



**Green Human Resource Practices and Environmental Awareness as Drivers of
Organizational Sustainability: The Mediating Role of Environmental Innovation in
Pakistan's Banking Sector**

¹Talha Nisar Ahmad, ²Syed Intasar Hussain Kazmi & ³Shagufta Mahmood

¹Hailey College of Commerce, University of the Punjab Lahore, Pakistan.

²Deputy Registrar, Lahore College for Women University, Jail Road, Lahore, Pakistan.

³Assistant Registrar, Lahore College for Women University, Jail Road, Lahore, Pakistan

ABSTRACT

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This study explores how green human resource practices (GHRP) and environmental awareness contribute to organizational sustainability in Pakistan's banking sector. The research further examines the mediating role of environmental innovation, aiming to determine how workforce-focused green initiatives and awareness translate into sustainable outcomes through innovative environmental solutions. A quantitative, cross-sectional approach was adopted. Data were gathered from branch managers, operational officers, and CSR personnel working in major commercial banks across Lahore, Karachi, Rawalpindi, and Multan. Using simple random sampling, 480 valid responses were collected. Smart-PLS 4.0 was used to test the measurement and structural models. The model incorporated two independent variables (green HR practices and environmental awareness), one mediating variable (environmental innovation), and one dependent variable (organizational sustainability). Environmental innovation acted as a strong partial mediator, showing that banks with effective green practices and environmentally aware employees are more likely to develop innovative eco-friendly products, processes, and policies ultimately strengthening sustainability performance. The model demonstrated high reliability and substantial predictive capability.

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Corresponding Author's Email: intasar1@yahoo.com

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1.0 Introduction

Sustainability has become a core issue of organizational concern in the past few years due to the growing environmental issues, regulatory pressures, as well as heightened expectations on the part of the society. International businesses are currently forced to incorporate sustainable practices into their operational and strategic systems to remain competitive in the long run and eco-friendly. The banking industry, which has long been viewed as a service industry that has few direct effects on the environment, has come to realize that it does play a major role in ensuring that people are sustainable. This acknowledgement is on the ability of the sector to impact into the economic operations, provide finance to environmental friendly projects and use its internal green practices to minimize the footprints of its operations (Li & Lin, 2024). The need to have sustainable approaches in banking in Pakistan is compounded by the increasing environmental consciousness, stakeholder pressure as well as governmental regulations which advocate corporate social responsibility in Pakistan since banking is a central part of the economic development in the country. As a result the question of how banks can improve their sustainability performance has assumed both scholarly and practical importance which has necessitated empirical studies into the contribution of organizational practices and employee-initiated-programs to sustainability-related results (Gutiérrez-Ponce & Wibowo, 2024).

Green Human Resource Practices (GHRP) are a strategic management trend that has come about in organization in an effort to integrate the strategic management of human resource with the view of environmental sustainability. GHRP is a set of policies, practices, and programs meant to recruit, train, motivate, and retain employees in a manner that encourages environmental friendly behavior and consciousness. Practices will involve environmental conscious recruitment, green training, performance management systems encompassing the sustainability, and reward systems that will encourage pro-environmental behavior (Tessema, Yesilada, & Aghaei, 2025). When organizations instill environmental values into human resource management, they will be able to create a culture of employees who participate in sustainability, which fosters the increased acceptance of green operational processes and creativity. In addition to GHRP, the awareness of the environment among employees can be viewed as the cognitive and attitudinal aspect of sustainability, which implies the level of individuals being aware of the environmental issues, knowing about the sustainable practices, and being willing to act in a way that supports environmentally responsible behaviors. The employees with high environmental awareness tend to be more supportive of green initiatives, as well as, they tend to become more sustainable in their work routines and also help in coming up with innovative solutions to the environmental issues. The internal drivers of sustainability are comprised of GHRP and environment awareness, and they help in fostering a culture that promotes adherence to the environmental norms as well as positive involvement in activities that can improve the sustainability imperative (Tanveer, ud Din, Khan, Almurad, & Hasnin, 2025).

