

Impact of GHRM on Organizational Performance: Analyzing the Mediating Role of Green Innovation and moderating Role of Green Strategy in the Relationship between GHRM and Organizational Development

Sania Matloob¹, Abdul Ghafoor Awan², Sundas Matloob³,
Ramis Matloob⁴ and Ayesha Rashid Khan⁵

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Abstract

This study examines the relationship between Green Human Resource Management (GHRM) practices and organisational performance, with a focus on the role of green innovation and green strategy in shaping this relationship. Data were gathered from 400 employees serving in 14 prominent manufacturing firms in Pakistan. The analysis employed structural modelling techniques, incorporating mediation and moderation variables, to diagnose their role in the relationship between GHRM and organisational performance. The findings reveal that GHRM has a strong and positive impact on organisational performance. Moreover, the results highlight that green innovation acts as a significant mediating channel, while the existence of a well-defined green strategy serves to fortify this relationship as a moderator. The findings provide empirical support for the Resource-Based View (RBV) theory by establishing that human capital represents a significant intangible resource, and they also strengthen the Natural Resource-Based View (NRBV) by demonstrating that integrating ecological strategies with innovation enhances the effectiveness of HRM practices. Collectively, the study underscores the importance of aligning GHRM with ecological objectives and innovative capability to achieve sustainable organisational performance.

Keywords: Green HRM Practices; Green Innovation; Green Strategy; Green Culture.

Introduction

The escalating ecological crisis and global focus on sustainability are compelling businesses to integrate environmental concerns into their operations (Famiyeh et al., 2018). In this context, green innovation (GI)—the creation of products and processes that mitigate ecological harm—is vital

¹MS Business Administration, Department of Business Administration, University of Southern Punjab, Multan, Pakistan. Email: saniamatloob7@gmail.com

²Dean, Faculty of Social Sciences, University of Southern Punjab, Multan, Pakistan.

Corresponding Author Email: drabdulghafoorawan@gmail.com

³PhD Scholar, School of Economics and Management, Anhui University of Science and Technology, China.

Email: sundasmatloob@outlook.com

⁴Batchelor in Information Technology, Government College University Faisalabad, Layyah Campus, Pakistan.

Email: Raimisheikh3706@gmail.com

⁵Assistant Professor, Department of Business Administration, University of Southern Punjab, Multan, Pakistan.

Email: Ayesharashidkhan123@gmail.com



for long-term development. Concurrently, Green Human Resource Management (GHRM) embeds sustainability into HR practices, enabling employees to support ecological goals (Renwick et al., 2012; Awan & Wamiq, 2016; Chowdhury et al., 2025). A green strategy (GS) provides the essential framework, embedding these environmental objectives into core decision-making to align sustainability with long-term aims (Porter & Van der Linde, 1995; Awan & Shahid, 2015; Fiza & Awan, 2025).

While GI has evolved into a strategic necessity that boosts efficiency and compliance (Chen, 2023), its success relies on a skilled workforce fostered by GHRM (Jabbour & Santos, 2008). The GS acts as the overarching mechanism that connects and amplifies these initiatives (Al-Zu'bi & Albloush, 2022). However, the combined effect of GHRM, GI, and GS on organisational performance remains underinvestigated, especially in emerging economies like Pakistan, which face severe environmental challenges but lack robust sustainability infrastructures (McCarthy & Kathryn, 2016). Prior research often examines these elements in isolation, creating a gap in understanding their interactive, systemic impact. This study addresses this gap by empirically testing a moderated mediation model where GI mediates the GHRM-performance relationship, and GS moderates this dynamic. Hence, the study has constructed the following research questions to explore direct and indirect relationships among variables.

- What is the direct impact of GHRM practices on organisational performance?
- How does green innovation (GI) mediate the relationship between GHRM and organisational performance?
- To what extent does green strategy (GS) moderate the effect of GHRM on organisational performance (OP) through green innovation (GI)?
- How can green HRM, innovation, and strategic sustainability practices be integrated to improve organisational performance?

Exploring these research questions will enable us to understand how green HRM practices, green innovation and green strategy influence organisational performance.

Literature Review

Theoretical Underpinning

This study draws on the Resource-Based View (RBV), which argues that competitive advantage arises from resources and capabilities that are valuable, rare, and difficult to imitate (Barney, 1991). GHRM contributes to such capabilities by equipping employees with environmental knowledge and skills that differentiate the organisation. Practices such as green recruitment, training, and performance management create an environmentally competent workforce that strengthens competitive advantage. The Natural Resource-Based View (NRBV) builds on RBV by emphasising sustainability as a pathway to long-term advantage (Hart, 1995). Ability–Motivation–Opportunity (AMO) theory also relates to this study because it emphasises that employees must possess the required knowledge, skills, and competencies to perform their jobs. Further, they are willing and motivated to apply their knowledge and skills in their work assignments, and they must be given opportunities to participate and contribute significantly to organisational performance.

