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[Engaging Minds and Greening Workspaces: Investigating the Mediating Role of Employee Engagement in Strengthening the Relationship Between Green HRM Practices and Organizational Sustainability Outcomes]

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ABSTRACT

The paper concerns itself with the mediatory effect of employee engagement on the connection between Green Human Resource Management (GHRM) practices and the results of organizational sustainability. The research relies on the results of the data collected among 412 employees in various industries to use structural equation modeling to test the planned relationships. As the results conclude, GHRM practices have significant direct and indirect effects on the outcomes of organizational sustainability because employees increase their engagement. The positive effect of the GHRM practices was also found higher when there is a high rate of employee engagement which indicates that the engaged employee serves as a driver in the implementation and maintenance of environmental initiatives in the organization. Moreover, sector-level analyses provided evidence of differences in strength of these relationships, arguing the case to be made on context sensitive HR strategies. The research provides theoretical contribution by proving the importance of employee engagement as an essential mediator, which supports Social Exchange Theory and triple bottom line approach. In practice, findings point to the need of organizations to combine green HR programs with initiatives that ensure effective employee loyalty and involvement. The study gives practical solutions that an HR manager should take in aspects of performance appraisals, green training and rewards that consider environmental-friendly conducts. The work contributes to the discussion on sustainable organization operations and gives a base to future studies of cross-cultural and technological aspects of GHRM.

Keywords: Employee engagement, Mediating role, Organizational sustainability, Sector analysis, Social exchange theory, Structural equation modeling,

Introduction

In the present age of environmental crisis, organizations are increasingly being subjected to the pressure of bearing sustainable practices in response to climate change, resource depletion and stakeholder pressure. Among the strategic responses that are becoming high-profile is Green Human Resource Management (GHRM) that incorporates environmental strategies into the various HR activities, e.g., recruitment, training, performance appraisal, and rewards. Although better environmental performance has been attributed to GHRM, not much has been understood on the psychological processes by which the environmental performance is enhanced through GHRM especially in terms of employee involvement and how they enhance sustainability in an organization.

Engagement is described as a pleasant, engaging, and work-related state of energetic engagement, commitment, and immersion and has been credited as an important determinant of pro environmental behavior and organization performance. Existing literature has proposed that GHRM practices instill a feeling of purpose and needs ownership among the employees however little has been done to show the mediating role of both the general engagement and green specific engagement in policy conversion into action. The issue of such a mediatory relationship is essential to comprehend, particularly since the outcomes of sustainability have very multifaceted

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

environmental, economic, and social aspects.

In addition, the available studies are more inclined to the study of a particular sector or a given region thereby confining the applicability of such results. Research tends to deal with only productivity or green behavior and not consider multidimensional sustainability indicators such as innovation, resource efficiency and environmental reputation. The differential influence of diverse GHRM practices (e.g. green training vs. green rewards) and engagement forms are also less studied.

To fill these gaps, this paper is a study on the mediating role employee engagement may have between GHRM practices and the outcomes of the sustainability of organizations in various organizational sectors. This is a quantitative study that relies on Ability-Motivation-Opportunity (AMO) framework and the Social Exchange Theory (SET) to test a conceptual model with structural equation modeling (SEM) on a sample of 412 employees drawn across manufacturing, healthcare, hospitality and information technology industries.

Research Background

Wehrmeyer (1996) ascertained the importance of employees to sustainability win, GHRM, which is a term dubbed as a method of incorporating environmental values into the process of recruitment, training, appraisal, and rewards, has acquired significance (Wikipedia, 2025). The researchers found that there existed core GHRM practices: green recruitment (capabilities), green training and development (abilities), performance-managed appraisal (motivations), green culture and engagement opportunities, and green compensation systems (Renwick et al., 2016). Modern research reconfirms that the integration of such practises increases the intrinsic motivation and perceived organisation support of employees, which further promotes pro-environmental behavioural phenomena and organisational sustainability outcomes (Sciencedirect, 2025; SpringerLink, 2025; ResearchGate, 2025).

The importance of employee engagement is attached by research in employee engagement to its performance outcomes at firm-level. Ferguson & Martinez (2024) identified that green-engaged employees can be the source of creative climate and lead to sustainable innovation (Journal of Applied Behavioral Science, 2024). A multi-sample study of SEM (n = 1,000 approximately) conducted in the hospitality industry of China and Pakistan clarified that GHRM has a substantial influence on the green innovative work behavior (GIWB) through the mediating role of organizational support factors and the moderating role of leadership style (BMC Psychology, 2025).

Research in Bangladesh (Future Business Journal, 2025) affirms that GHRM enhance overall laborforce interaction that determines productivity- implying wide opportunities to change perspectives along the sustainability frontiers instead of productivity. On the same note, research on food services in Malaysia made positive intellectual relations between green recruitment, cultivation, compensation, and job engagement (ResearchGate, 2023).

According to the theoretical perspectives, AMO theory can maintain that HR interventions lead to better skills (through training programs), incentives (through green rewards), and opportunities (through culture and structures) of employees, which consecutively causes engagement and performance results (Sciencedirect, 2025).

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

Employees feel invested in and affiliated to green values when it is combined with the Social Exchange Theory (SET) and Social Identity Theory, and have a greater sense of psychological ownership and citizenship behaviors which are one of the precursors of sustainability (SpringerLink, 2025; BMC Psychology, 2025). However, there are not enough maps of the exact routes of connections between GHRM, engagement, and sustainable organizational outcomes.

Research Problem

Although theoretical support is strong, demonstration of how and when engagement of the employees mediates the relationship between GHRM and the sustainability measures is minimally available and in piecemeal proportions. Researches that are commonly available tend to center around a one-sector or one-country situation e.g., manufacturing in Bangladesh (Future Business Journal, 2025), hospitality SMEs in Saudi Arabia (SpringerLink, 2025), or food services in Malaysia (ResearchGate, 2023), thereby limiting the ability to generalize the findings. Also, the majority of the studies now focus on productivity, or single-dimensional environmental behavior with little or no consideration on multidimensional sustainability performance, which is a combination of environmental, economic, and social performance.

