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Green Human Resource Management and Organizational Sustainability: The Mediating Role of Green Work Engagement in Climate Focused SMEs in Pakistan.

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ABSTRACT

This research paper examines the connection between Green Human Resource Management (GHRM) and Organizational Sustainability (OS) with the mediating role of Green Work Engagement (GWE) in Small and Medium sized Enterprises (SMEs) in Karachi. A quantitative research design was utilized, based on data obtained through a survey of 212 employees working in various organizations. The proposed hypotheses and mediation effects were tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS. The findings of this study demonstrate that GHRM has a positive and statistically significant impact on GWE (β=0.657, $p < 0.001$) and Organizational Sustainability (β = 0.269, $p < 0.001$). GWE has a positive and statistically significant effect on Organizational Sustainability (β=0.657, $p < 0.001$) and acts as a partial mediator for the relationship between GHRM and Organizational Sustainability (β = 0.432, $p < 0.001$). The model accounts for 43.2% of GWE and 73.7% of Organizational Sustainability. The results suggest that to improve sustainability performance, companies should incorporate green principles into HR practices and actively encourage employee involvement in environmentally friendly activities. This study contributes to the GHRM and sustainability literature by evaluating Green Work Engagement as a mediating mechanism of GHRM and Organizational Sustainability of climate-focused SMEs in a developing country context.

Keywords:
Green Human Resource Management (GHRM); Green Work Engagement (GWE); Organizational Sustainability; Sustainable HR Practices; PLS-SEM.

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1. Introduction

The growing international concern about the deterioration of the environment and the decline in resources has led to the need to shift corporate strategy towards a new paradigm, where organizations must incorporate sustainable practices into their internal operations (Gul et al., 2025). In this changing environment, the concept of Green Human Resource Management stands out as a strategic tool of paramount importance in promoting sustainability within organizations by creating a balanced relationship between ecological goals and human capital (Alfadel et al., 2025; Amini et al., 2024). GHRM integrates environmental sustainability into HR functions such as recruitment, training, performance appraisal, and reward, including recruitment, training, performance management, and remuneration (Javed et al., 2024; Tran, 2023).

Furthermore, corporate sustainability is increasingly driven by the need for organizations worldwide to consider environmental and social factors in their strategies. This shift is especially important for small and medium-sized enterprises (SMEs), which face resource limitations while simultaneously having a substantial impact on the environment (Alfadel et al., 2025).

In developing countries such as Pakistan, SMEs with a focus on climate require strategic processes to overcome sustainability pressures and gain a competitive advantage (Shahbaz & Malik, 2025). These challenges are particularly evident in climate-oriented SMEs in Karachi, one of the most important industrial areas. Despite this, the aspect of human resource management from a sustainability perspective in this sector remains extremely under-researched. The current literature on Green Human Resource Management (GHRM) in Pakistan has largely focused on large organizations or sectors such as banking and healthcare. Therefore, Green Human Resource Management (GHRM) has emerged as an important strategic asset for achieving organizational sustainability outcomes.

Nevertheless, the direct association between GHRM activities and ultimate sustainability performance is often mediated by psychological processes, particularly Green Work Engagement (GWE) (Alfadel et al., 2025). GWE, where employees are energetic, committed, and focused on green activities, plays a critical role in translating policies into green behaviors (Marini et al., 2023). Although existing literature demonstrates that GHRM practices predict GWE, there is limited empirical clarity regarding this relationship in Pakistani SMEs (Ali, 2023).

This study is motivated by three specific and interconnected gaps. First, a contextual gap: the dominance of GHRM studies in large companies and in developed or East Asian markets contrasts with climate-oriented Pakistani SMEs, which represent a different institutional setting that remains empirically underexplored (Huo et al., 2022; Singh et al., 2020). Second, a mediating gap: while both SET and JD-R theory suggest that GHRM influences sustainability through employee motivational states, GWE has not been empirically validated as a mediating factor in the GHRM organizational sustainability relationship in Pakistani SMEs, despite being identified in prior systematic reviews (Jiang et al., 2012; Jiang et al., 2023). Third, a measurement gap: the

literature often conceptualizes employee engagement in a generic manner, without adequately addressing green-specific psychological aspects namely vitality, dedication, and involvement in environmentally related activities which carry distinct theoretical and practical implications for sustainability management (Schaufeli et al., 2002; Tang et al., 2018).

