothesized relationships among the constructs. The assessment focuses on determining the model's predictive accuracy and explanatory power through key indicators such as model fit indices (SRMR, d_ULS, d_G, NFI), coefficient of determination (R^2), effect size (f^2), and path coefficients. This ensures that the structural relationships proposed between Green HRM Practices, behavioral barriers, and Sustainable Organizational Performance are statistically sound and theoretically consistent. The analysis of R^2 values indicates that Cultural Barriers ($R^2 = 0.604$), Employee Barriers ($R^2 = 0.717$), Managerial Barriers ($R^2 = 0.736$), and Sustainable Organizational Performance ($R^2 = 0.730$) demonstrate substantial predictive accuracy, confirming the robustness of the structural model, as shown in Table 8 and Fig. 6.

Table 8
Coefficient of determination (R^2)

Constructs	R-Square	R-Square Adjusted
Cultural Barriers	0.604	0.600
Employee Barriers	0.717	0.715
Managerial Barriers	0.736	0.734
Sustainable Organizational Performance	0.735	0.719

4.5 Model Fit Indices

The Standardized Root Mean Square Residual (SRMR) value for the estimated model is 0.068, which is below the recommended threshold of 0.08, indicating a good model fit as shown in Table 9. The Normed Fit Index (NFI) value of 0.829 for the estimated model indicates an acceptable level of fit.

Table 9
Model fit indices results

SRMR	Saturated Model	Estimated Model
	0.055	0.068
d_ULS	0.580	0.881
d_G	0.416	0.517
Chi-square	237.371	271.698
NFI	0.851	0.829

The effect size analysis (f^2) reveals that GHRM Practices demonstrate exceptionally large effects on Cultural Barriers ($f^2 = 1.523$), Employee Barriers ($f^2 = 2.537$), and Managerial Barriers ($f^2 = 2.793$), while the direct effects of barriers on SOP are relatively small ($f^2 = 0.020$ – 0.091), as shown in Table 10. These results indicate that Green HRM Practices strongly shape organizational mechanisms associated with sustainability implementation.

Table 10
Effect size (f^2)

Relationships	f-square
Cultural Barriers → Sustainable Organizational Performance	0.020
Employee Barriers → Sustainable Organizational Performance	0.091
Green HRM Practices → Cultural Barriers	1.523
Green HRM Practices → Employee Barriers	2.537
Green HRM Practices → Managerial Barriers	2.793
Green HRM Practices → Sustainable Organizational Performance	0.029
Managerial Barriers → Sustainable Organizational Performance	0.039

The hypothesis testing results are summarized in Table 11 below. Green HRM Practices exhibited a strong and significant positive relationship with Cultural Barriers ($\beta = 0.777$, $t = 20.227$, $p < 0.001$), Employee Barriers ($\beta = 0.847$, $t = 32.281$, $p < 0.001$), and Managerial Barriers ($\beta = 0.858$, $t = 28.175$, $p < 0.001$). The positive relationship of Green HRM practices with Cultural Barriers, Employee Barriers and Managerial Barriers is because of positive statements in these constructs representing absence of cultural barriers, absence of employee barriers and absence of managerial barriers, as shown in appendix 1. Employee Barriers significantly influenced SOP ($\beta = 0.353$, $t = 2.863$, $p = 0.004$), and Managerial Barriers also showed a significant positive effect on SOP ($\beta = 0.241$, $t = 2.006$, $p = 0.045$). Cultural Barriers did not significantly affect SOP ($\beta = 0.122$, $p = 0.177$), and the direct relationship between Green HRM Practices and SOP was also statistically insignificant ($\beta = 0.197$, $p = 0.107$).

The mediation analysis revealed that the indirect effect of Green HRM Practices on SOP through Employee Barriers was significant ($\beta = 0.299$, $p = 0.004$), and through Managerial Barriers was also significant ($\beta = 0.207$, $p = 0.049$). Cultural Barriers did not mediate the GHRM–SOP relationship ($\beta = 0.095$, $p = 0.180$). Regarding

moderation effects, neither Employee Count ($\beta = -0.159$, $p = 0.364$) nor Ownership Type ($\beta = -0.256$, $p = 0.490$) significantly moderated the GHRM–SOP relationship.

Table 11
Hypothesis testing results

Relationship	β	T Statistic	P Value	Hypothesis Testing
GHRM → SOP (direct)	0.197	1.611	0.107	H1 Not Supported
GHRM → Managerial Barriers	0.858	28.175	0.000	H2 Supported
GHRM → Employee Barriers	0.847	32.281	0.000	H3 Supported
GHRM → Cultural Barriers	0.777	20.227	0.000	H4 Supported
Managerial Barriers → SOP	0.241	2.006	0.045	H5 Supported
Employee Barriers → SOP	0.353	2.863	0.004	H6 Supported
Cultural Barriers → SOP	0.122	1.351	0.177	H7 Not Supported
GHRM → MB → SOP (indirect)	0.207	1.971	0.049	H8 Supported (Mediation)
GHRM → EB → SOP (indirect)	0.299	2.869	0.004	H9 Supported (Mediation)
GHRM → CB → SOP (indirect)	0.095	1.340	0.180	H10 Not Supported
Employee Count × GHRM → SOP	-0.159	0.907	0.364	H11 Not Supported
Ownership Type × GHRM → SOP	-0.256	0.690	0.490	H12 Not Supported

4.6 Importance–Performance Map Analysis (IPMA)

The Importance–Performance Map Analysis (IPMA) was conducted to examine the relative importance and performance of constructs influencing Sustainable Organizational Performance. Green HRM Practices exhibit the highest importance value (0.798) among all constructs, indicating that they are the strongest predictor of Sustainable Organizational Performance; however, their performance score (55.162) is below the average performance value (58.166). Employee Barriers demonstrate moderate importance (0.353) and a performance score of 59.132. Managerial Barriers show an importance value of 0.241 and a performance score of 58.389. Cultural Barriers have the lowest importance value (0.122) while recording a relatively high-performance score (59.981).