Empirical Analysis and Hypothesis Development

Green Human Resource Management (GHRM)

GHRM combines environmental management with HR practices to embed sustainability within organisations. Its key practices—green recruitment, training, appraisal, and compensation—shape

employee behaviours consistent with environmental objectives, fostering a culture of sustainability (Renwick et al., 2013). Studies suggest that embedding GHRM in corporate strategy enhances environmental performance, job satisfaction, and organisational effectiveness (Hristov, Appolloni, & Chirico, 2022). Hence, we propose the first hypothesis as:

H1: GHRM is positively associated with organisational performance.

Green Innovation (GI)

GI refers to innovations in products, processes, or organisational practices that reduce ecological harm and promote sustainability. Tuan (2023) categorises GI into product, process, and organisational innovation. For instance, green product innovation emphasises eco-friendly materials, energy efficiency, and recyclability. GI provides not only environmental benefits but also competitive advantages, as it meets consumer demand for sustainable products and supports regulatory compliance (Chen, 2023; Fiza & Awan, 2025). The study demonstrates that green innovation is a critical driver of both ecological and economic performance (Le, 2022; Fliaster & Kolloch, 2017), Yusuf (2021). Therefore, we can suggest a second hypothesis:

H2: GI mediates the relationship between GHRM and organisational performance.

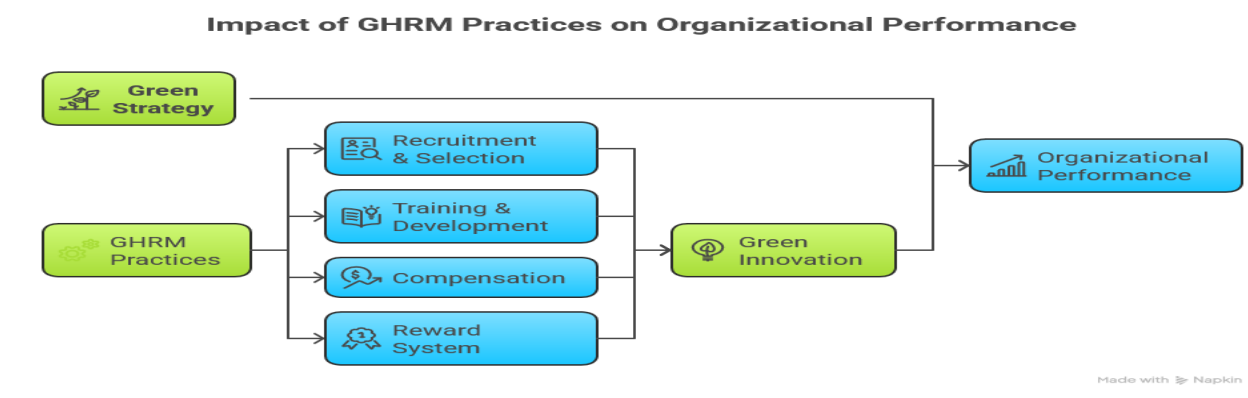
Green Strategy (GS)

This strategy involves the systematic incorporation of environmental priorities into organisational decision-making and operations. Such methods include waste reduction, emission control, and environmental management systems, which improve efficiency and legitimacy (Al-Zu'bi & Albloush, 2022). In contexts such as Indonesia and Pakistan, where deforestation and climate-induced disasters create enormous social and economic costs, GS becomes particularly significant (McCarthy & Kathryn, 2016). Furthermore, GS strengthens organisational identity and legitimacy, signalling a commitment to sustainability and earning stakeholder trust (Awan & Wamiq, 2016; Rejeki & Putra, 2024; Mukhtar et al., 2024). By aligning environmental practices with long-term objectives, green strategy enhances the performance impact of green innovation (Awan & Shahid, 2015). Hence, we can propose a third hypothesis

H3: A green strategy positively moderates the relationship between GHRM and organisational performance.

Conceptual Framework

We constructed a conceptual framework to determine hypothetical relationships between green HRM practices and organisational performance, mediated by green innovation and moderated by green strategy. The model is presented in Figure 1.

