

From Green HRM to Green Innovation: How Employee Environmental Awareness Bridges the Gap

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Abstract

The modern era of corporate sustainability emphasizes the strategic importance of human resource management and is gaining attention as a key driver of green innovation. This article explores the dynamics of Green Human Resource Management (HRM) practices in conjunction with green innovation and the role of employee environmental awareness as a mediator. The GHRM practices comprise green training practices, green recruitment practices, and green performance management practices. This study examines how GHRM practices promote green innovation by enhancing employees' environmental awareness. The Data were collected from 350 participants in the surgical instrument manufacturing industry in Pakistan, representing different occupational levels, including top, middle, and entry-level management, as well as workers. Using a structured survey, this study is analyzed through mediation analysis within a structural equation modeling (SEM) framework to verify the hypothesized relationships. The study finds that GHRM practices have a significant impact on green innovation, and as a result, this correlation is mediated by the mediating role of employee environmental awareness. Furthermore, green recruitment has not a significant relationship with green innovation thus these findings highlight the significance of employee environmental awareness and within human resource practices are important to drive innovation The study offers both practical and theoretical insights for researchers, scholars, policy makers, and HR managers aiming to integrate green practices into organizational environments.

KEYWORDS

GRHM Practices: Green Training, Green Recruitment, Green Performance Management, Green Innovation, Employee Environmental Awareness

1 | INTRODUCTION

In this modern era of progress, as the fifth-largest country in terms of population, Pakistan's manufacturing sector is facing numerous significant challenges. This study discusses the surgical instrument manufacturing industry in Pakistan. This industry is among the leading progressive sectors and provides the backbone of Pakistan's economy. This competitive era requires attention towards the environment and its awareness (Dad et al., 2023). The most important aspect of sustainable capabilities is GHRM. GHRM adopts an environmental approach aimed at creating a green environment that encourages employees to perform their roles in an accurate and environmentally manner (Renwick et al., 2013). According to current GHRM

practices, senior management contributes significantly to motivating employees towards the environment and organizational vitality. This involves providing significant, motivational personal development and mentoring aligned with the organization's goals. (AlKetbi & Rice, 2024).

Among all other GHRM practices, green performance management is significant, as some associations contribute through the reward and compensation system to their workers (Das & Dash, 2024). GHRM practices are crucial for fostering innovation, which in turn influences trust, customer satisfaction, credibility, and preference. To gain a competitive advantage and improve environmental

performance, these practices play a key role in driving innovation that impacts customer satisfaction, credibility, and trust (Abd-elmonem et al., 2022; Hollebeek & Rather, 2019; Kim et al., 2019). Due to pressure from corporate stakeholders, and environmental rules, industries nowadays attempt to follow responsible environmental behaviors (Babiak & Trendafilova, 2011; Dad et al., 2023; Paillé et al., 2014).

Evina et al. (2024) suggested that the goal of green HRM is to boost employees' productivity, which can be achieved through promoting eco-conscious actions. GHRM involves the adoption of management practices that support an organization's environmentally sustainable use of resources. Companies implementing GHRM strategies demonstrate a strong commitment to the environment, enhancing their reputation and appeal to potential future employees (Zhu, 2023). The promising nature of employees towards confidence and performance results in the enhancement of effectiveness overall, as individuals and as organizations, to achieve the objectives. Furthermore, if an individual is feeling optimistic about the environment, he tends to be more motivated towards achieving green innovation (Wang et al., 2025).

Furthermore, Ecer et al. (2021); Yong et al. (2019) noted that GHRM practices as a strategy that gives importance and priority to environmental sustainability, thus resulting in enhancing organizational performance. (AlKetbi & Rice, 2024). A study by Irani et al. (2022) states that personal skills can be enhanced through knowledge-based training programs, which should be encouraging and result in hiring environmentally concerned people who could successfully and consistently teach each other. Among other industries, the hotel industry specifically have put considerable efforts to address the issues and educate workers related to GHRM such as food wastage, water and energy conversions, and waste reduction (Bohdanowicz et al., 2011; Darvishmotevali & Altinay, 2022; Munawar et al., 2022; Pham et al., 2020). Employee engagement is crucial for cultivating a creative workforce, as it motivates employees to make a full contribution to their work. An innovative workforce enhances social performance by strengthening stakeholder relationships, driving innovation, and delivering higher-quality products and services.