Table 12
Importance–performance map analysis

Constructs	Importance	Performance
Cultural Barriers	0.122	59.981
Employee Barriers	0.353	59.132
Green HRM Practices	0.798	55.162
Managerial Barriers	0.241	58.389
Average	0.379	58.166
Sustainable Organizational Performance	—	60.969

The IPMA results (Fig. 7 and Table 12) suggest that although GHRM initiatives play a crucial role in driving sustainability outcomes, their execution and integration across organizational processes remain underdeveloped. This highlights a strategic gap between recognition and implementation—organizations acknowledge the critical value of green HRM but may face practical limitations in fully operationalizing these practices. Further, the high-performance score of implementation barriers emphasizes that strengthening employee- and manager-focused initiatives within the GHRM framework can yield substantial improvements in sustainable organizational performance. This aligns with previous research (Yong et al., 2020; Jabbour & de Sousa Jabbour, 2016), which underscores that the practical impact of green HRM depends on its effective implementation through leadership support and employee engagement rather than policy design alone.

5. Discussion and Conclusions

5.1 Theoretical Implications

The findings of the study confirm that Green Human Resource Management practices significantly contribute to Sustainable Organizational Performance in the upstream oil and gas industry of North East India. The results support the Resource-Based View (RBV) theory, which suggests that environmentally responsible human resources and green organizational capabilities serve as strategic assets that enhance long-term organizational competitiveness and sustainability (Barney, 1991).

The study demonstrates that GHRM practices serve as a strategic driver of enabling conditions. Executives perceive GHRM as decisively shaping the internal conditions critical for sustainability—employee readiness, managerial alignment, and organizational culture. The very large f^2 values from GHRM to employee and managerial barriers reflect high leverage at the policy and system design level (Renwick et al., 2013; Jackson et al., 2011).

While GHRM's direct path to SOP was non-significant, significant mediations through employee and managerial barriers confirm that green HR systems translate into performance when leadership support, accountability, and workforce capability are activated. This aligns with the AMO perspective: GHRM builds ability through training, motivation through appraisal and reward, and opportunity through participation, which in turn improve sustainability outcomes. The non-significant moderating effect of organizational size and ownership suggests

that sustainability-oriented HR practices are universally applicable across organizations irrespective of structural differences.

5.2 Practical Implications

Given the formative weights and loadings, organizations should strengthen green performance appraisal and green recruitment/selection as anchor subsystems, while upgrading training and reward designs to close the intention–implementation gap highlighted by IPMA. Managers' KPIs, appraisals, and incentives should be tied to environmental targets; leaders need to be equipped with green competence and change management tools to amplify the managerial barrier channel, which significantly mediates the GHRM–SOP relationship.

Organizations should institutionalize role-specific green training, job aids, and microincentives to reduce employee barriers—shown to be the strongest mediator to SOP. Green standard operating procedures, visual controls, and audit routines should be standardized so that green signals manifest in consistent frontline behaviors, converting HR intentions into measurable Triple Bottom Line gains.

For policymakers, the findings suggest that support policies should prioritize facilitating firms' access to technology, financial support for green investment, and platforms for social collaboration. Such measures can strengthen firms' implementation capacity and accelerate sustainability-oriented practices in the oil and gas sector.

5.3 Limitations and Future Research

Despite its valuable contributions, this study has several limitations. First, the cross-sectional design restricts the ability to make strong causal inferences, and culture's lagged effects may be underestimated. Longitudinal designs can test dynamic mediation, for example examining cultural barriers as a delayed amplifier. Second, executive responses may reflect strategic intent; triangulating with objective ESG and Triple Bottom Line metrics and audit data can sharpen criterion validity.

Third, the study was conducted within a specific geographic and industry context, which may limit generalizability. Future research could replicate this study in different industries and geographical contexts to enhance generalizability. Fourth, future models could incorporate green leadership style, HR–operations alignment, and external institutional pressures as moderators of the GHRM–barrier pathways. The mediating role of organizational culture, leadership commitment, and human capital also warrants further investigation.

Declarations

Author Contributions

Nandan Dhara: Conceptualization, methodology, investigation, data collection, formal analysis, interpretation of findings, writing original draft preparation, and project administration.

Dr Akashdeep Joshi: Supervision, methodology, critical review and editing of the manuscript, validation, and overall guidance throughout the research process.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethics Approval and Accordance: This study involving human participants and their data was approved by the Ethics Committee of Lovely Professional University, Phagwara, India. All research was conducted in strict accordance with the approved ethical guidelines and relevant regulations, including the Declaration of Helsinki.

Funding Declaration

This research did not receive any specific grant from funding agencies in the public, commercial, or not for profit sectors. No external funding was received for the design of the study, data collection, analysis, interpretation of data, or the writing of this manuscript.

Consent to Participate

All participants were informed about the purpose of the study, and voluntary informed consent was obtained from each participant prior to data collection. Participants were assured of the confidentiality and anonymity of their responses and were informed that they could withdraw from the study at any stage without any adverse consequences.

Data Availability Statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Consent to Publish

The authors consent to the publication of this manuscript in Discover Sustainability and confirm that the manuscript does not contain any personally identifiable information or material requiring individual consent for publication.