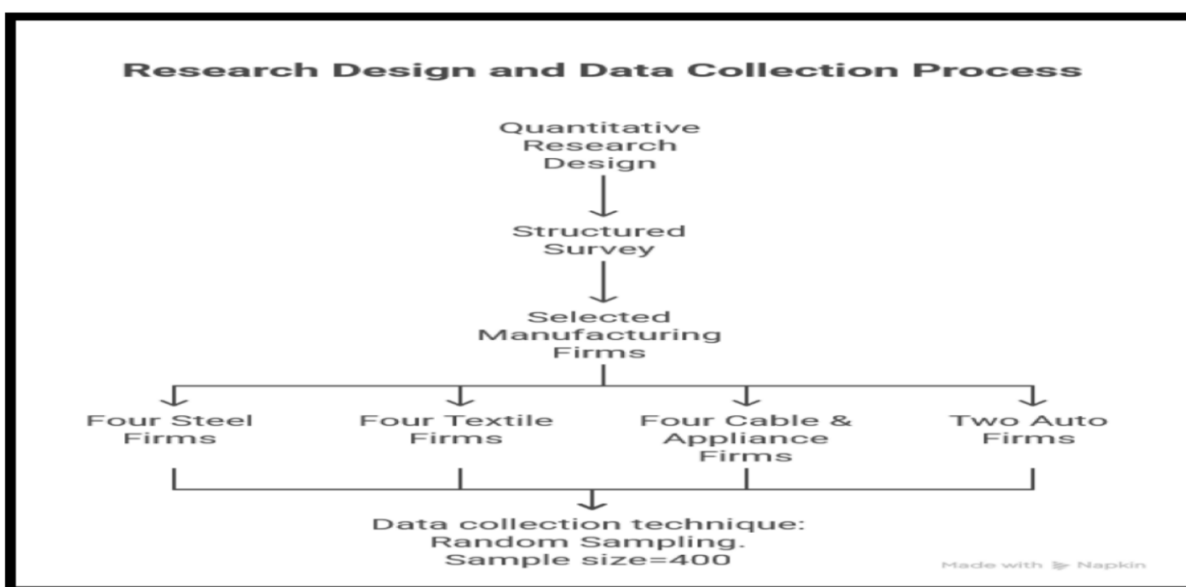
Figure 1: Research Model

Materials and Methods

This study investigates the influence of Green Human Resource Management (GHRM) practices on organizational performance within Pakistan's manufacturing sector, with a specific focus on the mediating role of green innovation and the moderating effect of green strategy. GHRM practices, defined as the integration of sustainability principles into HR policies to promote eco-friendly workplace behaviors served as the independent variables and was adopted from the studies of Hussain, (2018); Fawehinmi, (2019); Pham, (2020); Daily & Huang, (2021). Organizational performance was the dependent variable and adopted from the researches of Akpa, Asikhia, & Nneji, (2021) and Kaplan & Norton, (2023). The model positioned green innovation—the development of new products, processes, or business models that advance sustainability was chosen as mediator and was adopted from the studies of Schiederig & Herstatt, (2012); Fagerberg, (2023); Nidumolu, (2024) and Khan, (2024), while green strategy served as a moderator to strengthen relationship between GHRM, green innovation and organizational performance and this was adopted from the studies of Le, (2022); Peter Fisk, (2024); McKinsey & Company, (2023). The research employed quantitative design, utilizing a structured survey for primary data collection. The sample comprised 14 leading manufacturing firms from steel, textile, cable, home appliances, and automobile industries. A total of 450 questionnaires were distributed to employees with a minimum tenure of three years to ensure adequate exposure to company practices. Collaboration with HR departments in developing the sampling frame helped minimize selection bias (Creswell & Creswell, 2018). The survey instrument contained 26 items across four constructs: GHRM (8 items), green innovation (6 items), green strategy (5 items), and organizational performance (7 items). It was adapted from established scales and utilized a five-point Likert scale (Likert, 1932). Procedural remedies against common method bias included ensuring respondent anonymity (Podsakoff et al., 2003), maximizing item clarity, and strategically placing predictor and outcome variables in different survey sections (Podsakoff et al., 2012). Data collection concluded in July 2024, yielding 412 returned questionnaires. After screening, 400 complete responses were received, resulting in an 89% response rate. Harman's single-factor test confirmed that common method bias was not a concern (Podsakoff & Organ, 1986). The measurement model was rigorously tested for reliability and validity. Internal consistency was confirmed, with all constructs achieving Cronbach's alpha coefficients exceeding 0.70 (Nunnally & Bernstein, 1994). The 14 sampling firms include: four steel mills such as Mughal Steel Mills Ltd, Internal Steel Industries, Ittefaq Iron industries, and Ayesha Steel Mills Ltd, fours leading

textile manufacturing firms such as Nishat Textile Mills Ltd, Gul Ahmad Textile Mills Ltd, Towellers Ltd, and Reliance Weaving Mills Ltd, four cable and home appliances manufacturing companies such as Pakistan Cable Ltd, Pakistan Electron Ltd, Waves Homes Appliances Ltd, and EMCO industries Ltd, and two leading auto assembling firms such as Indus Motor Company Ltd, and Honda Car Ltd. Required data were collected from their employees. The research design of the study is presented in Figure 2.