1.1. Research Questions

RQ1: How do GHRM practices influence organizational sustainability in climate focused SMEs in Pakistan?

RQ2: Is there a positive impact of GHRM practices on work engagement among employees in climate-oriented SMEs?

RQ3: Does work engagement play a role in organizational sustainability in climate-oriented SMEs?

RQ4: Is the relationship between GHRM practices and organizational sustainability mediated by work engagement

2. Literature Review

2.1. Green Human Resource Management (GHRM)

Green Human Resource Management is being seen as a strategic need that is important to the organization that is trying to incorporate environmental sustainability and human resource operations (Zihan & Makhbul, 2024). The GHRM can be referred to as the rational inclusion of the concept of environmental sustainability into the conventional HR operations, including recruitment, selection, training and development, performance appraisal, compensation, employee engagement, and relations (Abualigah et al., 2023). Precisely, although the incorporation of green practices in the HRM strategies has been identified as a tool of improving environmental performance. (Shahrulnizam et al., 2024), there is a lack of knowledge of its direct impact on green work engagement in the Pakistani SME setting. GHRM core practices consist of green recruitment and selection (attracting greener-friendly candidates), green-training and development (enhancing greener skills and awareness), sustainability-based performance evaluation, green rewards and compensation (rewarding and recognizing environmental performance) and policies that promote a greener workplace culture (Abualigah et al., 2023; Khan et al., 2025).

2.2. Green Work Engagement (GWE)

The definition of work engagement is a positive, satisfying, work-related state of mind that is full of energy, devotion and obsession (Schaufeli et al., 2002). GWE is the state of vitality, commitment, and involvement of a worker in activities, which concerns the sustainability program of a workplace (Marini et al., 2023). Therefore, it is the effort that employees seek to facilitate an environmentally friendly work environment by investing in this area both on a cognitive, emotional and physical level (Marini et al., 2023). This literature review will bring together the existing studies on employee work engagement, its theoretical basis, empirical evidence, and practical consideration in various settings. Nevertheless, there is also a marked contextual gap in the existing literature in knowing what exactly drives and what are the consequences of employee engagement in a particular industrial environment, i.e. the financial industry, where green practices

and sustainability of the environment are becoming more prominent (Akter et al., 2021; Tran, 2023). The theoretical bases that have been used to support these kinds of relationships are the Resource based view (RBV) and the Social Exchange Theory (SET). According to SET, employees should return the perceived organizational investments (such as GHRM) with related engagement efforts (Aboramadan, 2022; Tran, 2023).

2.3. Organization Sustainability (OS)

The concept of organizational sustainability has become a central theme of modern business. The push to make organizations environmentally friendly by considering the ecological and social effects of the business activities is further motivated by growing global consciousness in the context of ecological and social implication of business activities (Marini et al., 2023). The three pillars of sustainable development are sustainability comprising of environmental performance, social responsibilities and economic feasibility (Zihan & Makhbul, 2024). This holistic view is a combination of environmental stewardship, social equity and economic prosperity, which complies with the extended ideals of sustainable development (Hofer et al., 2024).

2.4. Green Human Resource Management and Green Work Engagement

This literature review is systematic in exploring the available literature on the topic of GHRM and the critical role of the practice in enhancing Green Work Engagement in organizations (Shahrulnizam et al., 2024). The GHRM practices are recognized as the primary factor driving GWE Implementing competent HR practices promotes the possibility of employees getting more engaged in their job, which results in increased performance and positive attitudes (Alfadel et al., 2025). The Social Exchange Theory is a theory that proposes that employees are most likely to reciprocate positive HR practices through greater commitment and engagement (Alfadel et al., 2025). Therefore, by showing a willingness to manage the environment through GHRM practices organizations expect employees to show commitment to these practices by also demonstrating GWE (Tran, 2023).