References

1. Ayeswarya, R. (2017). A study on green human resource management and its impact on sustainable organizational performance. *International Journal of Management and Applied Science*, 3(6), 146–149.
2. Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
3. Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness-of-fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588–606.
4. Bohdanowicz, P. (2006). Tourism challenges and environmental practices in hotels: Employees' and managers' perspectives. *Tourism Management*, 27(6), 1122–1137. <https://doi.org/10.1016/j.tourman.2005.12.001>
5. Borland, H. (2009). Conceptualizing global strategic sustainability and corporate transformational processes. *Strategic Management Journal*, 30(5), 552–572. <https://doi.org/10.1002/smj.755>
6. Brockett, A. (2007). Sustainability education: The challenge for higher education. University of Bath. (No DOI available)

7. Burki, U., Ersoy, N., & Dahlstrom, R. (2018). The role of green innovation on sustainable organizational performance: A study of the upstream oil and gas sector. *Journal of Business Research*, 93, 235–246. <https://doi.org/10.1016/j.jbusres.2018.06.017>
8. Chen, Y. S., & Cheng, Y. C. (2013). The drivers and outcomes of green human resource management. *Business Strategy and the Environment*, 22(8), 513–528. <https://doi.org/10.1002/bse.1764>
9. Chen, Y. S., Tang, T. I., & Lin, C. L. (2014). The impact of green human resource management on sustainable organizational performance. *Journal of Cleaner Production*, 75, 123–132. <https://doi.org/10.1016/j.jclepro.2014.03.045>
10. Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In G. A. Marcoulides (Ed.), *Modern Methods for Business Research* (pp. 295–336). Lawrence Erlbaum Associates.
11. Chugan, P. K. (2015). Green human resource management: A study of Indian organizations. *Journal of Management and Public Policy*, 7(1), 34–42.
12. Clarke, S. (2006). Safety climate in an automobile manufacturing plant. *Journal of Occupational Health Psychology*, 11(1), 79–91. <https://doi.org/10.1037/1076-8998.11.1.79>
13. Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage Publications.
14. Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Lawrence Erlbaum Associates.
15. Daily, B. F., & Huang, S. C. (2001). Achieving sustainability through attention to human resource factors in environmental management. *International Journal of Operations & Production Management*, 21(12), 1539–1552.
16. Daily, B. F., Bishop, J. W., & Steiner, R. (2007). The mediating role of EMS teamwork in achieving environmental performance. *Journal of Management*, 33(4), 545–565. <https://doi.org/10.1177/0149206307302562>
17. Daily, B. F., Bishop, J. W., & Govindarajulu, N. (2012). A conceptual model for organizational citizenship behavior directed toward the environment. *Business & Society*, 48(2), 243–256. <https://doi.org/10.1177/0007650308315439>
18. Deshwal, P. (2015). Green human resource management: An overview. *International Journal of Applied Research*, 1(10), 578–580.
19. Dubey, R., Gunasekaran, A., Papadopoulos, T., Childe, S. J., Shibin, K. T., & Wamba, S. F. (2017). Sustainable supply chain management: Framework and further research directions. *Journal of Cleaner Production*, 142, 1119–1130. <https://doi.org/10.1016/j.jclepro.2016.03.117>
20. Dumont, J., Shen, J., & Deng, X. (2017). Effects of green HRM on employee green behavior: The role of psychological climate and green values. *Human Resource Management*, 56(4), 613–627. <https://doi.org/10.1002/hrm.21792>
21. Elkington, J. (1997). *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*. Capstone Publishing.
22. Fayyazi, M., Shahbazmoradi, S., Afshar, Z., & Shahbazmoradi, M. R. (2015). Investigating the barriers to the implementation of green human resource management in manufacturing organizations. *International Journal of Management, Accounting and Economics*, 2(5), 450–462.

23. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
24. Gonzalez-Benito, J. (2006). The effect of ISO 14001 on environmental practices an performance. *Journal of Cleaner Production*, 14(2), 177–187. <https://doi.org/10.1016/j.jclepro.2005.02.010>
25. Guerçi, M., & Carollo, L. (2016). A paradox view of green human resource management: Insights from the Italian context. *The International Journal of Human Resource Management*, 27(2), 212–238. <https://doi.org/10.1080/09585192.2015.1033109>
26. Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
27. Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications.
28. Hansson, J., Backlund, F., & Lycke, L. (2003). Managing commitment: Increasing the odds for successful implementation of TQM, TPM or RCM. *International Journal of Quality & Reliability Management*, 20(9), 993–1008. <https://doi.org/10.1108/02656710310503570>
29. Harris, C., & Tregidga, H. (2012). How critical dialogic accounting works: A social accounting perspective. *Accounting, Organizations and Society*, 37(4), 253–268. <https://doi.org/10.1016/j.aos.2012.03.002>
30. Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
31. Hosain, S., & Rahman, M. (2016). Green human resource management: A theoretical overview. *Journal of Business and Technology (Dhaka)*, 11(2), 53–68.
32. Huang, Y. C., Ding, C. G., & Chen, Y. C. (2016). The impact of green human resource management on organizational environmental performance. *Journal of Business Ethics*, 136(2), 405–420. <https://doi.org/10.1007/s10551-014-2450-4>
33. Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2019). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.). Sage Publications.
34. Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (3rd ed.). Sage Publications.
35. Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135.
36. Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management & Data Systems*, 116(1), 2–20.
37. Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55.
38. J. K., S. (2018). Green human resource management: A review. *Journal of Management Research and Analysis*, 5(2), 162–165.
39. Jafri, M. H. (2012). Green human resource management: A study of the Indian context. *International Journal of Business and Social Science*, 3(20), 121–125.