Figure 2: Research design and data collection method



Results

Demographics Analysis

Demographic statistics in Table 1 provides primary context for explanation of study results. It supports researchers in evaluating the composition of the participant sample, diagnosing trends that could be related with social or occupational factors, and establishing whether the sample is representative of the targeted population (Babbie, 2021). This type of data also facilitates comparisons between different segments, e.g., those by gender, age, level of education, or occupation—to examine whether interactions among variables vary within these segments (Hair et al., 2019).

Table 1: Demographic Characteristics of participants (N = 400)

Attribute	N	%	Valid %	Cum.%
Gender – Male	219	54.8	54.8	54.8
Gender – Female	181	45.3	45.3	100.0
Age – < 30	93	23.3	23.3	23.3
Age – 30-40	141	35.3	35.3	58.5
Age – 41-50	94	23.5	23.5	82.0
Age – 51-60	72	18.0	18.0	100.0
Marital – Single	164	41.0	41.0	41.0
Marital – Married	194	48.5	48.5	89.5

Marital – Separated	25	6.3	6.3	95.8
Marital – Divorced	16	4.0	4.0	99.8
Marital – Widowed	1	0.3	0.3	100.0
Education – ≤ Senior H.S.	277	69.3	69.3	69.3
Education – Bachelor	50	12.5	12.5	81.8
Education – Master	56	14.0	14.0	95.8
Education – M.Phil	17	4.3	4.3	100.0
Experience – < 3 yrs	100	25.0	25.0	25.0
Experience – 3-5 yrs	119	29.8	29.8	54.8
Experience – 6-10 yrs	138	34.5	34.5	89.3
Experience – > 10 yrs	43	10.8	10.8	100.0

The gender distribution is overall fairly even, with males at 54.8% and females at 45.3%, decreasing the likelihood of gender bias in results. In terms of age, the 30–40 years category (35.3%) dominates, followed by 41–50 years (23.5%), representing a mostly mid-career age group. Maritally, almost half of them (48.5%) are married and could be relevant for work–life balance issues in research on productivity or job satisfaction (Voydanoff, 2005). Educational attainment is skewed towards ≤ Senior High School (69.3%), consistent with the typical qualification profile in manufacturing sector. Only 4.3% hold M.Phil. degrees indicating that highly specialized academic qualifications are less common in this sample. Experience levels show a concentration in mid-career professionals, with 34.5% having 6–10 years of tenure and 29.8% having 3–5 years. This distribution suggests that the workforce is generally experienced, which may influence skill-related productivity outcomes (Ng & Feldman, 2010). No demographic subgroup falls below 3%, which supports the statistical reliability of subgroup analyses (Hair et al., 2019).

Reliability Analysis (Cronbach's α)

We check reliability of the questionnaire items to ensure that the measurement items for each construct consistently capture the same underlying concept. In other words, it assesses the internal consistency of a scale—whether different items intended to measure the same variable produce similar results. Without reliability, results may be unstable or inconsistent, reducing the credibility of findings (Tavakol & Dennick, 2011). Cronbach's alpha is a widely used test, with values ≥ 0.70 generally considered acceptable in social science research, especially for exploratory studies (Nunnally, 1978). Table 2 demonstrates the outcomes of Reliability test.

Table 2: Reliability test results

Construct	Cronbach's α
Green Innovation	0.721
Green Strategy	0.753
Organizational Performance	0.812
Human Resource Practice	0.765

The reliability analysis reveals that all four constructs surpass the recommended 0.70 threshold, indicating satisfactory internal consistency. Among them, Organizational Performance demonstrates the highest reliability ($\alpha = 0.812$), suggesting strong homogeneity among its items. Green Strategy ($\alpha = 0.753$) and Human Resource Practice ($\alpha = 0.765$) also exhibit robust reliability,

reflecting well-structured measurement scales. Green Innovation, while recording the lowest alpha ($\alpha = 0.721$), still meets the minimum acceptable standard, indicating that the items adequately capture the variables.

Convergent Validity & Multicollinearity

The results in Table 3 confirm both convergent validity and the absence of multicollinearity. Convergent validity, as suggested by Fornell and Larcker (1981), is established when the composite reliability (CR) exceeds 0.70 and the average variance extracted (AVE) is greater than 0.50. All four constructs—Green Innovation (CR = 0.72, AVE = 0.56), Green Strategy (CR = 0.76, AVE = 0.62), Organizational Performance (CR = 0.82, AVE = 0.71), and Human Resource Practice (CR = 0.78, AVE = 0.64)—meet these thresholds, indicating that their respective measurement items effectively represent the underlying latent variables. Notably, organizational performance has the highest AVE (0.71), reflecting stronger shared variance among its indicators, while green innovation, although lowest (AVE = 0.56), still falls within the acceptable range. Regarding multicollinearity, all variance inflation factors (VIF) values are well below the conservative cut-off of 3.3 proposed by Diamantopoulos and Siguaw (2006), ranging from 1.55 to 2.37. This suggests that the constructs are statistically independent enough to avoid distortion in parameter estimates, ensuring model stability.