2.5. Green Work Engagement and Organizational Sustainability

Green Work Engagement plays a significant role in translating organizational sustainability strategies into tangible environmental outcomes on employee performance in an eco-friendly environment (Adeel et al., 2022). Highly engaged employees working on green work are likely to embrace sustainable practices, minimize waste, conserve resources and be actively involved in environmental efforts. Their involvement improves the success of sustainability programs because it makes them stable and dedicated to implementation at the operational level. Work engagement is associated with emotional and cognitive engagement in work which is typified by vigor, dedication, and absorption (Dirjo, 2025).

2.6. GHRM & Organization Sustainability

The proposed review will focus on summarizing the current studies on the role of GHRM initiatives in promoting the sustainability of organizations and the green engagement of workforce.

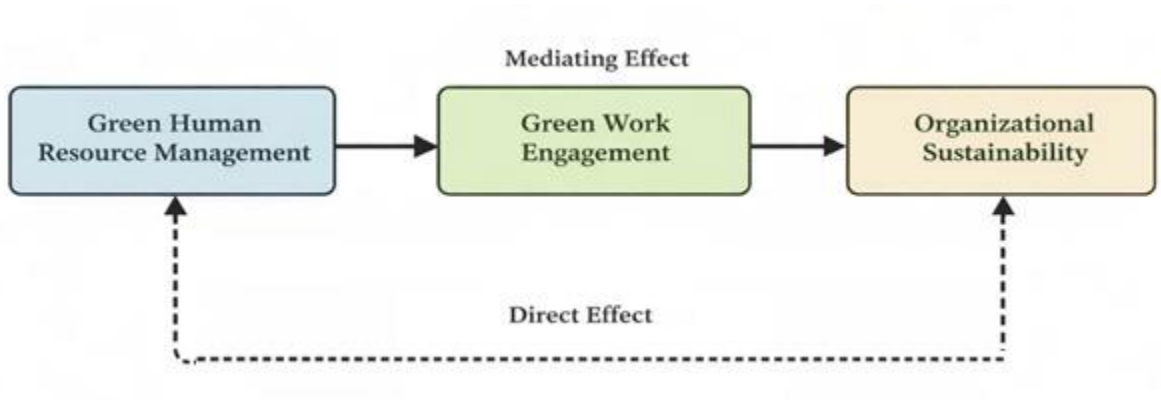
Longitudinal research designs provide strong means of investigating the effects of the GHRM practices on the behavior of the employees and the sustainability of the organization over time and offer dynamic and causal research that cannot be done with cross-sectional studies (Omolo, 2025). However, Green HRM is regarded as an essential resource to enhancement of work engagement and promotion of sustainable practices in the organizations (Baykal & Bayraktar, 2022; Islam et al., 2025).

2.7. Mediating Role of Green Work Engagement

GWE, a work-related, positive, energized state that is specifically oriented towards pro-environmental tasks and activities, has been proposed as a micro-level process that may be used to explain how GHRM gets converted to Organizational Sustainability (OS) (Putri et al., 2023). The mediation hypothesis is theoretically based on the Social Exchange Theory and the Job Demands-Resources (JD-R) framework: GHRM provides the green resources and conveys organizational support which are subsequently returned by the employees through providing effort and concentration in green work and this increased involvement then leads to the outcome of sustainability.

2.8. Conceptual Framework

Figure 1: Research Model



2.9. Hypothesis Development

H1: Green Human Resource Management has a significant positive effect on Green Work Engagement

H2: Green Human Resource Management has a significant positive effect on Organizational Sustainability

H3: Green Work Engagement has a significant positive effect on Organizational Sustainability

H4: Green Work Engagement mediates the relationship between Green Human Resource Management and Organizational Sustainability

3. Research Methodology

The present study adopts a quantitative research design using a cross-sectional survey approach to examine the hypothesized relationships among GHRM, GWE, and Organizational Sustainability (OS). A quantitative methodology is appropriate for this study as it enables the empirical testing of theoretical relationships between variables through statistical analysis, thereby ensuring objectivity and generalizability of findings (Creswell et. al., 2003). The cross-sectional design allows for the collection of data at a single point in time, which is suitable for assessing the associations among constructs within a specific organizational context.

Data were collected from a sample of 212 employees working in climate-focused SMEs in Karachi, Pakistan. The study employed a convenience sampling technique due to accessibility constraints and the absence of a comprehensive sampling frame for climate-focused SMEs. Although non-probability sampling may limit generalizability, it is widely accepted in organizational research where access to respondents is restricted (Etikan et al., 2016).