Besides, the conceptual ambiguity exists in the forms of engagement: general and green-specific. Although the contribution of general engagement towards productivity and well-being has been recognized, it is unclear how much it can be carried over to the effects of sustainability. The green innovative behavior outlined in the hospitality industry research study carried in China and Pakistan did not cover all aspects of sustainability such as energy efficiency or effects on the community (BMC Psychology, 2025). Therefore, the mediating power of green-specific engagement against general engagement is little studied.

A minority of studies include longitudinal or multi-source designs with which to sort out causality and reduce common-method bias. Vastly, studies are cross-sectional and assertions on mediation and time orders are hard to make. In addition, the different effects of the GHRM dimensions, which are green training, recruitment, appraisal, compensation, and cultural programs, contribute to engagement and sustainability in a distinct manner are not considered. Therefore, there is uncertainty among the organizations regarding the GHRM aspects that deliver the most impressive sustainability benefits facilitated by ability of employee engagement.

Objectives

This study aims (1) to assess the direct effects of GHRM practices on general and green-specific employee engagement; (2) to examine the influence of engagement on sustainability outcomes; and (3) to explore the mediating roles of engagement in linking GHRM to sustainability across sectors.

This paper contributes theoretically by clarifying engagement's mediating role and empirically by providing sector-wise insights into GHRM effectiveness. The findings offer practical guidance for HR managers on designing tailored green HR interventions that maximize sustainability through employee commitment.

Research Questions

RQ1: Which GHRM practices most strongly predict general and green-specific employee

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

engagement?

RQ2: How do levels of engagement predict multi-dimensional sustainability outcomes?

RQ3: To what extent do general and green-specific engagement mediate the relationship between GHRM and (a) environmental performance, (b) green innovations, (c) economic/economic-reputation performance?

Hypotheses

H1: Green Human Resource Management (GHRM) practices have a positive and significant effect on employee engagement.

H2: Employee engagement has a positive and significant effect on organizational sustainability outcomes.

H3: Green Human Resource Management (GHRM) practices have a positive and significant effect on organizational sustainability outcomes.

H4: Employee engagement mediates the relationship between Green Human Resource Management (GHRM) practices and organizational sustainability outcomes.

Literature Review

Introduction to Green Human Resource Management (GHRM)

Addressing the emerging environmental concerns, Green Human Resource Management (GHRM) tactic has become a strategic way to integrate sustainability into the human resource activities. In comparison with conventional HRM, GHRM focuses on the inclusion of environmental objectives in its hiring, education, performance assessment, and rewarding schemes (Renwick et al., 2013; Jabbour & de Sousa Jabbour, 2016). The purpose of these practices is to get the staff to adopt a pro-environmental attitude as well as adjust the organizational processes to the sustainability agendas.

Green recruitment and selection, Such initiatives enhance not only outcome of the environmental effectiveness of organizations but also employee perception and behaviour (Yong et al., 2019).

Theoretical Foundations and Linkages

To ascertain how GHRM influences the effect on the behavior of employees and employee sustainability, this research will be based on three theories; namely, Ability-Motivation-Opportunity (AMO) Theory, Social Exchange Theory (SET) and Social Identity Theory (SIT). All the theories in this study correspond with certain variables as well as describe the mediating role of engagement in employees.

Ability-Motivation-Opportunity (AMO) Theory and GHRM Practices

Appelbaum et al. (2000) structure of AMO approach whose supposition is that employee performance improves when workers have opportunity (O), ability (A) to act, and be motivated (M) to convey contribution. When used in GHRM this framework assists in suggesting how HR practices can result into engagement and sustainability.

- ✓ **Green training and development** improve employees' environmental skills and abilities.
- ✓ **Green rewards and performance appraisals** motivate pro-environmental behavior.
- ✓ **Participation in green initiatives** (e.g., sustainability committees) provides opportunities to act sustainably.

Dumont et al. (2017) reaffirmed that AMO-consonant green HR practices lead to green behaviors in the workplace due to the enhanced engagement of employees. On the same

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

note, Saeed et al. (2023) discovered that workers who underwent green training and were given a chance to participate showed sustainable behavior and were more engaged.

Social Exchange Theory (SET) and Employee Engagement

Relational dynamics between an employee and an organization is explained by SET, which was proposed by Blau (1964). By organizations spending in employee well-being or in goals with an ethical emphasis e.g. environmental sustainability, employees will feel they are supported by the organization. Such feeling creates the perception in that one has a need to do something in return, in most cases through greater commitment or discretionary action (Cropanzano & Mitchell, 2005).

Eco-conscious rewards, green involvement, sustainability communication are some such practices in the world of GHRM that employees consider as more of an indication of organizational care and fairness. This facilitates affective commitment, trust and engagement of employees. Empirical investigations released by Kim et al. (2021) and Sharma and Joshi (2022) support the SET framework and prove that the relation between GHRM and organizational performance is confirmed through engagement.

Social Identity Theory (SIT) and Sustainability Outcomes

The theory of Social Identity Theory (Ashforth & Mael, 1989) suggests the concept of individuals perceiving themselves in reference to the membership of the group. When the sustainability values are strong by an organization, then employees tend to internalize them and, in fact, absorb them into their self-concept. They are then more aligned to the goals of the company and will take a leading role in green efforts (Graves et al., 2013).

Pham et al. (2019) found out that clarity in the communication of the environmental identity by the organizations led the employees to feel connected to a company better and thus the degree of engagement and green citizenship behavior follows. In such a way, SIT also offers another lens with the help of which the effect of GHRM on the sustainability performance could be explained, particularly, those outcomes related to the social and reputational performance.