Table 3: Convergent Validity & Multicollinearity

Construct	CA	CR	AVE	VIF
Green Innovation	.72	.72	.56	1.81
Green Strategy	.75	.76	.62	2.10
Organisational Performance	.81	.82	.71	1.55
Human Resource Practice	.76	.78	.64	2.37

Source: Authors own calculation

Discriminant Validity (HTMT & Cross-Loadings)

The results in Table 4 indicate that discriminant validity confirms each scale measures a distinct construct. According to the Fornell–Larcker criterion, the square root of the Average Variance Extracted (AVE) for each construct should exceed the inter-construct correlations, ensuring that a latent variable shares more variance with its indicators than with other variables (Fornell & Larcker, 1981). In this study, HTMT ratios are all below the conservative threshold of 0.85, and their 95% confidence intervals exclude 1.0, which meets the criterion suggested by Henseler et al. (2015) for discriminant validity. Additionally, cross-loading analysis shows that every indicator loads ≥ 0.70 on its intended construct and < 0.50 on any other construct, aligning with Hair et al.'s (2022) recommendations. These results collectively confirm that the constructs are empirically distinct, eliminating the need to merge or re-specify the scales.

Table 4: Discriminant Validity (Fornell–Larcker)

Variables	1	2	3	4
1. Green Innovation	.75			
2. Green Strategy	.45	.79		
3. Organizational Performance	.40	.50	.84	
4. Human Resource Practices	.35	.55	.60	.80

Structural Model (Direct Effects)

Table 6 shows the results of the structural model analysis which indicates that the green Human Resource management Practices exert the strongest direct and positive impact on organizational performance ($\beta = 0.290$, $p < .001$). This indicates that HR programs for sustainability such as ecological training programs, engaging workers in green goals, and integrating ecological measures into performance appraisals have a strong link with better outcomes (Jabbour & Renwick, 2020; Tang et al., 2018). Further, a statistically significant, albeit smaller, positive impact was noted for Green Strategy ($\beta = 0.045$, $p < .001$). This finding emphasizes that integrating sustainability into the fabric of a firm's strategic goals is positively related to enhance overall performance (Porter & van der Linde, 1995; Aragón-Correa & Sharma, 2003). Green Innovation exerts the smallest, yet significant, positive effect ($\beta = 0.032$, $p < .001$), implying that, while green innovations (such as green products, processes, and technologies) improve performance, their direct effect may be more modest compared to human resource and strategic factors (Dangelico & Pujari, 2010). The model explains 47% of the variance ($R^2 = 0.47$) in organizational performance, which indicates a moderate explanatory power (Cohen, 1988). The predictive relevance measure ($Q^2 = 0.32$) further confirms the model's ability to forecast performance outcomes, as values above zero denote its substantial predictive capability (Hair et al., 2019).

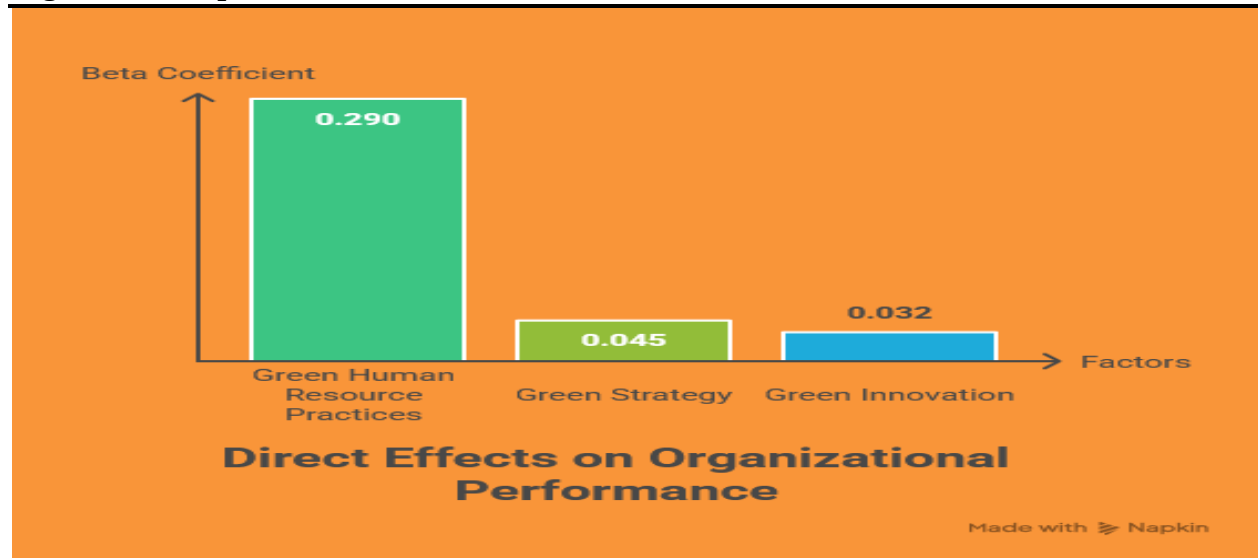
Table 5: Direct Effects on Organizational Performance