40. Jabbour, C. J. C. (2011). How environmentally oriented is the choice of human resource management practices? *International Journal of Human Resource Management*, 22(18), 3954–3974.
<https://doi.org/10.1080/09585192.2011.565668>
41. Jabbour, C. J. C. (2013). Environmental training and environmental management maturity of Brazilian companies. *Journal of Cleaner Production*, 46, 21–32. <https://doi.org/10.1016/j.jclepro.2012.09.020>
42. Jabbour, C. J. C., & de Sousa Jabbour, A. B. L. (2016). Green human resource management and green supply chain management: Linking two emerging agendas. *Journal of Cleaner Production*, 112, 1824–1833. <https://doi.org/10.1016/j.jclepro.2015.03.071>
43. Jabbour, C. J. C., Santos, F. C. A., & Nagano, M. S. (2010). Contributions of HRM throughout the stages of environmental management maturity: A methodological framework. *Resources, Conservation and Recycling*, 54(11), 1054–1066. <https://doi.org/10.1016/j.resconrec.2010.03.003>
44. Jackson, S. E., Renwick, D. W. S., Jabbour, C. J. C., & Muller-Camen, M. (2011). State-of-the-art and future directions for green human resource management: Introduction to the special issue. *Zeitschrift für Personalforschung*, 25(2), 99–116. <https://doi.org/10.1177/239700221102500201>
45. Jahan, S., & Ullah, M. (2016). Green human resource management: A strategic approach to sustainability. *Journal of Business and Management*, 18(1), 47–53.
46. Jabbour, C. J. C. (2013). Environmental training in organizations: From a literature review to a framework for future research. *Resources, Conservation and Recycling*, 74, 144–155.
47. Jabbour, C. J. C., & Santos, F. C. A. (2008). The central role of human resource management in the search for sustainable organizations. *The International Journal of Human Resource Management*, 19(12), 2133–2154.
48. Kapil, K. (2015). Green human resource management: A paradigm shift in HRM. *International Journal of Research in Business Studies and Management*, 2(5), 1–6.
49. Kazlauskaite, R., & Buciunien, I. (2008). The role of human resources in the management of organizational change. *Economics and Management*, 13, 26–33.
50. Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, 28(4), 563–575.
<https://doi.org/10.1111/j.1744-6570.1975.tb01393.x>
51. Li, Y., Zhao, S., & Liu, Y. (2018). The impact of GHRM on sustainable organizational performance: The role of green organizational identity. *Sustainability*, 10(12), 4489. <https://doi.org/10.3390/su10124489>
52. Likhitkar, P., & Verma, P. (2017). Impact of green HRM on employee performance. *International Journal of Research in Management & Business Studies*, 4(1), 16–20.
53. Masri, H. A., & Jaaron, A. A. M. (2017). Assessing green human resources management practices in Palestinian manufacturing context: An empirical study. *Journal of Cleaner Production*, 143, 474–489.
<https://doi.org/10.1016/j.jclepro.2016.12.087>
54. Mishra, P., Sarkar, S., & Kiran, S. (2014). Green human resource management: A framework for sustainable organizational development. *International Journal of Business and Management Invention*, 3(8), 23–30.
55. Opatha, H. H. D. N. P., & Arulrajah, A. A. (2014). Green human resource management: Simplified general reflections. *International Business Research*, 7(8), 101–112. <https://doi.org/10.5539/ibr.v7n8p101>
56. Pham, N. T., Hoang, H. T., & Phan, Q. P. T. (2020). Green Human Resource Management: A comprehensive review and future research agenda. *International Journal of Manpower*, 41(7), 845–878.

57. Pillai, R., & Sivathanu, B. (2014). Green Human Resource Management. *Zenith International Journal of Multidisciplinary Research*, 4(1), 72–82.
58. Pandey, A., Gupta, M., & Gupta, P. (2016). Barriers to the implementation of green human resource management. *Journal of Management and Research*, 6(1), 22–30.
59. Pham, N. T., Phan, Q. T. P., Tučková, Z., Vo, N. T., & Nguyen, L. H. (2020). Pro-environmental behavior at work: The role of green HRM and green organizational climate. *Sustainability*, 12(11), 4467. <https://doi.org/10.3390/su12114467>
60. Pillai, R., & Sivathanu, B. (2014). Green human resource management: A catalyst for sustainable organizational performance. *International Journal of Management Research and Reviews*, 4(12), 1148–1155.
61. Rawasdeh, A. (2018). The impact of green human resource management on the organizational performance. *International Journal of Business and Management*, 13(9), 114–122. <https://doi.org/10.5539/ijbm.v13n9p114>
62. Rebekah, J., & Madhu, P. (2017). Green HRM: A tool for sustainable development. *International Journal of Research in Commerce, IT and Management*, 7(6), 11–14.
63. Ren, S., Tang, G., & Jackson, S. E. (2018). Green human resource management research in emergence: A review and future directions. *Asia Pacific Journal of Management*, 35(3), 769–803. <https://doi.org/10.1007/s10490-017-9532-1>
64. Renwick, D. W. S., Redman, T., & Maguire, S. (2008). Green HRM: A review and research agenda. *Personnel Review*, 37(5), 545–563. <https://doi.org/10.1108/00483480810891651>
65. Renwick, D. W. S., Redman, T., & Maguire, S. (2013). Green human resource management: A review and research agenda. *International Journal of Management Reviews*, 15(1), 1–14. <https://doi.org/10.1111/j.1468-2370.2011.00328.x>
66. Rizvi, A., & Garg, R. (2020). Green human resource management: A study of Indian public sector enterprises. *International Journal of Management and Social Science*, 10(1), 45–52.
67. Roscoe, S., Subramanian, N., Jabbour, C. J. C., & Chong, T. (2019). Green human resource management and the enablers of green organizational culture: Enhancing a firm's environmental performance for sustainable development. *Business Strategy and the Environment*, 28(5), 737–749. <https://doi.org/10.1002/bse.2277>
68. Ringle, C. M., & Sarstedt, M. (2016). Gain more insight from your PLS-SEM results: The importance-performance map analysis. *Industrial Management & Data Systems*, 116(9), 1865–1886.
69. Sekaran, U., & Bougie, R. (2016). *Research Methods for Business: A Skill-Building Approach* (7th ed.). Wiley.
70. Saini, S., & Shukla, A. (2016). Green recruitment and selection: A new approach for cost-cutting. *International Journal of Management and Social Science*, 4(11), 32–36.
71. Santos, M., Lamberti, L., & Pires, G. (2020). Overcoming barriers to green human resource management. *Journal of Business and Economics*, 11(2), 112–125.
72. Sarstedt, M., Hair, J. F., Pick, M., Liengaard, B. D., Radomir, L., & Ringle, C. M. (2022). Progress in partial least squares structural equation modeling research: An updated guideline and editorial statement. *International Journal of Management Reviews*, 24(1), 1–13. <https://doi.org/10.1111/ijmr.12273>
73. Sengupta, S., & Sengupta, A. (2015). Green human resource management: An overview. *International Journal of Management and Applied Science*, 1(8), 100–104. (No DOI available)