The selected sample size is considered adequate for PLS-SEM analysis. PLS-SEM is particularly suitable for complex research models involving multiple constructs and relationships, and it is robust with relatively small to medium sample sizes (Hair et al., 2019). Moreover, PLS-SEM does not impose strict normality assumptions, making it appropriate for behavioural research contexts. All constructs in this study were measured using validated scales adapted from prior literature, ensuring content validity and reliability.

Responses were captured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), which is commonly used in social science research to measure attitudes and perceptions. The use of standardized measurement scales enhances the reliability and comparability of the findings.

4. Results and Findings

Table 1: Demographic Profile of Respondents

Variable	Category	Frequency	Percentage %
Gender	Male	98	46.2%
	Female	114	53.8%
Experience	1-5 years	72	34.0%

	6–10 years	81	38.2%
	11 years and above	59	27.8%
Total		**212**	**100%**

Demographic details of the survey participants are described in Table 1. Out of the total respondents, 53.8% were females, whereas 46.2% were males. In terms of working experience, most of the respondents, 38.2%, belonged to the 6-10 years' experience category; 34% had 1-5 years' experience; 27.8% respondents had more than 11 years of experience.

Additionally, SEM was applied to test the study hypotheses with the help of SmartPLS software. PLS-SEM is extensively applied in social science research because it enables the estimation of several endogenous and exogenous variables simultaneously (Hair et al., 2019).

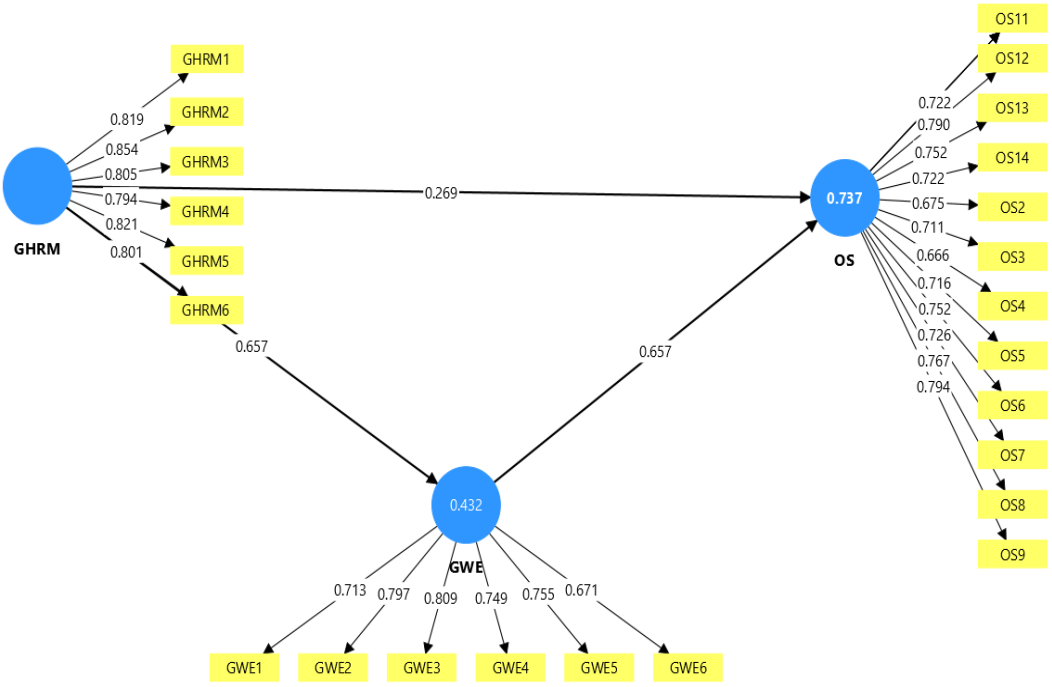
Table 1: Descriptive Statistics of Measurement Items