Predictor	Unstd. B	SE	Std. β	t	Sig.
Constant	1.119	.183	—	7.100	.001
Green Innovation	.035	.062	.032	3.75	.000
Green Strategy	.675	.063	.045	4.0	.000
Human Resource Practice	.303	.059	.290	5.126	.001

Model fit: $R^2 = .47$; $Q^2 = .32$ (Stone–Geisser).

The direct impact of Green HRM practices, green innovation and green strategy on organizational performance can be observed in Figure 3.

Figure 3: Direct impact of green HRM practices, Green strategy and green Innovation on organizational performance



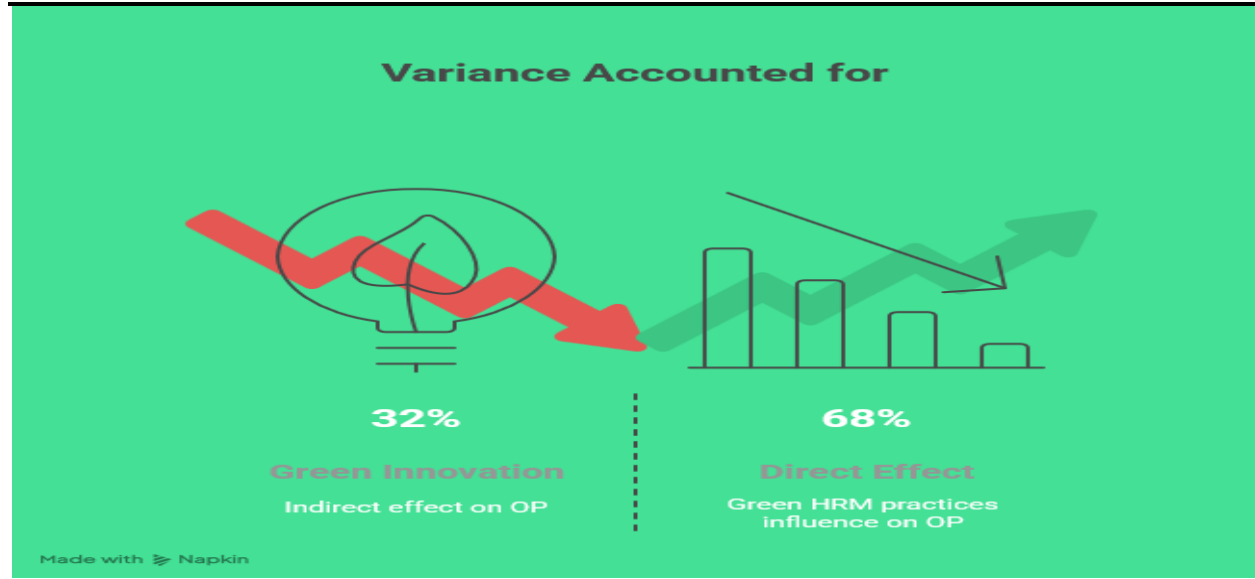
Mediation Analysis (Bootstrap 5,000)

The mediation analysis in Table 6 shows that green innovation (GI) serves as a partial mediator between human resource practices (HRP) and organizational performance (OP). The indirect effect value of 0.093, with a 95 % confidence interval ranging from 0.052 to 0.138, does not include zero, indicating statistical significance (Preacher & Hayes, 2008). The variance accounted for (VAF) is 32 %, meaning that approximately one-third of HRP's total effect on OP operates through GI, while the remaining influence is exerted directly. This finding suggests that HRP—such as recruitment, training, and incentives aligned with environmental goals—enhances OP not only through direct workforce engagement but also by fostering green innovation initiatives that improve processes, products, and services (Renwick, Redman, & Maguire, 2013; Dumont, Shen, & Deng, 2017). The partial mediation outcome is consistent with previous studies demonstrating that HR practices stimulate innovative capabilities, which in turn contribute to sustainability and competitive advantage (Chen, 2011; Xie et al., 2019). In short, while HRP directly boosts performance, its impact is amplified when employees leverage these practices to develop and implement green innovations, underscoring the strategic value of integrating HRM with innovation-driven sustainability practices.