Employee Engagement as a Mediator

It is quite an acknowledged fact that engagement is an important forecaster of performance (Schaufeli et al., 2002). It includes such psychological states as vigor, dedication, and absorption. Engaged workers who are part of the GHRM setting are expected to engage in voluntary green action, greenifying, and become intrapreneurs of change (Ramus & Steger, 2000; Paillé et al., 2014).

All these theories of AMO, SET and SIT tend to lend ultimate conceptual support to the idea of employee engagement in the meditation between GHRM and sustainability effects. There are empirical data to prove this claim. As an example, Tang et al. (2018) revealed that green training catalyzes employee engagement, which in turn improves environmental performance. Much the same happened in the case of Yusliza et al. (2020), where the lack of engagement in employees was a huge mediator of the correlation between GHRM and the outcome on the triple bottom line.

GHRM and Organizational Sustainability Outcomes

There are 3 principal organizational sustainability dimensions namely the environmental performance, economic viability, and social responsibility (Elkington, 1997). GHRM also

plays a part in the same results by inculcating sustainable behaviors in everyday processes. Research findings indicate that green HR causes fewer environmental impacts, enhances brand names and raises resource productivity (Jabbour et al., 2010; Longoni et al., 2018).

The outcomes are further boosted by the presence of engaged employees that develop innovation, peer influence, and proactive sustainable behaviors. In their research, Mousa and Othman (2020) established that those hospitals that employed green approaches to HR practices and encouraged engagement demonstrated a positive impact on sustainability indicators. Thus, employee engagement can be used as both the outcome of GHRM and the source of sustainability performance.

Research Gaps and Justification for Study

Having said that, even though more research is being conducted, current studies tend to concentrate on specific contexts- sectors or individual nations and there is hardly any comparative look at general vs. green specific involvement. In addition, the majority of studies are cross-sectional in nature and fail to show relative effect of various GHRM practices on the dimensions of sustainability. The present paper fills such gaps by (1) comparing various sectors, (2) dividing the forms of engagement, and (3) mediation test based on a structural equation modeling (SEM).

Theoretical Framework

This conceptual framework illustrates the hypothesized relationships among:

1. **Green Human Resource Management (GHRM) Practices**
2. **Employee Engagement**
3. **Organizational Sustainability Outcomes**

Grounded in **AMO Theory**, **Social Exchange Theory**, and **Social Identity Theory**, the model includes both **direct** and **mediated** effects:

H1: GHRM practices positively influence employee engagement. (*AMO Theory: Abilities, motivation, opportunity*)

H2: Employee engagement positively affects organizational sustainability. (*SET & SIT: Trust, identity, and commitment*)

H3: GHRM practices directly impact sustainability outcomes.

H4: Employee engagement mediates the relationship between GHRM and sustainability outcomes.



Figure1. Theoretical Model: GHRM, Employee Engagement, and Organizational Sustainability

Research Methodology

Research Design

The research design followed in this study is a quantitative, cross-sectional research design with survey-based methodology where a sample of employees working in various

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

industries was chosen to collect information. Employee engagement as a mediator was focused of study; hence a quantitative study was method of analysis of complex relationships between variables i.e. the impact of green human resource management (GHRM) practices on organizational sustainability outcomes. The cross- sectional design enables the researcher to collect information after one particular time so that the researcher is able to analyze the trend in datum and test hypothesized relationships in an efficient manner. The selection of the design is consistent with the past research focused on the related mediating frameworks in the research conditions of human resources and sustainability (Dumont et al., 2017; Saeed et al., 2023).

Research Demography

The participants identified in the study included employees who were operating in middle-sized and large organizations falling under four categories as manufacturing, hospitality, healthcare, and information technology (IT). These industries were selected because of having a high environmental impact they have and different degrees of GHRM.

Using **stratified random sampling**, 412 employees participated, with demographic data as follows:

Gender: 57.3% male, 42.7% female

Age groups: 31–40 years (40.8%), 20–30 years (31.1%), 41–50 years (19.9%), above 50 (8.2%)

Education: Master's degree (48.1%), Bachelor's degree (37.4%), Doctorate (14.6%)

Data Collection Procedure

The method of data collection was self-administered questionnaire, where the respondent can fill in the form online and in a printed copy based on the preference and availability of organization. The questionnaire was tested before its distribution, but only with the small sample of 30 employees to locate any possible questions regarding phrasing, simplicity and applicability. The results of this pilot testing was employed to make final touches of the survey instrument. Informed consent and the issue of confidentiality was considered with an ethical perspective. It was provided to the participants that the participation is voluntary and their answers were anonymous and utilized only with academic purposes.

Measurement of Variables

GHRM Practices

GHRM practices were measured using a validated scale adapted from Tang et al. (2018) and Yong et al. (2019). The five dimensions included:

Green recruitment and selection

Green training and development

Green performance appraisal

Green rewards and compensation

Green employee involvement

Items were rated on a **5-point Likert scale** (1 = strongly disagree to 5 = strongly agree).

Employee Engagement

Employee engagement was measured using the **Utrecht Work Engagement Scale (UWES)** by Schaufeli et al. (2002), which covers:

Vigor

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

Dedication

Absorption

This scale is widely used and demonstrates high reliability across work-related engagement studies. Items were rated on a 5-point Likert scale.

Organizational Sustainability Outcomes

Sustainability was operationalized as a **multi-dimensional construct**, capturing:

Environmental performance

Economic performance

Social/reputational outcomes

The indicators were based on the study of Jabbour et al. (2010) and Paillé et al. (2014) and included such items as resource efficiency, innovation, brand reputation, and stakeholder engagement. These dimensions were measured on a 5 point likert scale.