Moreover, a critical study recently conducted by Ashraf et al. (2024) emphasizes the importance and establishment of green innovation through green strategies and green capabilities. Human Resource events recover administrative presentation; additionally, it assists the business towards progress through green talents and inspires an eco-friendly approach, also exposing the chances for sustainable performance. GHRM (Ishaq et al.) HRM and incentives are possible ways to attain and apply GHRM, through which employees can be more connected in a constructive

way with environmental concerns and knowledge and thus they can protect the environment (Ahmad et al., 2022). The application of GHRM brings numerous benefits for organizations and businesses, along with the awareness to promote environmental accountability and vigorous involvement in eco-friendly practices (Zhang et al., 2025). There is a reflective study by (Meng et al., 2022) who proposed that the effects of GHRM practices while developing a green lifestyle play an inspirational role and influence the green organizational behavior of hotel employees.

This study contributes the following perspectives to the literature. At first, this study explores the relationship between GHRM practices and green innovation, which plays a vital role in a developing country setting (Shah & Soomro, 2023). Secondly, this study investigates the mediating effect of employee environmental awareness, which is a novel contribution of this study.

This study comprises further sections, including the introduction, theoretical framework, and hypothesis development, followed by sections on methodology, analysis, and results. The next section presents the conclusion, followed by a discussion and suggestions for future implications.

1. Theory Building & Hypothesis Development:

2.1 Human Capital Theory

Human Capital Theory is relevant and suitable for supporting the theoretical background of this study. This theory is a combination of habits, knowledge, personality attributes, life, and creativity, reflecting to the performance, and it contributes in economic growth as well (Oostendorp, 2009; Strober, 1990). HR department is related to human capital, and managing the human capital as a unit is also known as human capital management. This domain is prosperous when it comes to individuals, industries and societies (Eiadat et al., 2008; Rasmingsih et al., 2021). GHRM may positively impact green Human capital as it is considered to be an essential tactic to create human capital to manage environmental concerns where organizations are dealing with external environmental pressures (Yong et al., 2019). The scholars also note that green training can have the potential to increase the pool of human capital, which results in making human capital able to fulfil environmental standards which can lead to green innovation (Eiadat et al., 2008).

2.2 GHRM Practices and Green Innovation

GHRM is the study in novel field whose purpose is to explore the organizational environmental protection with respect to human resource management (Yong et al., 2020). GHRM is defined as the human resource management activities that support the enhancement of service and positive environmental awareness, with outcomes aimed at stabilizing and protecting the environment (Fachada et al., 2022). Recent studies

have shown the strategic significance of GHRM in adopting green innovation and maintaining sustainability within organizations. Meng et al. (2022) surveyed the impact of GHRM practices on green organizational citizenship behavior and found that green lifestyle positively mediates the relationship between GHRM practices and green organizational behavior. A systematic study by (Miah et al., 2024), which consisted of a systematic review, suggested that GHRM is an advancing tool for organizational sustainability with the help of structured HR Interventions. Furthermore, GHRM enhances green practices outcomes with the help of a green innovation mechanism (Abbas & Khan, 2023). A recent study investigated the impact of green HRM on organizational environmental performance, sustainability, and innovation (Khan et al., 2025). This study reveals a multifaceted impact of GHRM on environmental performance, sustainability, and innovation.