Name	Mean	Median	Scale min	Scale max	Observed min	Observed max	Standard deviation	Cramér-von Mises p value
GHRM1	3.472	4	1	5	1	5	1.155	0
GHRM2	3.467	4	1	5	1	5	1.113	0
GHRM3	3.585	4	1	5	1	5	1.076	0
GHRM4	3.528	4	1	5	1	5	1.034	0
GHRM5	3.472	4	1	5	1	5	1.113	0
GHRM6	3.476	4	1	5	1	5	1.088	0
GWE1	3.665	4	1	5	1	5	1.031	0
GWE2	3.745	4	1	5	1	5	1.073	0
GWE3	3.731	4	1	5	1	5	0.905	0
GWE4	3.731	4	1	5	1	5	0.98	0
GWE5	3.816	4	1	5	1	5	0.995	0
GWE6	3.67	4	1	5	1	5	0.969	0
OS1	3.552	4	1	5	1	5	1.074	0
OS2	3.642	4	1	5	1	5	1.07	0
OS3	3.656	4	1	5	1	5	1.032	0
OS4	3.66	4	1	5	1	5	0.999	0
OS5	3.472	4	1	5	1	5	1.075	0
OS6	3.712	4	1	5	1	5	1.013	0

OS7	3.759	4	1	5	1	5	0.968	0
OS8	3.726	4	1	5	1	5	1.051	0
OS9	3.59	4	1	5	1	5	1.058	0
OS10	3.406	4	1	5	1	5	1.084	0
OS11	3.604	4	1	5	1	5	0.923	0
OS12	3.547	4	1	5	1	5	0.987	0
OS13	3.604	4	1	5	1	5	0.973	0
OS14	3.679	4	1	5	1	5	0.977	0

Table 2 shows the descriptive statistics of the study variables. The average values reveal that the respondents mostly had moderate to high perceptions on GHRM, GWE and Organizational Sustainability. The values of standard deviation indicate a reasonably good variability in responses, and the lowest and highest values indicate that all the responses are within the anticipated range of measurement.

Figure 2: Structural Equation Model



The positive impact of GHRM on GWE is significant (β =657, $p < 0.001$), which means that green-oriented HR practices positively affect the engagement of employees in environmentally responsible work behavior. There is a significant positive direct effect of GHRM on Organizational Sustainability, which indicates that green HR activities have a direct impact on sustainable organizational performance.

Moreover, GWE has a significant positive effect on Organizational Sustainability (β = 0.657, p < 0.001), which emphasizes the importance of the green engagement of employees in the process of the realization of sustainability goals. This model predicts a significant amount of variance in GWE (R^2 = 0.432) and OS (R^2 = 0.737). The mediation analysis supports that Green Work Engagement is a partial mediating variable between GHRM and Organizational Sustainability as the indirect effect is both positive and significant (β = 0.432, p < 0.001).

Table 2: Indicator Reliability (Outer Loadings)

	Outer loadings
GHRM1 <- GHRM	0.819
GHRM2 <- GHRM	0.854
GHRM3 <- GHRM	0.805
GHRM4 <- GHRM	0.794
GHRM5 <- GHRM	0.821
GHRM6 <- GHRM	0.801
GWE1 <- GWE	0.713
GWE2 <- GWE	0.797
GWE3 <- GWE	0.809
GWE4 <- GWE	0.749
GWE5 <- GWE	0.755
GWE6 <- GWE	0.671
OS1 <- OS	0.66
OS10 <- OS	0.722
OS11 <- OS	0.693
OS12 <- OS	0.79

OS13 <- OS	0.752
OS14 <- OS	0.722
OS2 <- OS	0.675
OS3 <- OS	0.711
OS4 <- OS	0.666
OS5 <- OS	0.716
OS6 <- OS	0.752
OS7 <- OS	0.726
OS8 <- OS	0.767
OS9 <- OS	0.794

Table 3 depicts all measurement items that had reasonable loadings, which surpasses the recommended minimum of 0.60 (Hair et al., 2019). Despite some indicators showing loading slightly lower than 0.70, they were retained because of their theoretical relevance and acceptable level of composite reliability and AVE (Hair et al., 2019). The external loadings of the GHRM were between 0.794 and 0.854, GWE was between 0.671-0.809 and Organizational Sustainability was between 0.666-0.794.