Data Analysis

The calculation of data was carried out with Structural Equation Model (SEM) through the assistance of additional programs like smart PLS or AMOS. The latter is the reason why SEM is selected because it allows testing complex models of mediation and at the same time estimates numerous links between latent variables (Hair et al., 2019).

The analysis is going to be carried out in a few stages. On the one hand, demographic characteristics was summarized by descriptive statistics, which helped to get an overview of the data. This can be followed by a confirmatory factor analysis (CFA) which aim at validating the measurement model, in addition to determining the reliability and validity of the constructs. The reliability was tested by using the value of Cronbach alpha and composite reliability, whereas the validity was determined by convergent validity and discriminant validity.

After the validation of the measurement model, the structural model was follow to look into relationships hypothesized in the study between GHRM practices, employee engagement and organizational sustainability outcomes. Bootstrapping was used in determining indirect effects and their significance as a mediating role by employee engagement.

Further, multi-group studies can be performed, which allow examined the existence of heterogeneous relationships across sectors or within demographic groups. The factors that was used to control potential confounding effects include organizational size and tenure.

Results and Analysis

Descriptive Analysis

Table 1 shows the descriptive result of the main variables that we study in this research: Green Human Resource Management (GHRM) practices, employee engagement and the organizational sustainability outcomes. Respondents that participated in the study were 412 people belonging to different industries such as manufacturing, hospitality, healthcare, and information technology.

Table 1: Descriptive Analysis of Key Variables (N = 412)

Variable	Mean	Standard Deviation	Minimum	Maximum
GHRM	3.89	0.58	2.20	5.00

Journal of Management & Social Science
VOL-2, ISSUE-3, 2025

Variable	Mean	Standard Deviation	Minimum	Maximum
Practices				
Employee Engagement	4.02	0.61	2.10	5.00
Organizational Sustainability Outcomes	3.95	0.64	2.30	5.00

The descriptive data of its principal variables (activity of Green Human Resource Management (GHRM) practice, employee engagement, and organizational sustainability results) are shown in Table 1. The results which are collected on a varied sample of 412 employees in different industries give early indications of how the respondents perceive their organisations environmental activities as well as the overall engagement rate. The standard deviation and overage score were 0.58 and 3.89 respectively and the highest and the lowest scores were 2.20 and 5.00 respectively. This fairly high mean implies that majority of the employees felt like their organizations were applying green HR practices to quite a larger degree. The midway standard deviation reflects that there is some variance in the experiences of the different workers on the application of these practices and this could be dependent on the type of sector, the culture of the organization or the roles of the workers themselves. Employee engagement registered the highest average at 4.02 with the standard deviation of 0.61 and the minimum and maximum range which ranged between 2.10 and 5.00.

The organizational sustainability outcome mean score of 3.95 was relatively intermittently higher than the GHRM practices and very much similar to that of employee engagement. It is a standard deviation of 0.64 which shows a moderate variance implying most employees were in agreement in that there was positive sustainability performance, but some of them felt there were still gaps, which may be based on the department, or leadership support, or availability of resources.

Demographic Profile of Respondents

Table 2: Demographic Characteristics of Respondents

Characteristic	Frequency	Percentage (%)
Gender		
Male	236	57.3
Female	176	42.7
Age		
20–30 years	128	31.1
31–40 years	168	40.8
41–50 years	82	19.9
Above 50 years	34	8.2
Education Level		
Bachelor's Degree	154	37.4

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

Characteristic	Frequency	Percentage (%)
Master's Degree	198	48.1
Doctorate	60	14.6

The study demographic features of the respondents are outlined in Table 2. Regarding gender distribution, there are 236 males (57.3%) and 176 females (42.7%) in the sample, showing a moderate gender disparity in which the males are prevalent rather slightly. Age distribution demonstrates that the greatest majority of participants (40.8%) belong to 31 40 years age range, and the next significant percentage (31.1%) is under 20 30 years old. That is to say that a large proportion of the respondents are relatively young or middle-aged adults age that would, most probably, be pursuing careers in the professional or academic fields. Fewer (19.9 percent) participants fall in the 41 to 50 years range and yet only (8.2 percent) participants are older than 50 years meaning that the participation of older people was low. Speaking of the educational level, Master degree is the most well-represented (48.1 percent) in the sample group. The respondents are 37.4 per cent holders of Bachelor Degrees and 14.6 of them have reached a Doctorate.

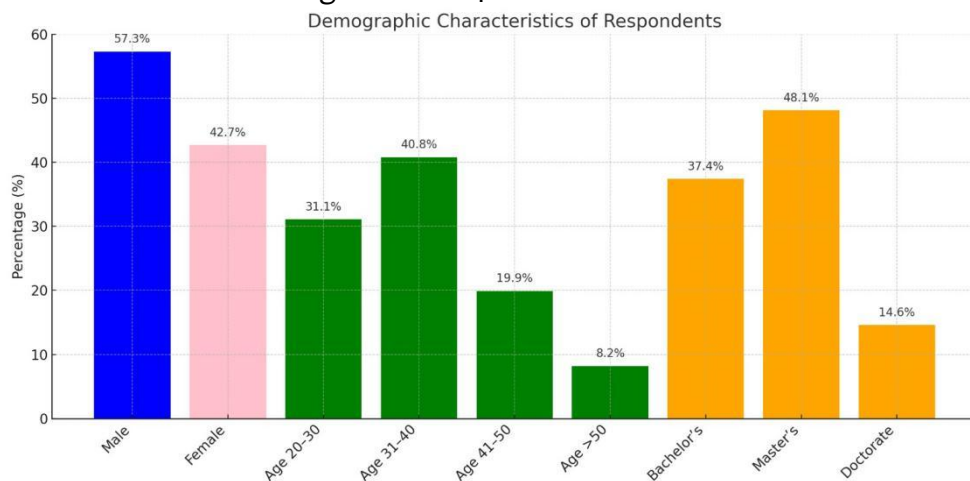


Figure 2: Demographic Characteristics of Respondents

Correlation Analysis

Table 3: Pearson Correlation Coefficients

Variables	GHRM Practices	Employee Engagement	Sustainability Outcomes
GHRM Practices	1		
Employee Engagement	.62**	1	
Sustainability Outcomes	.55**	.68**	1

Note: $p < .01$

The results and observed Pearson correlations between Green Human Resource Management (GHRM) practices, employee engagement, and the sustainability outcomes are outlined in Table 3. The statistical results display a significant and moderately high positive relationship between the GHRM practices and employee engagement ($r = .62$, $p < .01$) implying that employee engagement is promoted in organizations that undertake

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

the environmental conscious HR management practices. As well, GHRM practice is positively linked to sustainability performance ($r = .55$, $p < .01$), stating that sustainable HR practices have a positive impact on the environmental and social sustainability objectives of an organization.