Green recruitment involves attracting and selecting candidates who value sustainability and possess environmental awareness. (Harrington et al., 2025). Using a sample size of 121 manufacturing companies, Zhang et al. (2025) found that Green recruitment practices put a significant impact on green innovation. Najam (2025) studied the impact of GHRM on organization and reported the moderate relationship of job analysis concerning the green environment and job design practices with the organizational performance. The potential for innovative employees to contribute to ecological creativity is enhanced through recruitment practices aligned with sustainability goals. By implementing hiring strategies focused on sustainability, organizations foster a culture that encourages green innovation (Wang et al., 2024).

Using a sample of 285 Chinese medical equipment firms, Wu et al. (2024) reveals that environmental awareness and green training have a significant impact on the adoption of green innovation. Their mediation analysis confirms the relationship. An investigative study by Zafar et al. (2025) Earlier gave insights that when employees give importance to environmental values, and develop ecological consciousness, they identify eco-friendly innovative solutions. This study finds that organizations that actively engage in green training experience a shift towards innovation and sustainability in their environmental awareness. This study focuses on understanding the impacts of GHRM practice in promoting environmental awareness within the manufacturing sector. Kuo et al. (2022) studied using a sample of 500 employees from the chemical industry in Pakistan and found a positive significant relationship of GHRM and green innovation and employees' performance so we pose our hypothesis regarding GHRM as;

H1: Green training positively impacts the green innovation.

H2: Green recruitment has a positive impact on green innovation.

H3: Green performance management has a positive impact on green innovation.

2.3 GHRM Practices and the Employee Environmental Awareness

Several empirical studies have confirmed the mediating role of employee environmental awareness in the relationship between GHRM and green innovation. A study by (Yong et al., 2019) GHRM practices primarily influence employees' environmental thought process and perceptions, which in turn stimulate innovative behaviors aimed at promoting sustainability. Moreover, research conducted by (Zhang et al., 2025) found that green training is playing a role in elevating awareness stages among employees, which is directly related to an increase in green innovation.

Furthermore, Renwick et al. (2012) stated that GHRM is an integrative system with the mediation of environmental awareness, concretizes the foundation of sustainable business. A study by (Fang et al., 2022) was conducted to examine the mediated path of green innovation among GPM and EA and reported that GNI mediated the relationship partially regarding GHRM practices.

H4: Green training positively influences employee environmental awareness

H5: Green recruitment positively influences employee environmental awareness

H6: Green performance management positively influences employee environmental awareness.

2.4 Employee Environmental Awareness & Green Innovation

Green Innovation is described as the newly introduced or modified practices, systems, processes, ideas and products through which environmental benefits are given and also make contribution to environmental sustainability (Oduro et al., 2022). Many organizations and companies and communities are not directed towards green innovation to achieve economic growth along with environmental protection (Takalo & Tooranloo, 2021).

Similarly, organizations with performance frameworks focused on environmental indicators observed a higher hierarchy of environmental awareness and subsequent innovation while engaging in sustainable processes. The mediating effect suggests that awareness is just not an outcome but a pathway through which GHRM practices achieve competitive sustainability objectives (Harrington et al., 2025). A study conducted by Munawar et al. (2022), using a sample size of 249 participants from different occupational levels, found that environmental awareness plays a vital role in GHRM practices and green innovation. Thus, we pose our hypothesis

regarding the mediating role of employee environmental awareness and GHRM.

H7: Employee environmental awareness significantly positively influences green innovation.

H8: Employee environmental awareness mediates the relationship between green training and green innovation.

H9: Employee environmental awareness mediates the relationship between green recruitment and green innovation.

H10: Employee environmental awareness plays a mediating role between green performance management and green innovation.

2 MATERIAL AND METHOD

3.1 Study Construct & Data Collection:

This investigation employs a cross-sectional quantitative research approach to examine the relationships among all the variables and constructs at a specific point in time. The objective is to explore how GHRM influences green innovation, with employees' awareness of environmental issues acting as a mediating factor. Furthermore, the data is collected from the city of Sialkot in Punjab Province, Pakistan, which has a diverse range of manufacturing industries, including the sports industry and companies that manufacture surgical instruments. A purposive explorative sample method was used for this study, and data were collected from 350 participants related to middle-level, high-level, and junior-level administration. A closed-ended questionnaire was designed to collect data, with the respondents' confidentiality being a priority that was maintained. The questionnaire had two parts: the first part covered instructions and demographic information of the respondents, and the second part consisted of questions regarding GHRM practices, including GRT, GRR, and GPM. Some question constructs were related to the mediator variable, the employee environmental awareness, and some items were related to the green innovation.