74. Smedley, K. (2007). Environmental education and training in the workplace. Routledge.
75. Suharti, L., & Sugiarto, S. (2020). A qualitative study of green human resource management practices in Indonesian companies. *Journal of Management and Sustainability*, 10(2), 90–98.
<https://doi.org/10.5539/jms.v10n2p90>
76. Tang, G., Chen, Y., Jiang, Y., Paille, P., & Jia, J. (2018). Green human resource management practices: Scale development and validity. *Asia Pacific Journal of Human Resources*, 56(1), 31–55.
<https://doi.org/10.1111/1744-7941.12147>
77. Wehrmeyer, W., & Oates, S. (1996). Green recruitment and selection. *Greener Management International*, 14, 57–74.
78. Wibisono, Y. (2007). Membedah konsep dan aplikasi corporate social responsibility (CSR). Fascho Publishing.
79. Yasamis, F. (2011). Environmental management in the construction industry. *International Journal of Construction Management*, 11(2), 1–15. <https://doi.org/10.1080/15623599.2011.10773167>
80. Yong, J. Y., Yusliza, M. Y., Ramayah, T., Chiappetta Jabbour, C. J., Sehnem, S., & Mani, V. (2019). Pathways towards sustainability in manufacturing organizations: Empirical evidence on the role of green human resource management. *Business Strategy and the Environment*, 28(2), 212–228.
<https://doi.org/10.1002/bse.2247>
81. Yong, J. Y., Yusliza, M. Y., Ramayah, T., & Fawehinmi, O. (2020). Nexus between green intellectual capital and green human resource management. *Journal of Cleaner Production*, 256, 120425.
<https://doi.org/10.1016/j.jclepro.2020.120425>