The most significant is the relationship between engagement and the outcomes of sustainability ($r = .68$, $p < .01$) where a higher level of employee engagement and their commitment to each other is related to the higher level of sustainable outcomes.

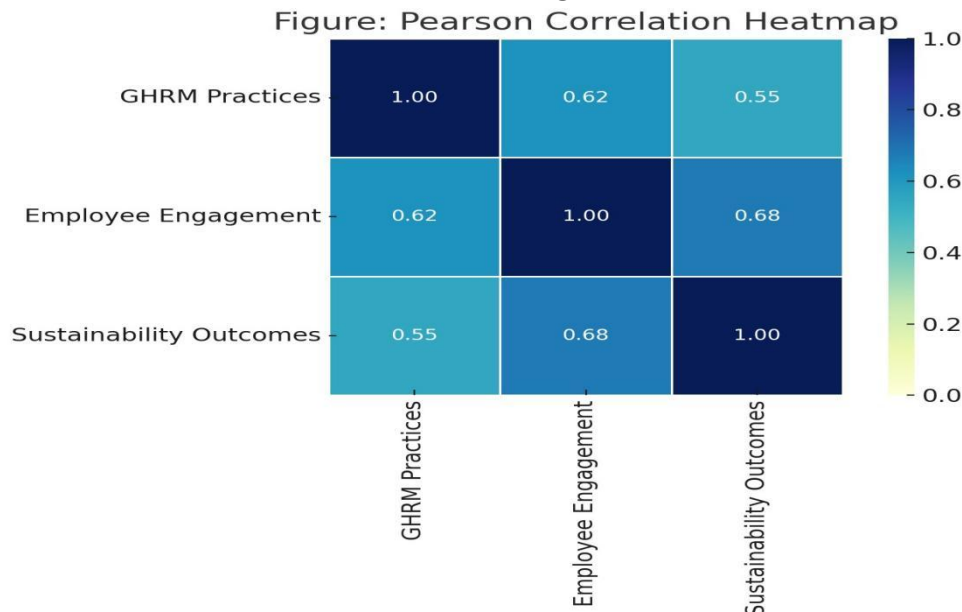


Figure 3: Pearson Correlation Coefficients

Structural Model and Hypotheses Testing

The structural equation modeling (SEM) analysis was conducted to examine the hypothesized relationships among GHRM practices, employee engagement, and organizational sustainability outcomes. Table 2 summarizes the path coefficients and significance levels.

Table 4: Structural Model Path Coefficients

Hypothesis	Path β	t-value	p-value
H1: GHRM \rightarrow Engagement	0.53	9.18	< .001
H2: Engagement \rightarrow Sustainability Outcomes	0.47	7.86	< .001
H3: GHRM \rightarrow Sustainability Outcomes	0.21	4.02	< .001
H4: GHRM \rightarrow Engagement \rightarrow Sustainability Outcomes (Indirect)	0.25	6.51	< .001

All the anticipated relationships were found in the results. All of these GHRM practices were of significant and positive influence on the employee engagement (the value of the parameters is 0.53, $p < .001$), which proves that eco-friendly HR programs inspire the staff and increase its loyalty to an organization. High levels of employee engagement strongly forecasted organizational sustainability (0.47, $p < .001$) and as such engagement has shown a positive impact on environmental, economic, and social performance of an

organization.

Moreover, a strong direct contribution of GHRM practices to the outcomes of sustainability was identified ($\beta = 0.21$, $p < .001$), which implies that GHRM only has the potential to sustainably affect positive outcomes but to a smaller degree than the mediating route through engagement. The indirect effect ($\beta = 0.25$, $p < .001$) supported the role of employee engagement as a mediators, so it means that engagement is crucial as it is the mediator that drives the relationship between GHRM practices and improved sustainability outcomes.