Data collection will be conducted using a structured brief questionnaire, a method recognized for its standardization in organizational research and

effectiveness in study conduct. Each concept in the study will be measured using established and validated scales drawn from prior studies. For instance, GHRM practices are adapted from existing literature, while employee environmental awareness and green innovation will reflect ongoing efforts in daily operations. All items will utilize a five-point Likert scale to assess agreement levels, enabling further quantitative deep analysis.

This study will employ random sampling to ensure representation across different sectors and roles within organizations that value a green environment. Moreover, this sampling method reduces sampling bias and improves the applicability of the findings to a broader population.

To verify the reliability and validity of the data, content validity will be confirmed through expert evaluation. This study will observe construct validity using Confirmatory Factor Analysis (CFA). Furthermore, consistency and reliability internally will be examined by utilizing Cronbach's alpha, whose critical value is 0.70 or greater; 0.70 is considered acceptable (Shahzad et al., 2023). The technique of bootstrapping will be applied to examine the moderation effect of employee environmental awareness, with the results drawn.

3.2 Study Demographics

This study utilized the demographics of the respondents, which included education, age, gender, and their work experiences in surgical instrument manufacturing companies. The survey included 32.6% female respondents and 67.4% male respondents. Furthermore, if we look into the age wise segregation of the total sample population, the responses were categorized into four sections, 6 % were below 21 ages, 76.3 % were 21-30 years old, and 16.3 % were 31-40 years of age, and 6.9 % were from above 40 years of age. In terms of education, 57% were college graduates, 38.3 % had a master's degree, and 13% had a doctorate. Moreover, the majority of respondents (60%) had 6-10 years of experience, while 36.3% had 1-5 years of experience, and 3.1% had more than 15 years of experience.

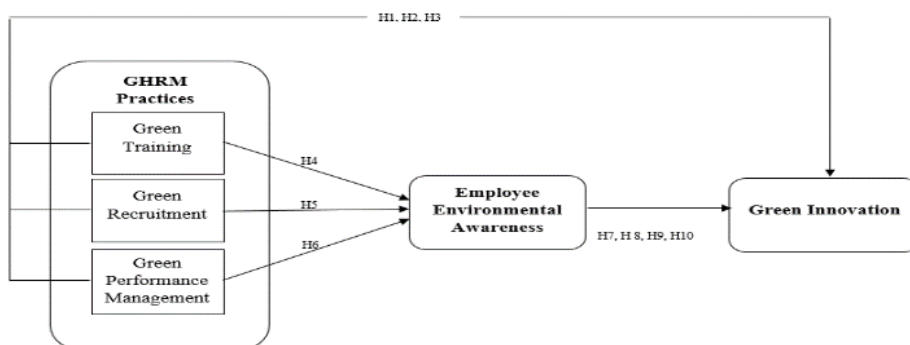


Fig. 1: The Model Conceptual Framework

3.3 Measures

This study employed the five-point Likert scale for response reading. This study utilized this scale to measure and analyze the responses of the respondents, who were asked to answer the questionnaires based on their experiences, knowledge, and preferences. They were required to select the option that best fit their responses from the given five choices. There were five categories ranging from strongly disagree to agree strongly. 385 samples were gathered out of which 350 valid responses were used for further statistical analysis. GHRM practices were measured by three components: green training, green recruitment, and green performance management. For green training, the 16-item scale used to measure recruitment and green performance management from the studies by (Guerci et al., 2016; Hameed et al., 2020; Liu et al., 2021; Renwick et al., 2013). Moreover, green innovation is a five-item questionnaire derived from the study conducted by (Chen et al., 2006). The five-item Likert scale questionnaire was derived from the study conducted by (Stern & Dietz, 1994) to measure the employee's environmental awareness.