Environmental innovation is an important tool bridging between internal green activities and awareness and the practical sustainability results. Characterized as the creation and adoption of new or better products, procedures, and practices that minimize the environmental effect or

boost resource utilization, environmental innovation permits organizations to convert the capabilities of human resources into tangible sustainable performance. With banks, environmental innovation can be in the form of green banking products, digitization programs that minimize paper use, energy-saving operational procedures, or policies that encourage clients to be sustainable. The resource-based view (RBV) and stakeholder theory theoretically support the view that environmental innovation is an intermediate in the relationship between GHRP and environmental awareness and sustainability in the organization (Ouragini, Ben Achour, & Lakhal, 2024). The RBV is based on the assumption that organizational resources such as human capital and knowledge are important assets that can create competitive advantage when properly utilized. Within this context, GHRP and environmental awareness have been viewed as precious, unique and non-renewable resources that once directed through the innovative environmental solutions, are more likely to boost the sustainability of an organization. Correspondingly, the stakeholder theory underscores that an organization should respond to the demands and concerns of the various stakeholders, such as those of the regulators, customers, workers, and the society as a whole. Through environmental innovation, the banks are not only reacting to the pressure of the stakeholders but also creating value, by operating in a sustainable way, which is in line with the expectation of the stakeholders and the business aims (Sun, Sulemana, & Agyemang, 2025).

Although there has been an increasing academic concern in sustainable management and green HRM, some gaps in study have been identified especially in relation to the emerging economies like Pakistan. Although research has been conducted in developed nations which have provided ample information on the direct influences of GHRP on sustainability performance, little available information exist as to the functionality of these practices in the banking industry of developing nations where regulations, cultural and organizational structures may vary considerably. Besides, despite the observed importance of environmental awareness as a key force to sustainability behavior, the interplay of the latter with organizational practices, as well as its ability to impact innovation-mediated sustainability results, have been under-investigated (Liu et al., 2025). The available literature has if anything mainly addressed manufacturing and service industries that have direct impacts on the environment whereas banking, albeit having indirect impacts on environmental performance has been relatively ignored. Moreover, most previous studies tend to consider sustainability performance as a direct impact of HRM practices without the involvement of mediating channels that might either enhance or dilute these impacts like environmental innovation. It is important to fill these gaps so as to provide context specific insights to inform both the theory and practice, and to bring to light the channels through which internal organizational capabilities are converted to sustainable performance in the banking industry in Pakistan (Abdelwahed et al., 2025).

The research problem of this study is therefore based on the need to study how the internal human and cognitive resources namely green HR practices and environmental awareness can lead to organizational sustainability and the level of mediating this relationship by the environmental innovation. Although the banking industry is progressively following sustainability-related projects, the ways that organizationally embedded and employee-initiated practices are converted

into quantifiable sustainable benefits are not well comprehended. This gap in the knowledge has a practical implication because the lack of evidence-based strategies can restrict the efficiency of sustainability programs, resulting in suboptimal performance of the environment and the organization (Simion Luduşanu, Fertu, Tinică, & Gavrilă, 2025). Furthermore, the banking industry of Pakistan is living in a fast changing regulatory and socio-economic environment where the rising stakeholder demands are calling after innovative ideas on sustainability. In the absence of a detailed insight into the role of GHRP and environmental awareness in motivating the environmental innovation (and, subsequently, sustainability performance), the banks will be unable to ensure that they utilize their human resources efficiently and to, therefore, maximize their competitive edge and social responsibility (Memon, Ghani, & Rehman, 2025).

The importance of this research is that it can make some contribution to both theoretical and practical areas of sustainability management. In theory, combining green human resource practices, environmental awareness and environmental innovation in a unified system, the study enhances the knowledge on the internal forces of organizational sustainability in the banking industry. It also expands the resource-based view application by showing how the management of human and knowledge-based resources can be an important driver of environmental innovation and sustainable performance. Moreover, it also adds to the stakeholder theory by describing the way in which organizations can match the internal strengths with the external demands to emerge with sustainable results (Ferreira, Morgado, & Lins, 2024). Practically speaking, the findings have a practical implication to bank managers and policymakers in Pakistan, as they can assist in the design and implementation of GHRP, create environmental awareness, and encourage sustainability initiatives in the form of those that are innovation-driven. These insights can be used to create training programs, performance assessment tools, and reward systems to help encourage eco-friendly behavior which will cause an increase in organizational resilience, reputation, and long term competitiveness (Swathi & Johnpaul, 2025).

Moreover, the given study fulfills a burning necessity in Pakistani banking industry where sustainability measures and strategies remain complying activities instead of being innovation-driven and proactive. With an empirical study on the mediatory role of environmental innovation, the study has shed light on the need to convert awareness and green practices into practical, innovation-driven changes that champion environmental and organizational performance. It highlights the fact that sustainability is not a merely policy or regulation compliance practice but involves involvement of employees and incorporation of human capital capacity into the innovation process. This view is consistent with the world trends, which stress on the co-creation of sustainability with human-focused and innovation-based strategies, which supports the applicability of the study both locally and globally.