Table 6: Mediation Test

Path	Indirect Effect	95 % CI	VAF	Decision
HRP → GI → OP	.093	[.052, .138]	32 %	Partial

The mediation (indirect) effect of green innovation on organizational performance can be visualized in Figure 4.

Figure 4: Mediation effect of green innovation on organizational performance

Moderation Analysis

The moderation analysis aimed to determine whether Green Strategy influences the strength of the relationship between Green Innovation and Organizational Performance. Table 7 shows that the interaction term (HRP $\times$ Green Strategy) which was found to be positive and statistically significant ($\beta = 0.045$, $t = 4.0$, $p < 0.001$), indicating that Green Strategy significantly moderates this relationship. This means that organizations with stronger green strategic orientation derive greater performance benefits from green innovation initiatives. The simple slope analysis further supports this interpretation. When Green Strategy is high (+1 SD), the effect of green innovation on performance is strong and significant ($\beta = 0.077$, $p < 0.001$). However, under low Green Strategy conditions (−1 SD), the effect is weaker and statistically insignificant ($\beta = 0.013$, $p = 0.086$). This suggests that green innovation alone may not substantially enhance performance unless supported by a green strategic framework prioritizing environmental sustainability (Fok, Zee, & Morgan, (2022). These findings are consistent with earlier research, which emphasizes that strategic alignment is crucial for translating innovation into tangible outcomes (Porter & van der Linde, 1995; Dangelico, 2016). A robust green strategy can provide the necessary resources, organizational culture, and market positioning to maximize the returns on innovation efforts (Rennings, 2000; Fraj-Andrés et al., 2009).

Table 7: Moderation Test

Interaction	β	t	p	Decision
HRP $\times$ Green Strategy $\rightarrow$ OP	.045	4.0	.000	Supported

Simple-slopes:

High Green Strategy (+1 SD): $\beta = .077$, $p < .001$

Low Green Strategy (−1 SD): $\beta = .013$, $p = .086$.

The impact of moderating variables, green strategy, on organizational performance and green innovation can be visualized from Figure 5.

Figure 5: Moderating role of green strategy in the relationship of GI and OP

Source: Author draws this diagram by Napkin

Moderated-Mediation index

The results in Table 8 reveal that the Index of Moderated Mediation is 0.019 (SE = 0.006), with a 95% confidence interval ranging from 0.007 to 0.032, which does not contain zero. This indicates a statistically significant moderate mediation effect (Hayes, 2018). Particularly, the mediating effect of Green Innovation (GI) between green Human Resource Practices (HRP) and Organizational Performance (OP) depends on the intensity of Green Strategy (GS). The findings reveal that the high commitment of the organization towards environmental strategy significantly strengthens the indirect, positive impact of Human Resource Practices (HRP) on Organizational Performance (OP) via the process of Green Innovation (GI). The observation lends empirical evidence to the Resource-based View (RBV) that a company's competitive edge stems from strategically matching its internal resources with its external context (Barney, 1991; Hart, 1995). The findings confirm previous studies proving that a clear environmental strategic plan can enhance the impact of innovations championed by human resources on the performance metrics of a firm (Chen et al., 2015; Singh et al., 2020).

Table 8: Moderated-mediation Index

Index of Moderated Mediation = .019 (SE = .006) 95 % CI [.007, .032]

Source: The authors

Robustness & Diagnostics

Different diagnostic and robustness tests were applied to diagnose the reliability and statistical validity of the model and its results. From Table 9, it can be observed that all the calculated values for Cook's distance were found less than the conventional level of 1. This indicates that there was no major outlier that had a negative effect on the parameter estimates produced by the regression analysis (Belsley, Kuh, & Welsch, 1980). In addition, all the Mahalanobis distance values were

found within the acceptable chi-square range at a significance level of $\alpha = .001$, suggesting no multivariate outliers exists in the data (Tabachnick & Fidell, 2019). In order to assess the possibility of common-method bias (CMB), two established methods were used. Harman's single-factor test indicated the first unrotated factor explained variance of 31.2%, a far away from the 40% threshold, hence putting serious fears of CMB to rest (Podsakoff et al., 2003). This was further strengthened through application of a marker-variable adjustment. The stability of the regression coefficients, which signifies variations of less than ± 0.02 , provides further assurance that common-method variance does not threaten the validity of these results significantly (Lindell & Whitney, 2001).