3 RESULTS

4.1 Data Analysis & Research Techniques

For explanatory statistical data analysis and result generation, the partial least squares structural equation modeling (PLS-SEM) software was used. Literature supports that PLS-SEM is a highly accepted and appropriate method for medium-sized data and small sized data samples. (Sarstedt et al., 2014). In this study, each latent variable was treated as both a reflective and representative variable. Additionally, PLS-SEM operates in two phases: the first phase involves evaluating the measurement model, followed by the second phase, which focuses on the structural model evaluation (Hair et al., 2011). In the first phase, the internal consistency and discriminant validity of the variables were assessed; additionally, their reliability was also examined. On the other hand, the second phase helped us in measuring path coefficient and p-values, and R² to analyze whether the hypothesis is rejected or accepted.

4.2 Measurement Model

To examine the measurement model's fitness, this study analyzes the Reliability and validity of the model, which are the most important elements in the research study. For this purpose, composite reliability (CR) and Cronbach's alpha (CA) were used to check the construct reliability. In Table 1, as mentioned, the values of composite reliability for GRT, GRR, and GPM are (0.934, 0.945, 0.966), and the values for Cronbach's alpha for GRT, GRR, and GPM are (0.928, 0.942, 0.959). Moreover, CA and CR values of all the

constructs of variables were above the cut-off value of 0.70 as calculated by previous scholars (Aiken et al., 1991; Henseler & Fassott, 2010). Moreover, the average variance extracted (AVE) was measured to assess convergent validity, which ranged from 0.56 to 0.83, a value considered acceptable in the literature. AVE values should be greater than 0.5 (Henseler et al., 2015). Therefore, this study gained encouraging results about CA, CR, and the variance inflation factor (VIF). This study also observed the VIF values, which are shown in Table 1, indicating that in the data there is no issue of multi-collinearity because VIF values of all the constructs are found to be under 5 as advised by the researchers (Hair et al., 2019; Hair et al., 2012).

Discriminant Validity

This study examined the discriminant validity, which is identified as a crucial analysis in the model. For validity, the cross-loadings of variable constructs have been measured and reported. We found that no indicator shows a higher load than the other on their opposing variable construct as mentioned by the previous researcher (Hair et al., 2019). Furthermore, the criterion of the heterotrait-monotrait (HTMT) ratio as per Table 2 and Fornell-Larcker (1981) as per Table 3 for validity were also used to examine and analyze the correlation among variable constructs and square root Sq² of the AVE. The results show that all the diagonal values are significantly higher compared to those in the corresponding columns and rows, indicating that, in this model, each construct differs from the others. In addition to HTMT, the values should not be higher than 0.85 (Henseler et al., 2015). Therefore, the highest measured HTMT value was 0.832.

4.3. Structural Model

Using the coefficient of determination (R²), Q², and F² values, the structural model fitness was assessed. Figure 2 indicates the values of R². These values of endogenous constructs (R²) were determined by how well the data lines matched a line or a curve, and whether the model fits or not. According to a study, R² levels are categorized into three groups: large (0.26), medium (0.10 to 0.26), and small (0.02 to 0.10), depending on their R² level (Chinn, 1998). These values are used to testify the model fit. The values of environmental awareness and green innovation were 0.933 and 0.879, respectively. This indicates a strong effect, along with the highest proportion of variance explained by the independent variable on both the mediator and the dependent variable. This shows the high explanatory power of the model fit. Furthermore, we calculated F² values to assess the model's explanatory power. Results show that GRT has a large and significant effect on both EA and GIN, with values of 1.494 and 1.871, respectively. On the other hand, GRR is having a medium impact, with a value of 0.166,

and a small effect on GIN, with 0.52 value. Furthermore, GPM has small effects on EA, with a value of 0.074, and GIN, with 0.003. The results show that the effect of EA to GIN is small with 0.037. The F^2 values are drawn upon the suggested guidelines (Hair et al., 2019).