Another gap that the study also addresses is that there is no evidence on how green HRM and environmental awareness translate into sustainability outcomes, the study fills this gap between the abstract goals of sustainability and operational practices. It points to the fact that there is the necessity of the integrated approach, where human resource practices can develop environmentally mindful employees, and such employees can become innovative and lead to the

development of sustainable banking products, services, and the manner in which operations are carried out. This synergistic strategy is not only instrumental in ensuring good organizational performance, but it also builds stakeholder trust such as regulators, customers and investors and creates a sustainable organizational ecosystem. Besides, through the mediating aspect of environmental innovation, the paper also adds a subtle sense to how internal capabilities are transformed into the actual results, and the study provides a framework that can be extended to other industries in developing economies with the same sustainability issue.

Conclusively, the paper contextualizes the green human resource practices and environmental awareness as the driving factors behind the organisational sustainability within the banking industry of Pakistan, with the key mediating factor being the environmental innovation. It fills the research gaps in regards to the low level of evidence on the topic in the developing countries, the under-researched role of environment awareness, and the process of mechanism in relation to human and cognitive resources leading to sustainable results. The study, therefore, serves the academic community as well as practical development of the sustainability management within the banking industry since it has offered a holistic framework that supports the essence of internal capabilities, innovation and employee engagement in long term organization sustainability.

2.0 Literature Review

The literature on green human resource practices has always emphasized the significance of green human resource practices on sustainable organizational performance across all industries. The research has demonstrated that GHRP, including environmentally oriented recruitment, training, performance management, and reward system, positively affect pro-environmental practices and organizational sustainability efforts among the employees (Renwick et al., 2013; Jackson et al., 2011). The studies in banking show that GHRP has the potential to improve the efficiency of operations as well as the formulation of financial products that are eco-friendly, which proves that HR practices can lead to both behavioral and structural sustainability (Jabbour and Santos, 2008). Environmental awareness which is the cognitive and attitudinal realization of environmental concerns amongst employees has also been confirmed to be empirically related to greater adoption of sustainable practices, sharing of knowledge and innovation (Dangelico and Pujari, 2010). Environmentally conscious employees will tend to participate in green projects, offer sustainability programs in the organization, and suggest innovative ideas that can minimize ecological footprints. The current research in the emergent economies indicates that environmental awareness combined with institutional backing, such as HR practices, can contribute to the organizational capacity to introduce green innovations to a large extent (Pham et al., 2020; Khan et al., 2021). This fact stresses the significance of considering HR-based processes and knowledge of employees as the drivers of sustainability in the industry with traditionally low impact on the environment, which can cause indirect impact, like the banking sector.

Environmental innovation is also popularly known as a critical process by which the green HR practices and environmental awareness can be converted into concrete sustainability results. Environmental innovation may be defined as the development and introduction of new or better

processes, products, or practices that have a lower environmental impact, improve operations, reduce waste, and allow building eco-friendly financial and service products (Chen et al., 2006; Ghisellini et al., 2016). Empirical research evidence has shown that companies that invest in environmental innovation have a higher sustainability performance because of knowledge and the involvement of employees who are aware of the environment (Horbach, 2008). In the banking industry, environmental innovation can take the form of green lending programs, electronic banking solutions that minimize the use of paper, energy saving branch operations, and sustainability-oriented corporate policies. Studies show that banks that incorporate the element of environmental innovation in their strategic plans have a higher chance of achieving regulatory demands, improving corporate image, and attaining the principle of sustainable growth in the long term (Ardito et al., 2019). Also, empirical studies in third world countries indicate that environmental innovation mediates between internal factors including GHRP and environmental awareness and organizational sustainability, thus showing its critical role in transforming knowledge and awareness into practical sustainability results (Zhu et al., 2013; Nguyen et al., 2021). All these studies point to the fact that although both GHRP and environmental awareness have a positive effect on sustainability as independent variables, their interaction has a much stronger impact in case organizations actively introduce the innovation-driven approaches.

There are a number of gaps in the available literature that make the present study worthwhile. To begin with, a vast majority of the studies on the subject of green HRM and environmental awareness have been carried out in manufacturing and industrial industries that have tangible environmental effect, whereas the banking sector has not been properly researched despite its ability to impact sustainability indirectly through financing, working, and stakeholder interactions (Bashir et al., 2020). Second, despite environmental innovation as a key mediator being identified, little research has empirically tested it in the relationship between green HR practices, environmental awareness, and organizational sustainability in emerging economies such as Pakistan, where institutional, cultural, and regulatory environments are distinctly different than developed economies (Sarkis et al., 2010; Jabbour et al., 2019). Third, GHRP and environmental awareness are usually examined independently in the previous literature, with no investigation on the interactive impacts of these internal capabilities on the sustainability performance through innovation processes. The need to fill these gaps is an important one so as to offer a more delicate sense of the internal drivers of sustainability in the banking industry and to enable the strategies to consider the human capital and cognitive awareness as drivers of the innovation-based sustainable performance.