Figures

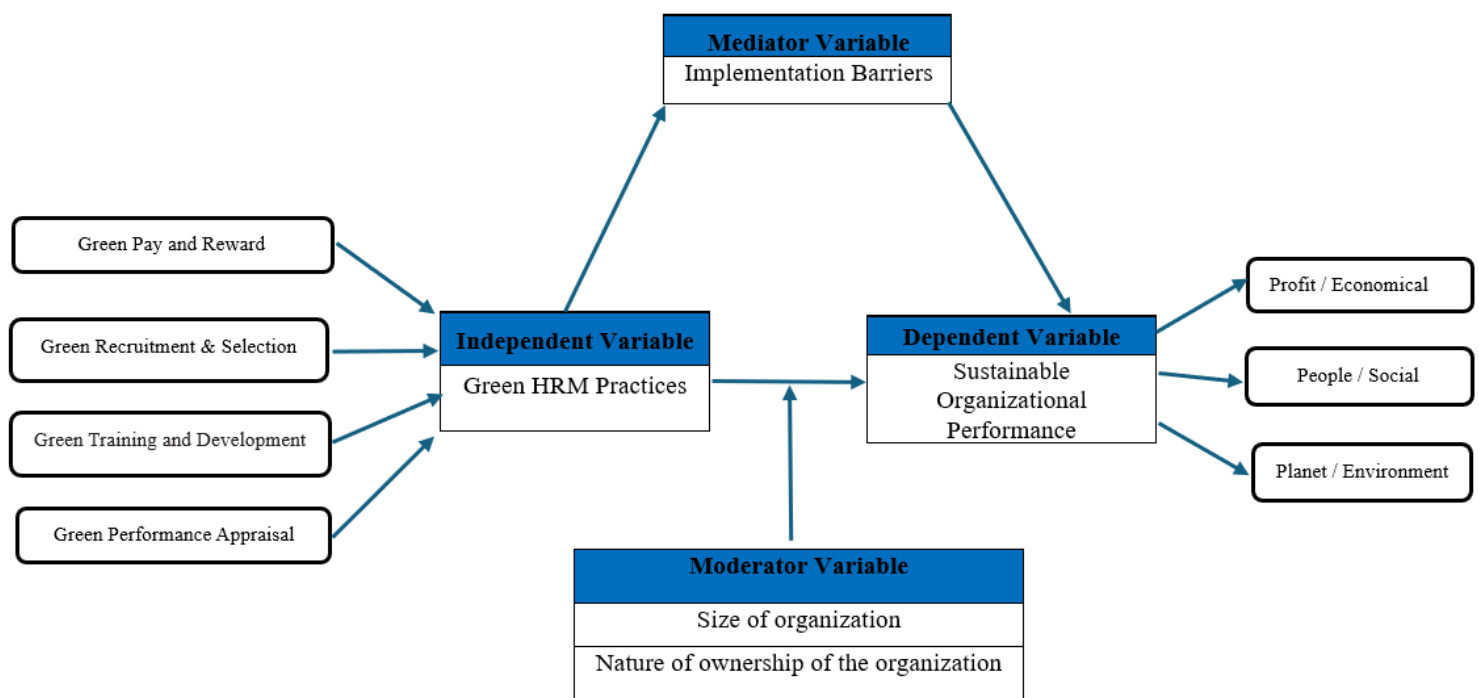


Figure 1

Conceptual framework of the study

Source: Authors own work

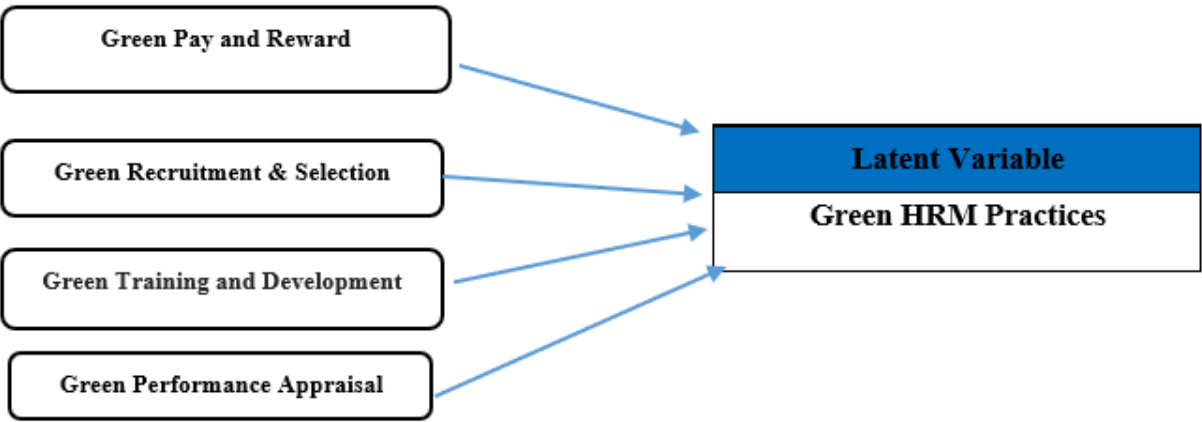


Figure 2

Formation of Higher Order Construct (Green HRM Practices)

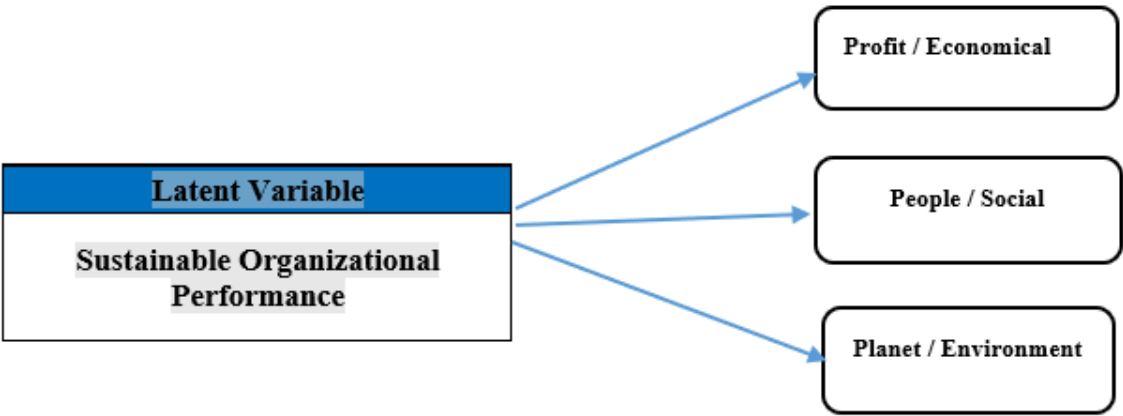


Figure 3

Formation of Higher order construct (Sustainable Organizational Performance (SOP))