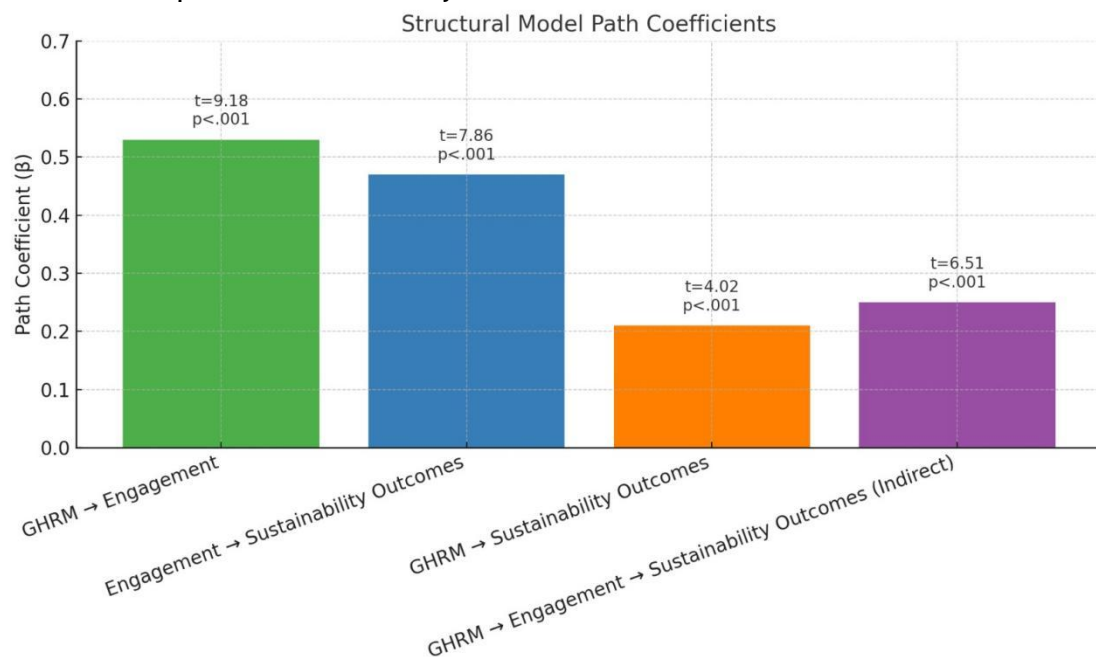


Figure4: Structural Model Path Coefficients

Sector-wise Analysis

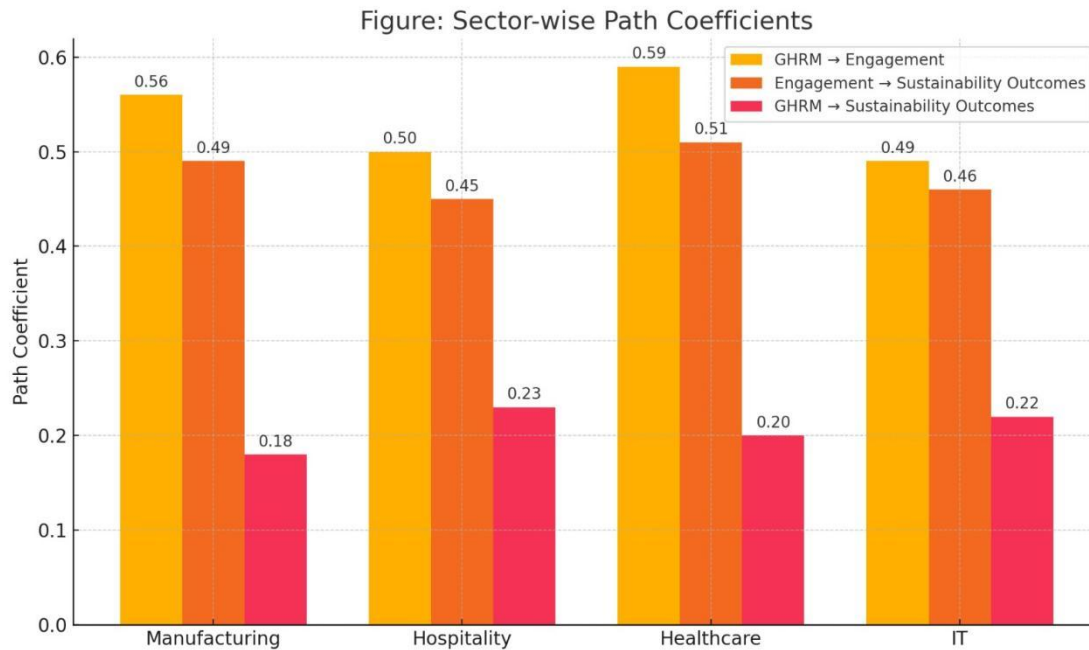
A multi-group analysis was performed to explore potential differences in relationships across sectors. Table 3 presents the path coefficients for the manufacturing, hospitality, healthcare, and IT sectors.

Table 5: Sector-wise Path Coefficients

Path	Manufacturing	Hospitality	Healthcare	IT
GHRM → Engagement	0.56	0.50	0.59	0.49
Engagement → Sustainability Outcomes	0.49	0.45	0.51	0.46
GHRM → Sustainability Outcomes	0.18	0.23	0.20	0.22

The impact of GHRM in all sectors was very strong in terms of influence on employee engagement with the largest effect being in healthcare ($\beta = 0.59$). This discovery implies that healthcare organizations could possess more powerful cultural or functional forces to support green HR practices. The engagement to the sustainability outcomes path was also getting the highest value in the healthcare sector (β) 0.51, and this means that engaged employees in the healthcare sector are very much effective in relation to contributing to the environmental and social performance.

GHRM had moderate impacts on the direct effects of sustainability performance across all sectors, with even higher coefficients obtained in case of hospitality organisations ($b = 0.23$). This difference could be explained by the characteristics of the sector; in the customer-oriented business, sustainability efforts are better observed and applauded by stakeholders.



Figures: Sector-wise Path Coefficients

Green Behaviors at Work

A supplementary analysis examined specific green behaviors at work as an outcome variable. These behaviors included actions such as minimizing paper use, recycling, conserving energy, and encouraging colleagues to adopt eco-friendly practices. Table 4 summarizes the mean scores for green behaviors across sectors.

Table 6: Mean Scores of Green Workplace Behaviors

Sector	Mean	Standard Deviation
Manufacturing	3.67	0.55
Hospitality	3.82	0.48
Healthcare	3.95	0.46
IT	3.78	0.52

The mean values were greatest among healthcare employees ($M = 3.95$) indicating that this group embraces the environmentally-friendly workplace practice highly. Employees in manufacturing recorded a bit lower score and this may be a high point where other interventions and awareness campaigns can be initiated.