Table 3: Internal Consistency Reliability

	Cronbach's alpha	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**	**Average variance extracted (AVE)**
GHRM	0.899	0.9	0.923	0.666
GWE	0.844	0.848	0.885	0.564
OS	0.931	0.932	0.94	0.527

According to Table 4, the constructs were all higher than the recommended level of 0.70 (Hair et al., 2019). The alpha of Cronbach was between 0.844 and 0.931 and composite reliability was between 0.885 and 0.940. These findings show that the measurement scales have strong internal consistency and reliability. Furthermore, Table 4 indicates that all constructs have obtained an AVE of over the desirable polarity of 0.50, which implies that convergent validity is satisfactory (Hair et al., 2019). In particular, the AVE values of GHRM (AVE = 0.666), GWE (AVE = 0.564), and Organizational Sustainability (AVE = 0.527) reveal that the indicators

adequately explain the variance of their respective constructs of the corresponding constructs in explaining the variance is high enough to be considered satisfactory**.**

Table 4: Discriminant Validity

	GHRM	**GWE**
GWE	0.75	
OS	0.765	0.939

The Heterotrait-Monotrait (HTMT) ratio was used to measure discriminant validity, and it is regarded as a strong measure of assessing the discriminant validity in PLS-SEM (Hair et al., 2019). The construct pair of GHRM-GWE has HTMT values below the conservative value of 0.90 as shown in Table 5, which depicts satisfactory discriminant validity. Despite the HTMT value of 0.90, suggesting less than optimal value, GWE and Organizational Sustainability would still be constructed while maintaining a degree of distinction and some level of convergent validity.

The PLS-SEM guidelines were followed as the evaluation was done using bootstrapping with 5,000 resamples to measure the path coefficients, coefficients of determination (R^2), and indirect effects.

Table 5: Collinearity Assessment

	VIF
GHRM1	2.446
GHRM2	2.948
GHRM3	2.171
GHRM4	2.069
GHRM5	2.333
GHRM6	2.078
GWE1	1.592
GWE2	2.026
GWE3	2.123
GWE4	1.785
GWE5	1.787
GWE6	1.472
OS1	2.192
OS10	2.757
OS11	2.321
OS12	2.689
OS13	3.081
OS14	2.927
OS2	2.398

OS3	2.369
OS4	1.966
OS5	1.986
OS6	2.311
OS7	2.208
OS8	2.563
OS9	2.997

Table 6 indicates that all the VIFs of the predictor constructs are less than the recommended level. This means that multicollinearity is not an issue with the structural model and the path coefficients estimated can be interpreted with confidence.

Table 6: Path Coefficients

	Original sample (O)	**T statistics (|O/STDEV|)**	**P values**	**Decision**
GHRM -> GWE	0.657	12.755	< 0.001	Supported
GHRM -> OS	0.269	4.807	< 0.001	Supported
GWE -> OS	0.657	11.764	< 0.001	Supported

To begin with, there is a significant and positive impact of Green Human Resource Management (GHRM) on Green Work Engagement (GWE) (β =0.657, $p < 0.001$). This finding indicates that an organization that successfully adopts green HR closely increases the engagement of employees in the management of the environmentally responsible work practices, thus supporting Hypothesis 1.

Secondly, Organizational Sustainability (OS) is another variable that is impacted by Green Human Resource Management significantly ($\beta = 0.269$, $p < 0.001$). This observation shows that green-oriented HR practices have a direct impact on sustainability results, as they facilitate the organization of the environmentally and socially responsible practices, which is in support of Hypothesis 2. Third, the findings indicate that the positive impact of Green Work Engagement on Organizational Sustainability is significant (β=0.657, $p < 0.001$). This means that high involvement employees to green work activities are important in converting sustainability programs to positive organizational performances, hence endorsing Hypothesis 3.

Table 7: Coefficient of Determination (R^2)

	R-square	R-square adjusted
GWE	0.432	0.429
OS	0.737	0.734

Table 8 indicates that Green Human Resource Management can account for 43.2% of the variance of GWE ($R^2 = 0.432$) which represents a moderate degree of explanatory power. Moreover, GHRM and GWE together explicate 73.7% of Organizational Sustainability variance ($R^2 = 0.737$) which depicts a large degree of explanatory potential. These results indicate that the proposed model is a good explanation of the organizational sustainability outcomes.