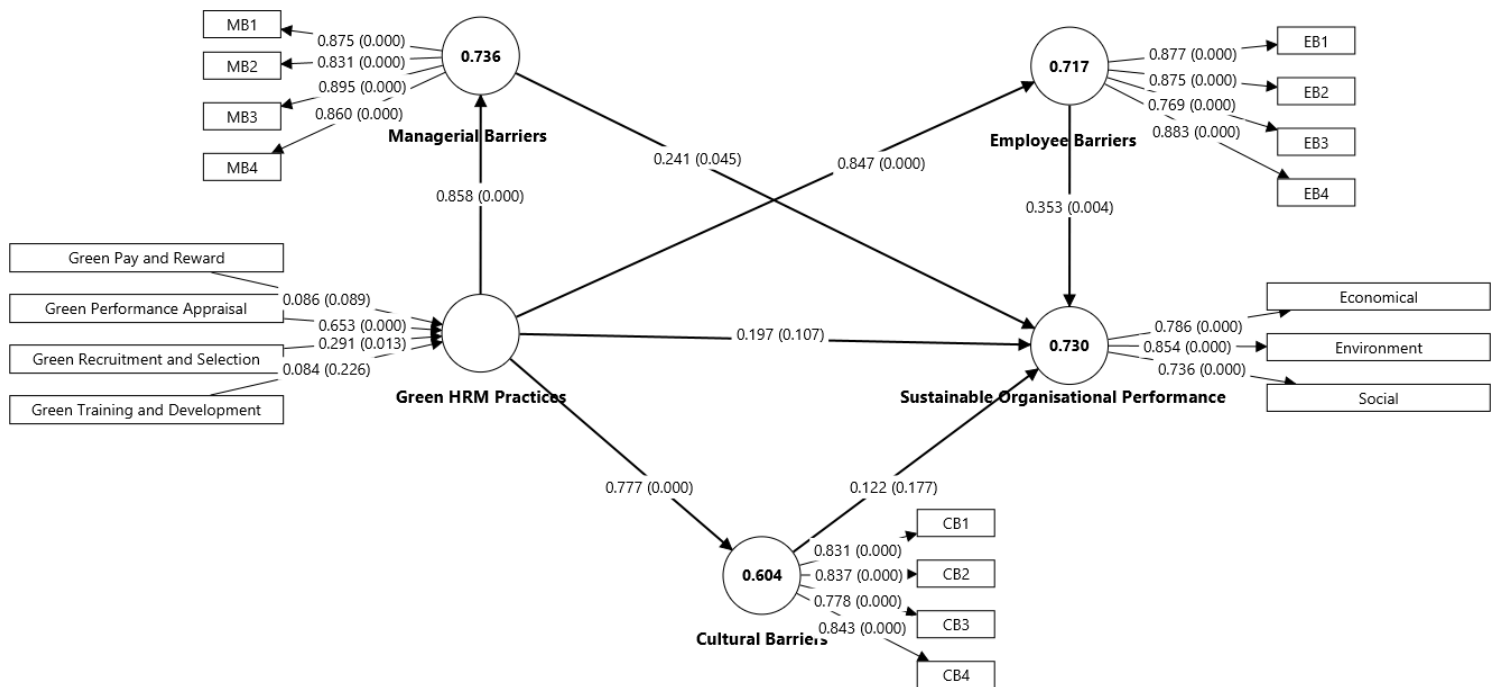


Figure 4

Higher Order Model Assessment

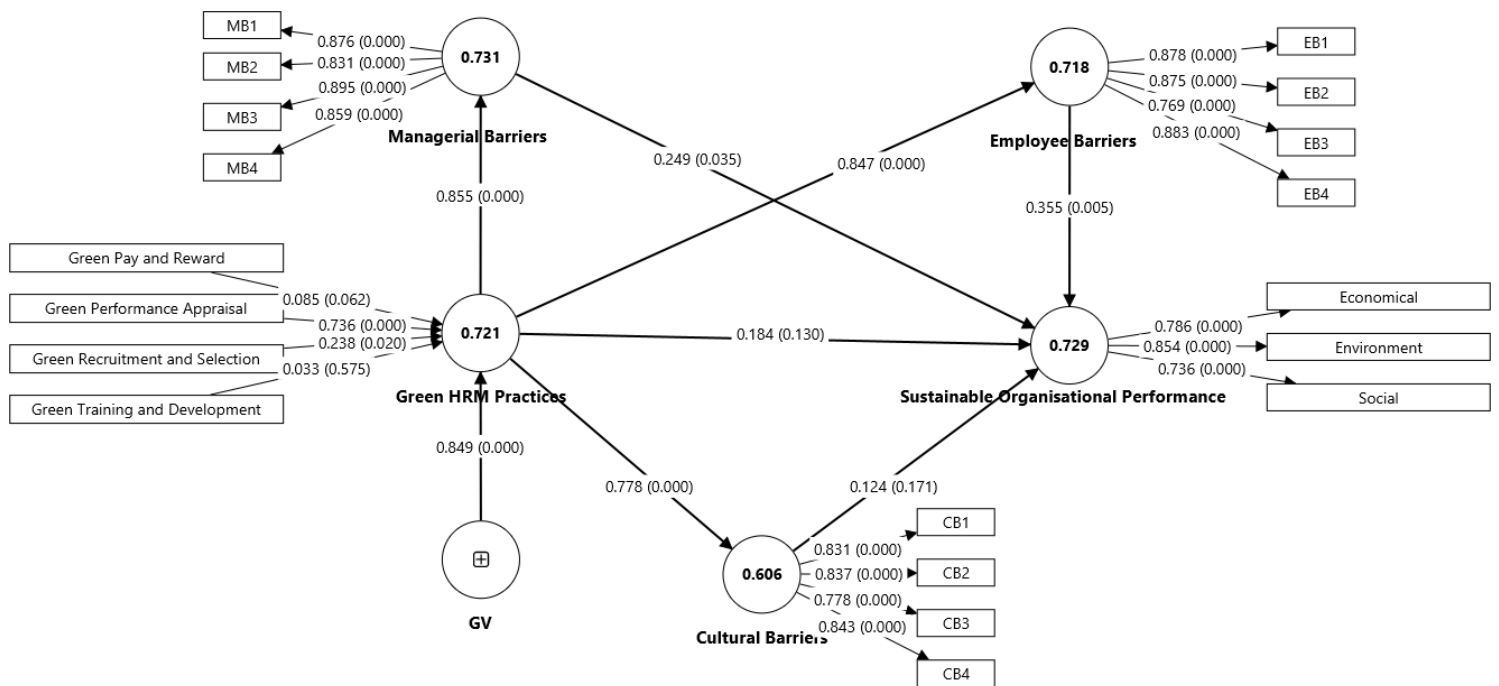


Figure 5

Redundancy Analysis for Higher Order Construct Green HRM Practices