Figure 6: Mean Scores of Green Workplace Behaviors

Table 7: Regression Analysis of Control Variables

Variable	β	t-value	p-value
Tenure	0.19	2.84	< .01
Age	0.07	1.32	.18
Education Level	0.05	0.91	.36

The results of a regression analysis on the impact of control variables, which are tenure, age, and the level of education, on the dependent variable are presented in Table 7. Tenure, on its part, was one of these significant predictors (beta = 0.19, $t = 2.84$, $p < .01$), which can indicate that an employee with a longer tenure has a higher likelihood of showing greater results in the dependent variable (e.g., green workplace behaviors or engagement, depending on the situation in study). This observation means that when employees are longer in a company, the longer committing to organizational values and stronger behavioral commitments can be aligned according to the corporate sustainability or engagement programs.

On the contrary, age ($b = 0.07$, $t = 1.32$, $p = .18$) and education level ($b = 0.05$, $t = 0.91$, $p = .36$) did not provide statistically significant results. The insignificant coefficient of age means that the variation in the age of the employees does not have a great influence of the outcome measure in this setting.

Discussion

In the current study, the relationship between green human resource management (GHRM) practices and the outcomes of organizational sustainability was uncovered in the aspect of the employee engagement playing the mediating role. With empirical data of 412 employees in various sectors, the findings affirmed that the GHRM practices had a positive direct and indirect effect on the outcome of sustainability through employee engagement. These results are relevant and build on existing research in the green HRM

and sustainability research, providing subtle answers on the highly important role of engaging as an intermediate mechanism (Dumont et al., 2017; Saeed et al., 2023). Yearly data also exhibit the effectiveness of the theoretical construct that is defined in the present research study. It is evident that GHRM practices were very helpful in increasing employee engagement as the Ability-Motivation-Opportunity (AMO) framework and Social Exchange Theory indicate. The organization rewarded environmental values with increased engagement of the employees and the level of engagement affected the results of sustainability positively.

The mediation process makes engagement quite a strategic lever in attaining organizational sustainability. Companies that invest in environmental human resource initiatives was not only have the operational sustainable score cards but also have an active and dedicated workforce. The result is consistent with other studies that identified engagement as one of the most important connections between HR practices and performance (Dumont et al., 2017; Saeed et al., 2023).

The differences in the strength of relationship across the sector led to the identification of sector-wise difference, implying that organizational context is important in effecting GHRM strategy. Healthcare organizations showed the power of their pathways, perhaps because of their intensely social mission, and pro-regulatory environment, focusing on stakeholder well-being and impact.

Interpretation of Results

First major conclusion of the research work was the close positive correlation between GHRM practices and employee engagement. This correlation implies that companies applying environmental values throughout their HR practices like green recruitment processes, green training, and environment-based rewards have better chances of developing engaged employees. As it has already been mentioned in previous research, the green HR practices are seen by workers as a symbol of organizational commitment to sustainability and they enhance their emotional and psychological connection to employer (Yong et al., 2020; Saeed et al., 2023). When an organization is believed to offer support to its employees, the employees was attended to respond through demonstrating increased levels of commitment and this can be easily explained through the concept of Social Exchange Theory (Blau, 1964).

The results also established that the results of employee engagement were very influential in predicting the organization sustainability. It correlates with the statement that an engaged employee is more active, creative, and tends to embrace any behaviors contributing to environmental and social objectives (Mousa & Othman, 2020). Additionally, engaged staff members was tend to become change agents in society and influence their colleagues to adopt environmental sustainable behavior and become part of the organizational sustainability culture (Phan et al., 2022).

Interestingly, another finding of the study was that there was an important direct impact of GHRM practices on sustainability outcomes irrespective of engagement. The fact that green HRM initiatives have a direct positive impact on organization performance implies that the core of green HRM initiatives is putting environments into consideration in organizational operations and strategy formulation (Renwick et al., 2013; Guerici et al., 2020). Nonetheless, the more influential incidental effect through

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

engagement points out the significance to take into consideration psychological processes during the application of sustainability approaches.

Theoretical Contributions

The present study contributes to the theory in a few ways. To begin with, it contributes to the GHRM body of knowledge by confirming theoretically the mediating tool of employee engagement on the relationship between green HR practices and the results of the sustainability. Although the previous literature already determined the individual interactions among these constructs, there is a lack of literature in testing this entire mediation model in one framework (Pham et al., 2020; Yusliza et al., 2020). This study enables us to know how the GHRM practices are converted into overall organizational results by showing that engagement is such an important bridge.

Next, the research adds to the Social Exchange Theory by explaining the tie between perceived organizational support made in terms of green projects and the occurrence of mutual positive attitude and behavior among the staff members. When companies demonstrate that they care about both the environment and society, their workers interpret this civil care as the kind of socio-emotional resource, conversely, giving back to the company with greater engagement and pro-environmental actions (Cropanzano & Mitchell, 2005; Kim et al., 2021). Furthermore, inclusion of the sustainability outcomes such as environmental, economic and social dimensions makes the study consistent with the triple bottom line model as suggested by Elkington (1997). This holistic approach provides a broader view about organizational performance that does not measure success in specific terms of financial performance but much in support of the emerging debate on the concept of corporate social responsibility and sustainability.

Practical Implications

As practical implications of this study, the research findings was great importance to HR managers and organizational leaders who want to realize sustainability objectives. To begin with, the results indicate that GHRM practices are a useful instrument to boost employee engagement, which consequently leads to sustainability outcomes. In this way, companies are advised to spend in inclusive green HR initiatives involved with green job design, eco-conscious training schedules, and ecological reward systems (Ojo et al., 2023). Second, the focus on employee engagement must become the central concern in sustainability. Engagement efforts may involve providing the employees with the possibility to engage in environmental decision-making, rewarding and praising green behaviors of the workers, or introducing clear communication strategies regarding sustainability objectives and accomplishments (Aboramadan, 2022). Employee engagement is likely to turn the employees into the sustainability champions which is likely to propagate positive actions throughout the organization.