Table 9: Diagnostics Tests results	
Cook's distance < 1 for every case; Mahalanobis distance within χ^2 critical value ($\alpha = .001$)	
Harman's single-factor test:	first eigenvalue = 31.2 % (< 40 %)
Marker-variable adjustment changes no coefficient by more than $\pm .02$	

Discussion

Hypotheses Testing

This study examined the impact of Green HRM practices on organisational performance in Pakistan's manufacturing sector, with green innovation serving as a mediator and green strategy acting as a moderator. The analysis of 400 valid responses provided several important insights. First, the results confirmed that GHRM practices exert a strong and positive influence on organisational performance (Carballo-Penela et al., 2023; Faisal, 2023; Rejeki & Putra, 2024). This suggests that human resource policies aligned with sustainability objectives play a direct role in strengthening firm performance, as reported by Fok, Zee, and Morgan (2022) and Abdelhakim (2024). Hence, Hypothesis (H1) is confirmed by hard evidence of current research. Second, green innovation was found to mediate the relationship between GHRM practices and organisational performance partially. While GHRM practices had a substantial direct effect, they also enhanced performance indirectly by stimulating employees' ability to generate eco-friendly products, processes, and services, as observed by Duque-Grisales et al. (2021) and Chowdhury et al. (2025). Approximately one-third of the impact of GHRM practices on performance was explained through innovation, highlighting the importance of linking HR initiatives with innovation-driven sustainability measures, as identified by Jia et al. (2022) and Ahmed et al. (2023). Therefore, the second hypothesis (H2) is validated. Third, the study revealed that a green strategy strengthens the relationship between green innovation and performance. Organisations with a clearly defined environmental strategy were better able to translate green innovations into tangible performance outcomes. In contrast, firms with a weaker strategic orientation derived fewer benefits from innovation, as reported by Awan & Shahid (2015), Al-Zu'bi & Albloush (2022), and Al-Romeedy & El-Sisi (2024). This indicates that innovation alone is insufficient without a guiding strategic framework to allocate resources and align organisational culture with sustainability goals (Garad & Khalifa, 2024). The indirect pathway from GHRM practices to organisational performance through green innovation became stronger when supported by a robust green strategy (Bhatia, M.S. (2021); Raut et al.(2022). Thus, the third hypothesis (H3) is confirmed by the hard evidence of this analysis. These findings underscore the importance of aligning HR initiatives, innovation, and strategic orientation to maximise organisational performance as identified by Wang et al. (2021); Huang and Huang (2022); Tuan (2023); and Mukhtar et al. (2024).

Managerial Implications

From a management perspective, this study demonstrates that environmental sustainability must be an intrinsic consideration in HR policymaking. In particular, recruitment procedures and training programs with an emphasis on environmental values not only contribute to an environmentally conscious culture but also equip employees with the appropriate skills to promote Eco-innovation. In addition, the inclusion of sustainability metrics in performance measurement systems provides a strong instrument to encourage and strengthen green behaviours. Finally, it should be noted that although pursuing green innovation is beneficial in itself, its potential to contribute to organisational performance is only maximised when it is part of a comprehensive and clear corporate strategy. A well-formulated green strategy provides the necessary resources, cultural support, and market orientation to ensure that innovative practices are not isolated efforts but are instead aligned with long-term organisational goals. Therefore, managers in the manufacturing sector should view GHRM, green innovation, and green strategy as mutually reinforcing elements rather than independent initiatives.

Conclusion

The study makes three key contributions to theories of the Resource-based View, the Natural Resource-based View, and Ability-Motivation-Opportunity (AMO) in a significant manner. First, it strengthens the empirical link between GHRM and organisational performance, expanding the literature on how sustainability-oriented HR practices serve as a driver of firm competitiveness. Second, it advances the understanding of green innovation as a mediating mechanism, illustrating how HR practices shape employees' innovative capacity, which in turn fosters superior performance. Third, by demonstrating the moderating role of green strategy, the study provides evidence that strategic orientation is critical in translating innovative capabilities into measurable organisational outcomes. The results are strongly aligned with the Resource-Based View (RBV), which suggests that a lasting competitive advantage arises from a company's potential to exploit its distinct internal resources (Barney, 1991; Hart, 1995). The findings also support the Ability–Motivation–Opportunity (AMO) theory, which argues that employees must have the required knowledge, skills, and competencies to perform their jobs.

Despite providing valuable theoretical and empirical insights, this study has certain limitations, including a small sample size of 400 participants and 14 manufacturing firms, as well as a lack of capability to generalise its results. However, future research should expand the scope of this study by increasing the number of companies and participants, as well as employing a non-linear model to investigate the relationship between green HRM practices, green innovation, green strategies, and organisational performance.

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