Furthermore, the cross-validated redundancy measure Q^2 was examined to assess the predictive relevance of the model. As per suggestions by (Hair et al., 2019), the value of Q^2 should be greater than zero. Figure 2 is representing the structure model of the study.

Table 1: Reliability & Validity

Indicators	Loadings	Cronbach's Alpha	Composite Reliability	Average Variance	Variance Inflation
Green Training		0.928	0.934	0.737	
GR1	0.892				1.087
GR2	0.727				1.069
GR3	0.918				1.985
GR4	0.885				1.321
GR5	0.827				1.838
GR6	0.890				1.674
Green Recruitment		0.942	0.814	0.588	
GRR1	0.941				1.101
GRR2	0.941				1.256
GRR3	0.967				1.193
GRR4	0.796				1.096
GRR5	0.856				1.072
Green Performance		0.959	0.966	0.830	
GPM1	0.782				1.556
GPM2	0.954				1.017
GPM3	0.955				1.426
GPM4	0.948				1.387
GPM5	0.889				1.565
GPM5	0.930				1.065
Employee Awareness		0.941	0.814	0.766	
EA1	0.930				1.375
EA2	0.983				1.213
EA3	0.961				1.503
EA4	0.811				1.172
EA5	0.811				1.138
Green Innovation		0.954	0.814	0.814	
GN1	0.873				1.161
GN2	0.926				1.134
GN3	0.938				1.097
GN4	0.871				1.142
GN5	0.872				1.104
GN6	0.931				1.074

Note: GRT = green recruitment; GRR= green recruitment organizational; GPM = green performance management; EA= employee environmental awareness; GIN = green innovation

Table 2: Hetrotrait–monotrait (HTMT) ratio

	GRT	GRR	GPM	EA	GIN
GRT					
GRR	0.841				
GPM	0.823	0.832			
EA	0.812	0.781	0.821		
GIN	0.782	0.825	0.839	0.811	0.850

Note: GRT = green recruitment; GRR= green recruitment organizational; GPM = green performance management; EA= employee environmental awareness; GIN = green innovation

Table 3: Fornell–Larcker Crieterion for Discriminant Validity

	GRT	GRR	GPM	GIN	EA
GRT	0.752				
GRR	0.781	0.767			
GPM	0.788	0.97	0.912		
GIN	0.958	0.818	0.819	0.902	

EA	0.908	0.804	0.778	0.868	0.875
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4.4 Hypothesis Testing

This study has tested hypothesis by using the bootstrapping method. Results shows that all the hypothesis are statistically significant except H2. The results of H1 in the direct effect of GRT and GIN (β - 0.917, T 2.988, and P-value 0.000) shows the significance and positive impact Regarding hypothesis H2 the p-value is not significant (β -0.265, T 1.327, p-value 0.085) so this hypothesis is rejected otherwise all other hypothesis are valid and accepted. The direct effects of EA and GIN is (β 0.133, T 1.491 and P-value 0.003) shows the significant impact so H7 is also accepted. Furthermore, the findings are presented in table 5, following hypothesis supporting the relationships of

GRT, EA and GIN, GRR, EA and GIN, and GPM EA and GIN and thus all accepted.