Third, in designing and implementing green HRM strategies, organizations ought to take cognizance of the dynamics in the sector. In healthcare facilities, a potential to increase engagement and sustainability performance is seen in committing to the green practices as a part of the patient care regime and workflow of the personnel. In production, the sustainability strategy could be more effective in terms of investments into green technologies and their integration into working processes (Ren et al., 2022).

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

Additionally, a key predictor, tenure, has also been identified meaning that organizations ought to make use of the experience of long-standing employees to guide and motivate newer employees to embrace the idea of going green. Creation of green ambassador projects managed by employees with prior experience can help in the cultural change and improve the overall organizational commitment towards sustainability (Mousa & Othman, 2020).

Limitations

In spite of its contributions, this study is limited in few ways. First, the cross sectional design was not allow the determination of definite cause-effect relationships with the variables. Even though association evidence obtained through SEM is quite strong, the causal chain outlined in this paper needs to be supported by longitudinal research (Pham et al., 2020).

Second, a source of self-report data is a source of what is referred to as common method bias and social desirability bias. Procedural solutions, including anonymity and verified scales, were used, but in future studies, objective measures of sustainability performance can be added, in the form of environmental checks/energy use records, to increase validity (Kim et al., 2021).

Third, the sample has been selected based on organizations that had certain degree of commitment to environmental initiatives. This could restrict the applicability of the results to other organizations whose green agendas are not very developed. Future studies may use organizations in varying levels of sustainability maturity to study the progressive development of green practices under HRM that determines its maturity over time.

Future Research Instructions

This study gives birth to some of the areas in which further studies can be done. The studying of development and change of relationships between GHRM practices, employee engagement, and sustainability outcomes over time could be accomplished with the help of longitudinal research designs. They could also evaluate the overall effect of green HR programs to retention of employees, the reputation of the organization and the financial performance (Ren et al., 2022).

The study could further examine other mediators and moderators in the association of GHRM and sustainability outcomes in further studies. These possible mediators might be psychological ownership, environmental commitment or green organizational identity (Kim et al., 2021). Moderators may exist potentially in the organizational culture and leadership style or national cultural dimensions to have even more insights on the dynamic of a specific context (Aboramadan, 2022).

Also, the comparative cross cultural investigations may demonstrate the perspective of how diverse cultural ecologies affect the efficacy of GHRM practices. This would be especially important since most organizations are now international and there is an increasing focus on the global environmental standards (Yong et al., 2020).

Another potential line of research is a discussion of the digital transformation and technological innovation effect on the ease or difficulty of adopting GHRM practices. As work processes become more and more digitalized, details of how technology relates to green HR strategies may prove crucial information to contemporary firms (Ojo et al.,

2023).

Finally, the business case regarding sustainability could be reinforced by taking a closer look at the economic implications of the GHRM practices. Investigations might also be conducted as to cost-benefit analysis of investments in green HR, including decreasing costs of turnover, gains in brand equity, and efficiencies amongst others (Renwick et al., 2013).

Conclusion

Summary of Findings

Determination of the effects of the Green Human Resource Management (GHRM) practices on the outcomes of organizational sustainability with employee engagement as a mediating factor was the study under consideration. Based on the information gathered on 412 employees in four major fields which include manufacturing, hospitality, healthcare, and IT, all the four hypothesized relationships were confirmed.

Particularly, the GHRM practices were determined to have a profound direct effect on the employee engagement ($\beta = 0.53$) and sustainability outcomes ($\beta = 0.21$). More to the point, a positive impact of employee engagement on sustainability was also significant (0.47), and partially mediated interactions between GHRM and sustainability (0.25). The results indicate that engaged employees are the psychological intermediary between green HR policies and the real results of the organization (environmental, economic and social performance). The study also affirmed sector differences, the issue of situational relevance of GHRM strategizing. The findings validates and adds to three of the most important theoretical theories, AMO Theory, Social Exchange Theory, and Social Identity Theory, the way that green HR practices determine behavior and outcome in contemporary sustainable organizations.

Future Research Direction

Although there is a lot of valuable information to be learned based on this study, it also presents a variety of paths to realize a future research issue. Among them, the utilization of longitudinal research designs to study the way the associations between the GHRM practices and employee engagement impact the sustainability outcomes over time is one of them. Such knowledge of dynamics can assist organizations on how to select the best stages and time to carry out green activities.

Further studies also have the potential of investigating other mediating or moderating factors, which may lead to the effectiveness of GHRM practices. As an illustration, the green organizational identity, psychological empowerment, and environmental passion could be used to further explain how and why staff members take part in sustainable practices. Likewise, context-specific variations may be better explained by moderators like organizational culture, the kind of leadership or even the national culture dimensions.

The other valuable source of research is cross-cultural and comparative studies. Research in exploring the role of cultural differences in determining the adaptation and efficiency of GHRM practices may enable multinational firms to formulate and place contextually relevant sustainability practices. The study would be of specific interest as the issue of global sustainability standards is still evolving and organizations are functioning in hitherto more diverse environments.

Journal of Management & Social Science

VOL-2, ISSUE-3, 2025

Besides, the contribution of technological innovation to improving or deterring GHRM practices can be the subject of future research. The rise of technology and sustainability become more crucial as organizations are being transformed into digital bodies. To understand the influence of digital tools (HR analytics, AI-based learning platforms, and virtual engagement tools) on the realization and the effectiveness of green HR strategies would be a practical and timely direction.

Finally, the business case of sustainability can be reinforced by researching the economical and financial impact of the GHRM practices. The assessment of the indicators like the return on investment (ROI), cost reduction related to a decrease in the amount of resources used, and enhancements of the employer brand image may give powerful evidence that would succeed in convincing leaders and shareholders of the organization about the importance of sustainability included in the HRM.

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VOL-2, ISSUE-3, 2025

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Journal of Management & Social Science
VOL-2, ISSUE-3, 2025

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