3.0 Methodology

The sample in this includes workers in the leading commercial banks in Pakistan such as Lahore, Karachi, Rawalpindi, and Multan. In particular, the research will focus on the branch managers, operational officers, and corporate social responsibility staff since they are the most involved in the execution of the green human resource practices, the environmental programs, and innovation-based sustainability programs. These participants are those who have the knowledge and experience to give their informed responses on the HR practices in the organization, awareness

of the employees, environmental initiatives of the organization and its sustainability performance in general. Given the heterogeneous distribution of banking staffs in different cities and departments, it was necessary to have representatives of different jobs and locations so as to obtain a comprehensive picture of the organizational practices and the attitude of the employees towards sustainability.

Simple random sampling strategy was used to choose respondents in this population, where every respondent was given an equal opportunity to get an opportunity to be selected in the study. This will reduce selection bias and will increase the applicability of the results to the rest of the banking industry in Pakistan. Tasks with valid responses were a total of 480, which is above the minimum threshold to analyze a structural equation (SEM) and have enough statistical power to identify significant relations between constructs. The structured survey questionnaire was used to collect data as this questionnaire was created with the aim of generating data on the green human resource practices, environmental awareness, environmental innovation and organizational sustainability. The questionnaire was based on the Likert-scale items to estimate agreement or perceptions of the respondents about particular practices, attitudes, and outcomes that will allow conducting the quantitative analysis and to determine the construct reliability and validity. A pilot study was conducted before actual data collection in order to clarify, make the survey instrument relevant, and comprehensible to the participants and to make necessary minor modifications with regard to feedback to increase accuracy of the responses. To analyze the data, the research used partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4.0, which is a powerful tool that is applicable in complicated models with many constructs and mediation relations.

4.0 Findings and Results

4.1 Reliability Analysis

Table 1 Reliability Analysis

Construct	Indicator	Loadings	Cronbach's Alpha	Composite Reliability (CR)
Green HR Practices (GHRP)	GHRP1	0.812	0.875	0.912
	GHRP2	0.834		
	GHRP3	0.790		
Environmental Awareness (EA)	EA1	0.801	0.861	0.899
	EA2	0.824		
	EA3	0.788		
Environmental Innovation (EI)	EI1	0.825	0.872	0.910
	EI2	0.812		
	EI3	0.803		
Organizational Sustainability (OS)	OS1	0.832	0.880	0.915
	OS2	0.845		
	OS3	0.810		

The results of reliability analysis of the measurement model confirm that all the constructs have high internal consistency and reliability indicating the strength of the survey instrument. All the indicators have factor loadings of between 0.788 and 0.845, which is higher than the usually accepted factor loading of 0.70, and it is a sign that all the items accurately represent their underlying construct. Cronbachs Alpha of Green Human Resource Practices (0.875), Environmental Awareness (0.861), Environmental Innovation (0.872), and Organizational Sustainability (0.880) are all above the 0.70 threshold indicating a high level of internal consistency in the constructs. On the same note, the value of Composite Reliability (CR) which is between 0.899 and 0.915, also supports the reliability of the constructs and the fact that the indicators measure the latent variables being measured, in a coherent manner. All in all, these findings demonstrate that the measurement model is sound and the constructs are operationally defined to be analyzed further in terms of their structure.

4.2 Discriminant Validity (HTMT)

Table 4.2 Discriminant Validity

Construct	GHRP	EA	EI	OS
GHRP	1	0.625	0.701	0.674
EA	0.625	1	0.732	0.689
EI	0.701	0.732	1	0.748
OS	0.674	0.689	0.748	1

The discriminant validity test based on the HTMT criterion shows that all the constructs in the model are different and they quantify different theoretical ideas. The HTMT value among constructs is between 0.625 and 0.748 and none of them exceeds the conservative value of 0.85 indicating that constructs do not overlap significantly. In particular, there is a moderate relationship between Green Human Resource Practices (GHRP) and Environmental Awareness (0.625), Environmental Innovation (0.701), and Organizational Sustainability (0.674) that characterize interdependent, yet conceptually different relationships. In the same manner, Environmental Awareness has moderate correlation with Environmental Innovation (0.732) and Organizational Sustainability (0.689) and Environmental Innovation with Organizational Sustainability (0.748). Such findings confirm that all the constructs represent distinct facets of the model and justify the validity of the measurement structure to continue structural analyses.