Table 8: Mediation Analysis

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
GHRM -> GWE -> OS	0.432	0.432	0.044	9.756	< 0.001

The outcomes of the indirect effects reveal that Green Work Engagement has a positive and significant indirect impact on Organizational Sustainability, which is caused by Green Human Resource Management ($\beta = 0.432$, $p < 0.001$). Thus, the findings suggest partial mediation, which proves Hypothesis 4.

5. Discussion and Conclusion

This paper analyzed how GHRM practices, GWE determine Organizational Sustainability (OS) in 212 employees working in climate-focused SMEs in Karachi, Pakistan. All four hypotheses were well supported by the PLS-SEM analysis. Results were subsequently discussed in reference to each research question and related findings to high-impact literature and to draw theoretical and practical implications, before finally considering limitations of the study. This study provides empirical evidence that GHRM significantly contributes to Organizational Sustainability through both direct and indirect mechanisms in climate-based Pakistani SMEs. Using the PLS-SEM analysis using 212 employees, the results endorse that GHRM strongly predicts Green Work Engagement ($\beta=0.657$, $R\ 2 = 0.432$) and has a direct impact on OS ($\beta = 0.269$); GWE is the strongest predictor of sustainability performance (0.657), and that GHRM has a significant indirect impact.

The analytical high ground of the study is to empirically substantiate the theoretical position of Green Work Engagement as the psychological process on the micro-level that transforms the macro-level GHRM investments into the outcomes of organizational sustainability, a mediation mechanism that has been theorized long ago, but finally to be tested in the SME sector of Pakistan. The fact that the indirect effect is significantly greater than the direct one (0.432 > 0.269) makes it clear that organizational sustainability, in particular is primarily a human dimension issues green policies cannot have the desired effect unless green nature adaptive people are found, who are energized, committed and preoccupied with environmental issues. Future longitudinal, multi-source and cross-national studies based on this framework will further explain the boundary conditions, causal dynamics and generalizability of such findings, enhancing the scholarly knowledge and practical application of the GHRM.

5.1 Theoretical Implications.

The result that GHRM is a significant and positive predictor of GWE which is 0.657, $p < 0.001$; = 0.432 also answers RQ2 and validates the Hypothesis 1. This finding is well rooted in the Job Demands-Resources (JD-R) model that hypothesizes that organizational resources, such as green human resource practices, such as eco-training, sustainability-based appraisal, and environmental rewards, would create an inspirational process that increases the psychological energy, commitment and absorption of employees in their activities (Bakker & Demerouti, 2017)

Furthermore, The Social Exchange Theory predicts that in response to GHRM practices that are viewed as organizational investments in environmental values, employees will incorporate green behaviors in return by demonstrating their efforts cognitively, affectively, and behaviorally in environmentally oriented work (Dumont et al., 2017; Hameed et al., 2020). The level of the path coefficient (0.657) is also in line with meta-analytic estimates that relate bundles of HR practice to engagement, and which have come up with corrected correlations ranging between 0.40 and 0.65 in various organizational settings (Jiang et al., 2012). Additionally, proximity between employees and owners in the SME context implies that the symbolic weight of the green HR messages can be stronger, which enhances their motivational impact in comparison to large bureaucratic organizations hence a contextual effect that enriches the current theory (Tang et al., 2018).

Responding to RQ1, the direct impact of GHRM on OS ($\beta = 0.269$, $p < 0.001$) is significant and makes Hypothesis 2 true, as well as in agreement with strategic HRM theory. Based on the HR Performance pathway developed by K. Jiang et al. (2012), HR systems can affect organizational outcome with both ability-building (green skills) and motivation enhancing (green norms), approaches. The immediate institutional route, in which green recruitment protects green talent, in which green training instils eco-competency, and sustainability-related rewards institutionalize green standards, creates a sustainability benefit, without involving the psychological engagement route. Therefore, the two-pathway structure, which GHRM has a direct ($\beta = 0.269$) and indirect effect ($\beta = 0.432$) on OS, would, therefore, indicate the multi-level

characteristics of the HR-performance relationship that have been reported in high-impact strategic HRM literature (Jiang et al., 2012; Singh et al., 2020).