Table 4: Cross Loadings:

	GRT	GRR	GPM	EA	GIN
GRT1	0.991	0.227	0.246	0.214	0.32
GRT2	0.726	0.19	0.133	0.261	0.265
GRT3	0.917	0.629	0.666	0.722	0.872
GRT4	0.886	0.769	0.767	0.816	0.929
GRT5	0.828	0.789	0.77	0.936	0.757
GRT6	0.890	0.62	0.644	0.798	0.869
GRR1	0.940	0.982	0.955	0.744	0.757
GRR2	0.940	0.982	0.955	0.744	0.757
GRR3	0.967	0.944	0.931	0.849	0.879
GRR4	0.796	0.281	0.197	0.199	0.152
GRR5	0.856	0.21	0.142	0.102	0.031
GPM1	0.782	0.711	0.781	0.556	0.646
GPM2	0.954	0.924	0.954	0.725	0.747
GPM3	0.955	0.982	0.955	0.744	0.757
GPM4	0.948	0.911	0.948	0.702	0.691
GPM5	0.889	0.803	0.889	0.632	0.725
GPM6	0.930	0.944	0.931	0.849	0.879
GIN1	0.882	0.814	0.783	0.745	0.876
GIN2	0.931	0.821	0.829	0.828	0.928
GIN3	0.938	0.763	0.732	0.787	0.937
GIN4	0.875	0.62	0.644	0.798	0.869
GIN5	0.894	0.629	0.666	0.722	0.872
GIN6	0.872	0.769	0.767	0.816	0.929
EA1	0.857	0.683	0.673	0.958	0.814
EA2	0.888	0.803	0.77	0.978	0.832
EA3	0.853	0.789	0.77	0.936	0.757
EA4	0.686	0.591	0.552	0.798	0.676
EA5	0.653	0.621	0.605	0.663	0.703

Note: GRT = green recruitment; GRR= green recruitment organizational; GPM = green performance management; EA= employee environmental awareness; GIN = green innovation

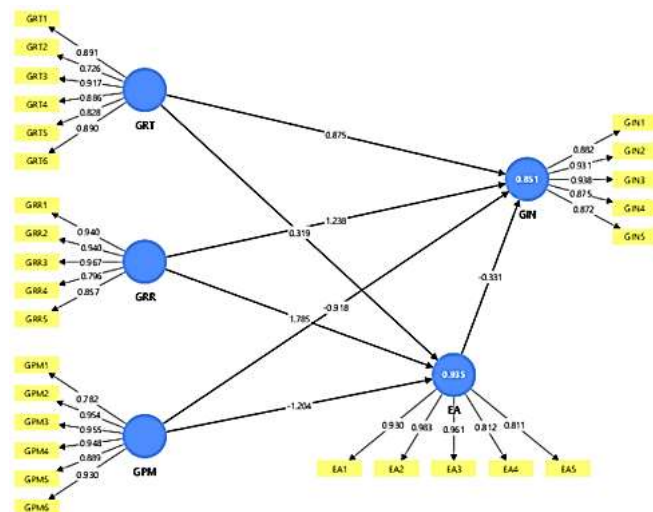


Fig-2

4 | DISCUSSION

The primary objective of this study is to investigate the impact of GHRM practices on green innovation,

while also examining the mediating role of employee environmental awareness. GHRM practices includes the GRT, the GRR, and the GPM. The research also identifies a strong positive link between GHRM practices and the EA. consistent with previous studies. This suggests that HR practices incorporating environmental awareness can effectively increase employees' awareness of environmental issues, making them more likely to contribute to the organization's sustainability goals (Irani et al., 2022). Hypotheses H1, H2, and H3 are related to the direct relationship with GIN, in which H2, GRR was found to have a non-significant impact on the green innovation, thus it was rejected (Munawar et al., 2022). The results show that if effective GHRM practices, especially GRT and the GPM, are implemented in the organizations, it encourages the green innovative mindset, thus resulting in increasing green innovation. (Liu et al., 2021). Furthermore, this study found that employee environmental awareness positively impacts the green innovation in the organizations which is in alignment with prior findings and literature regarding green innovation and employee environmental awareness (Abbas & Khan, 2023; Shah & Soomro, 2023; Shahzad et al., 2023). Furthermore, as per findings H4, H5, and H6 representing the mediation role of employee environmental awareness are accepted because of their positive influence as mediators on GRHM and the green innovation