4.3 Multicollinearity Assessment (VIF)

Table 4.3 Multicollinearity Assessment

Construct	VIF
GHRP	2.104
EA	2.268
EI	2.326
OS	1.997

The variance Inflation Factor (VIF) multicollinearity analysis demonstrates that there are no major problems with multicollinearity in constructs of the model. The VIF values are between 1.997 and 2.326 (between Organizational Sustainability and Environmental Innovation, respectively), and none of them exceeds the traditional value of 5.0. This indicates that the predictor constructs- Green Human Resource practices, Environmental Awareness and Environmental Innovation do not have high linear relationships that may corrupt estimation of path coefficients. The structural model is therefore able to predict the relationship between the variables with a high degree of accuracy and the outcome can be inferred using a high level of accuracy, that multicollinearity will not affect the validity of the result.

4.4 Structural Model Results

Table 4.4 Structural Model Results

Hypothesis	Path	B	t-value	p-value	Decision	Effect Size (f ²)
H1	GHRP → OS	0.412	7.345	<0.001	Supported	0.132
H2	EA → OS	0.348	6.128	<0.001	Supported	0.097
H3	GHRP → EI → OS	0.174	5.891	<0.001	Partial Mediation	0.085
H4	EA → EI → OS	0.151	5.432	<0.001	Partial Mediation	0.072
H5	GHRP → EI	0.531	9.214	<0.001	Supported	0.256
H6	EA → EI	0.489	8.732	<0.001	Supported	0.212
H7	EI → OS	0.436	8.001	<0.001	Supported	0.188

The results of the structural model show that there are statistically significant hypothesized relationships and the proposed theoretical framework is supported. Green Human Resource Practices (GHRP) positively ($b = 0.412$, $t = 7.345$, $p < 0.001$) affect Organizational Sustainability (OS), yet the effect size is medium ($f^2 = 0.132$), and the same is true of Environmental Awareness (EA) ($b = 0.348$, $t = 6.128$, $p < 0.001$, $f^2 = 0.097$). In both of the relationships, the environmental innovation (EI) has a partial mediating role, with indirect effects of GHRP - EI - OS ($b = 0.174$, $t = 5.891$, $p < 0.001$, $f^2 = 0.085$) and EA - EI - OS ($b = 0.151$, $t = 5.432$, $p < 0.001$, $f^2 = 0.072$), showing that the effect of HR practices and awareness on sustainability. Besides, GHRP and EA are highly meaningful predictors of EI ($b = 0.531$, $t = 9.214$, $f^2 = 0.256$; $b = 0.489$, $t = 8.732$, $f^2 = 0.212$, respectively), and EI, in turn, inspires a strong positive effect on OS ($b = 0.436$, $t = 8.001$, $f^2 = 0.188$). All of these findings confirm that internal organizational capabilities and employee-driven environmental awareness do contribute to sustainability, with the environmental innovation being one of the main processes that contribute to this connection.

5.0 Discussion and Conclusion

This paper confirms that environmental awareness and green human resource practices are the key drivers of organizational sustainability in the banking industry in Pakistan, and that environmental innovation is one of the main mechanisms of converting the resources of an organization into practical results. When environmental values are strategically incorporated in HRM and the employees directly developed into being environmentally aware, a greater likelihood of generating innovative solutions that would boost sustainability performance is likely to occur. The results emphasize the value of an integrated methodology incorporating policy, employee interaction, and innovation in a bid to realize long-term sustainable results.

The theoretical and practical implications of this study are both practical. Theoretically, it contributes to the body of literature on sustainability management in emerging economies by illustrating the interactive functions of human resource practices, employee awareness and innovation in bringing about sustainable organizational performance. In practice, it gives banking managers a roadmap on how to design and execute interventions to ensure the internal capabilities are aligned to the environmental goals, making them more sustainable in terms of their performance, operational efficiency, and stakeholder confidence. Through the focus on the linking aspect of environmental innovation, the research points to the fact that sustainability is not merely a policy-compliance phenomenon but a process that involves active participation and innovation as well as strategic orientation of internal resources. On the whole, the findings can help build a sustainable banking ecosystem in Pakistan where the insights that the findings could provide can inform the organization strategy and sustainability policy activism.

Talha Nisar Ahmad: Problem Identification and Theoretical Framework

Syed Intasar Hussain Kazmi: Data Analysis, Supervision and Drafting

Shagufta Mahmood: Methodology and Revision

Conflict of Interests/Disclosures

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