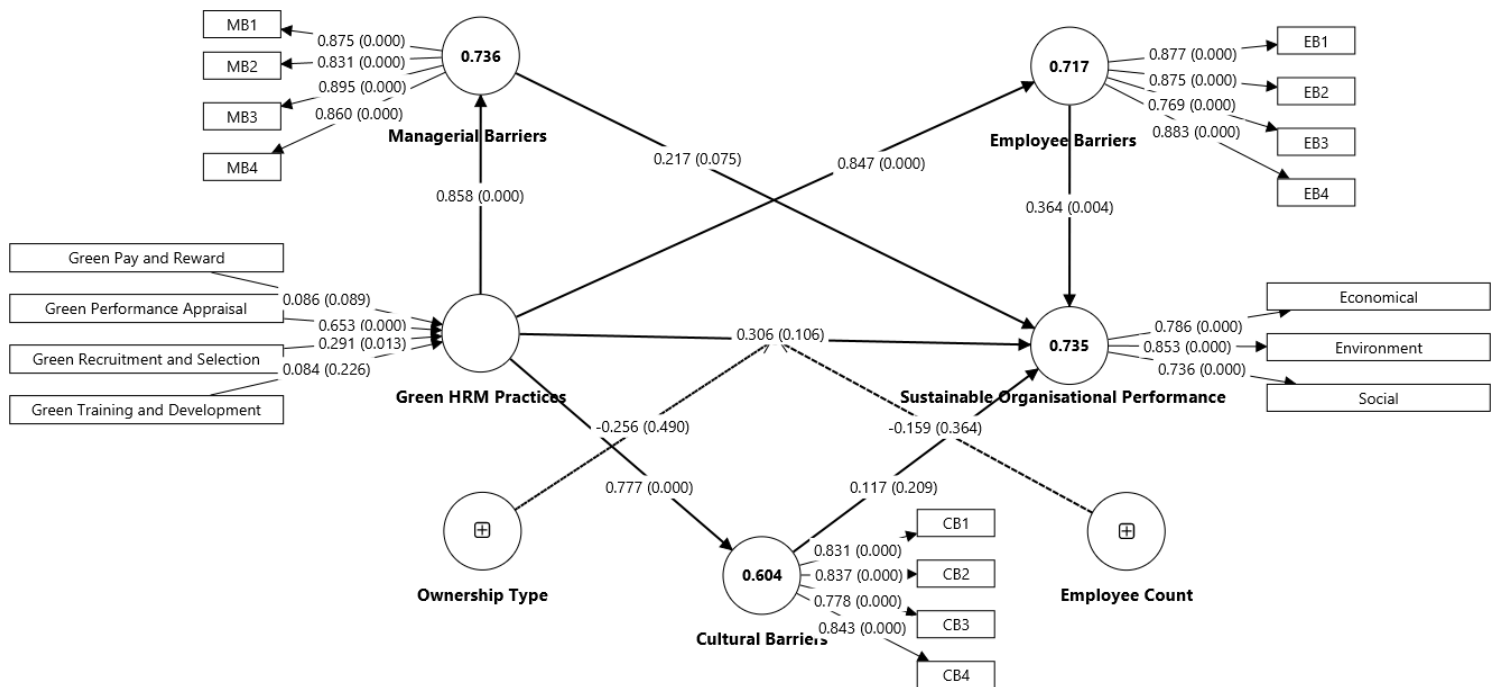


Figure 6

Structural Model Assessment of the model

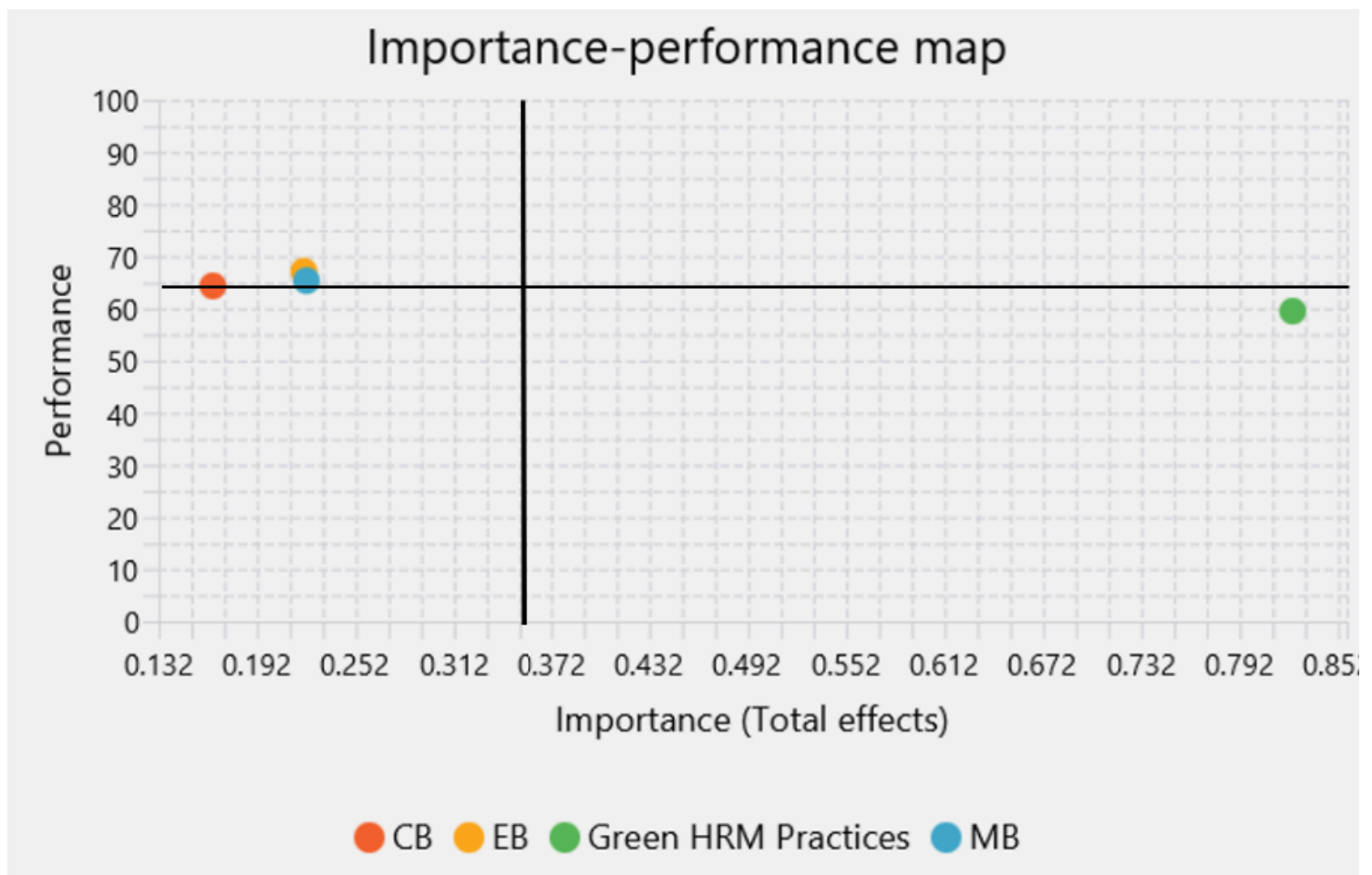


Figure 7

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [DataSheet.xlsx](#)
- [Appendix1.docx](#)