The dominance of GWE in the structural model (β = (0.657, p < 0.001; R 2 = 0.737) is relevant to RQ3 and supports Hypothesis 3. The high explained variance (73.7) indicates the theoretical thoroughness of the GHRM-GWE-OS mediation model. Active (as opposed to passive) sustainability participants are engaged employees: they are energetic, committed, and engaged in green work arrangements, they are conservers of resources, minimizers of waste, green innovators, and implementers of ecological activities in everyday work (Bakker & Demerouti, 2017; Schaufeli et al., 2002).

The highly impactful partial mediation of GWE (indirect β = 0.432, p < 0.001) answers RQ4 and is the most important theoretical contribution of the study, which proves Hypothesis 4. The fact that GHRM has a dual channel of operation, including direct institutional channel, and a predominant psychological channel, mediated by green engagement, suggests the existence of partial mediation. The indirect effect is higher than the direct GHRM-OS effect (0.432 > 0.269) confirming that the human motivational channel, rather than structural policy in isolation, is the main driver of creating sustainability performance created by GHRM. This extends (Jiang et al., 2023) results connecting environmental HR practices with sustainability results via psychological processes and supports Dumont et al. (2017) evidence of psychological mediation between HR and green behavior relationship, which now also relates to the context of sustainability of SMEs.

5.2 Practical Implications

The results suggest that climate focused SMEs need to embed environmental sustainability in their HR processes, such as green recruitment, training, performance evaluation, and reward systems. There is a need to motivate employees to engage in sustainability initiatives to further develop the sustainability performance and Green Work Engagement of the organization. Environmental commitment can be strengthened using green KPIs, environmental training, and participative environmental initiatives in organizations.

5.3 Limitations and Future Research Directions

There are four methodological and contextual constraints that would have to be recognized to put the study within reasonable limits and map out fruitful research directions in the future. First, cross-sectional research design, when all GHRM, GWE, and OS were measured one time point at time, does not allow conclusive causation conclusions. Though the hypothesis direction of causation (GHRM, GWE and OS) is theoretically informed within the JD-R model as well as SET, in-spite of the fact that the PLS-SEM results support the specification by statistical probability, a cross-sectional study design fails to confirm against the possibility of causality going the other way, such as more sustainable organizations using more advanced GHRM practices (Bakker & Demerouti, 2017). The future studies will apply experience-sampling or longitudinal panel design that will monitor changes in the GHRM practices, GWE and the OS indicators over time to allow causal attribution as well as determine the time lag within which change in HR

practice will be transformed into the sustainability outcomes. Second, convenience sampling based on climate-focused SMEs that were concentrated at Karachi, the commercial and industrial centre of Pakistan was used to draw the sample. Although the institutional, regulatory and cultural environment of Karachi might also be inconsistent with other Pakistani cities and regions, it is also possible that Karachi, being the largest and most climate exposed urban economy, has a different institutional, regulatory, and cultural environment. The interpretation should thus be taken as specific to the context, not as the nations; further researchers are advised to use stratified probability sampling in numerous regions and industries to estimate the extent to which the GHRM-GWE-OS framework is generalizable.

Thirdly, employee perceptions rated on Likert-type scales were used to measure all three constructs, GHRM, GWE and OS, which results put the likelihood of common method variance (CMV) to exaggerate observed relationships (Podsakoff et al., 2003). Despite the fact that PLS-SEM multi-construct measurement architecture helps to minimize the worst cases associated with CMV, future studies may enhance construct validity more by diversifying self-reported OS with more objective measures of environmental performance, i.e. through employee-reported GHRM and GWE perceptions, across management assessment of HR practice implementation, and incorporating triangulation of self-reported OS with objective indicators of environmental performance. Fourth, the model fails to consider the possible moderating factors that theory and previous literature indicate may enhance or decrease the GHRM-GWE-OS relationships. Much of the theoretical plausibility of the study of the perspectives of the following are green organisational culture, environmental leadership exercised by supervisors, the pre-existing personal environmental values of the employees, the level of intensity of regulatory enforcement as well as the age of the firm are all hypothetically plausible as boundary conditions that have not been addressed in the research (Dumont et al., 2017; Jiang et al., 2012). Future studies that include these moderators (such as trying to establish whether the GHRM GWE association is greater in organizations having high green cultures or in organizations with strict regulatory systems) would build up the theoretical representation and provide more accurate management guidelines.

6. References

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