Table 5: The Hypothesis Decisions

Hypothesis		β	T	p-value	Decision
Direct Effects					
H1	GRT > GIN	0.917	2.988	0.000	Accepted
H2	GRR > GIN	-0.265	1.327	0.085	Rejected
H3	GPM > GIN	0.058	0.281	0.004	Accepted
H4	GRT > EA	0.751	9.999	0.000	Accepted
H5	GRR > EA	0.636	2.753	0.006	Accepted
H6	GPM > EA	0.431	2.022	0.004	Accepted
H7	EA > GIN	0.133	1.491	0.003	Accepted
Indirect Effects					
H8	GRT>EA>GIN	0.325	0.145	0.000	Accepted
H9	GRR>EA>GIN	0.439	1.169	0.042	Accepted
H10	GPM>EA>GIN	0.281	0.967	0.033	Accepted

Additionally, the study finds a positive relationship between green innovation and employee environmental awareness, which reinforces the argument that environmentally conscious employees are more likely to adopt or support innovative, environmentally friendly practices. This highlights the mediating role of environmental awareness, as employees who are more informed about environmental concerns can act as internal change agents, transforming green HR initiatives into tangible innovation outcomes.

6. Implications, Limitations, and Future Directions

Nowadays, in the era of progress, managers can effectively build strategies to compete with their

competitors by utilizing GHRM practices and providing employees with awareness of the environmental importance. Green Innovation changes the lives of many if implemented through right channels. Awareness in employees regarding a sustainable environment significantly brings changes in developing a green innovative platform in the organizations that can put a practical impact on the lives of not only employees but also managers and common people. This study, through its framework and structure, provides insights to HR practitioners and policymakers on implementing and developing a green environment to enhance and promote green innovation in organizations. An efficient set of seminars, training and awareness workshops can be organized in the organizations to encourage more and more employees in order to make them aware of the environmental importance alongside GHRM.

Furthermore, this study has several limitations and implications for the future. Hypotheses are studied under the framework of human capital theory; further studies can be conducted by utilizing the theories of resource conservation, knowledge-based theory, and expectancy theory. Moreover, this study innovatively examined the mediating relationship between GHRM practices and green innovation, employing a quantitative approach and methodology. Further studies can be conducted using a quantitative approach by conducting interviews with HR personnel. Information gathered from the manufacturing industry of Sialkot, especially the surgical instruments manufacturing industry; therefore, future researcher could extend their research by collecting data from other sectors in the Punjab province of Pakistan.

Conclusion

Addressing environmental issues has become a significant challenge for businesses. As a result, to maintain their environmental competitiveness, many organizations are adopting a culture that promotes a green innovation culture by implementing GHRM practices. The purpose of the research was to explore the link between GHRM practices and GNI, considering the mediating role of the EA, all of which were analyzed through the lens of human capital theory. The study utilized Smart PLS SEM to analyze the model and assess and report the results. The findings suggest that GHRM practices, particularly green training and green performance management, have a significant impact on green innovation and employee environmental awareness. However, the component of GHRM, green recruitment practice, was found to have an insignificant effect, suggesting that while GHRM practices foster green innovation, they do not substantially influence the bond between green recruitment practices and green innovation. While employee environmental awareness plays a significant mediating role, it encourages HR managers in Pakistan to take a step ahead in adapting

fully to GHRM practices to encourage green innovation. Given the ever-changing environmental challenges organizations face, this study is valuable for strengthening contemporary HR practices and strategies to secure a green, sustainable advantage in the near future.

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Author Contributions

Dr. Basit Raza was involved in conceptual development and also contributed to the methodology, software implementation, data analysis, and writing. Ibtesam participated in reviewing and editing the manuscript. Adan was responsible for preparing the initial draft and handling the data collection and validation.

Disclosure of Potential Conflict

The authors confirm that they have no conflict of interests regarding the study, authorship and publication of this work

Data Availability Statement

As this study did not include the generation or analysis of any datasets; hence, data sharing is not relevant to this study,

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