The Asia Pacific
Journal of Management Studies

E – ISSN : 2502-7050
P – ISSN : 2407-6325

Vol. 13 │No. 1

GREEN HUMAN RESOURCE MANAGEMENT AND SUSTAINABLE PERFORMANCE IN BUMDES: MEDIATING EFFECTS OF GREEN INNOVATION AND RISK MANAGEMENT

Ahmad[1], Etik Prihatin[2], Heriyanti Mustafa[3], Firman Bachtiar[4], Danis Imam Bachtiar[5]
[1]Universitas La Tansa Mashiro, [2]Universitas Muslim Indonesia, [3]STIE Amkop Makassar, [4-5]Politeknik Sawunggalih Aji

Article Info

Keywords:
Green innovation; green human resource management; risk management; sustainable performance, BUMDesa.

Corresponding Author:
dr.ahmadbento@gmail.com

The Asia Pacific Journal of Management Studies
Volume 13 dan Nomor 1
Januari - April 2026
Hal. 31 - 44

Abstract

Rapid economic development and environmental degradation have become major challenges for community-based organizations, including Village-Owned Enterprises (BUMDes) operating in the tourism sector. Tourism-based BUMDes in Banten Province not only function as drivers of local economic development but also carry responsibilities for maintaining environmental and social sustainability. Therefore, the implementation of Green Human Resource Management (GHRM) practices has become a crucial strategic approach for enhancing the sustainable performance of tourism-based BUMDes. Existing literature indicates that GHRM practices integrated with green innovation can foster environmentally responsible work behavior and generate sustainable value. However, risk management in the development of village-based tourism remains relatively limited and has not been optimally integrated with GHRM practices and green innovation initiatives. Based on this gap, the present study aims to analyze the influence of GHRM practices on the sustainable performance of tourism-sector BUMDes in Banten Province through the mediating role of green innovation. Additionally, this study examines the moderating role of risk management in the relationship between GHRM practices and sustainable performance. This study adopts a quantitative research approach. Data were collected from managers and employees of tourism-sector BUMDes in Banten Province. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the structural relationships among the variables. The results reveal that GHRM practices positively influence sustainable performance through green innovation. Furthermore, risk management significantly moderates the relationship between GHRM practices and green innovation in enhancing sustainable performance. These findings provide important implications for BUMDes managers, local governments, and policymakers in designing sustainable, competitive, and environmentally responsible strategies for village tourism development.

INTRODUCTION

The tourism sector plays a strategic role in society as it contributes significantly to economic prosperity, improves quality of life, and supports the preservation of local culture and environmental resources (Farrukh et al., 2023). However, tourism activities are also associated with substantial environmental impacts, including high energy consumption, increasing waste generation, and greenhouse gas emissions resulting from transportation and tourism operations (Sun et al., 2023). In recent years, growing awareness has emerged regarding the necessity for tourism organizations to adopt sustainable practices in order to mitigate environmental impacts, reduce operational costs, and ensure the long-term sustainability of tourism destinations.

In response to these challenges, Green Human Resource Management (GHRM) has emerged as a crucial strategic approach for tourism organizations seeking to enhance sustainable performance (Chowdhury et al., 2023). Community well-being, tourism industry development, and long-term sustainability largely depend on how environmental management is implemented responsibly. In practice, sustainability has become a critical element in the tourism sector for achieving competitive advantage while responding to evolving workplace dynamics and changing tourist preferences (Kanan et al., 2023).

Environmental degradation often occurs as a consequence of excessive human exploitation of natural resources, frequently preceding the realization of sustainable economic growth (Shahzad et al., 2023). In this context, environmental conservation and the protection of natural resources for future generations have become universal imperatives, including in tourism development (Rizvi & Garg, 2022).

Top management and decision-makers in tourism-related businesses increasingly prioritize effective resource management strategies to achieve sustainable performance, particularly in preserving and protecting the ecosystems of tourism destinations. Many tourism organizations, including community-based tourism enterprises, are actively exploring innovative approaches, experimenting with alternative strategies, and developing creative techniques to improve operational processes and leverage technological advancements to foster organizational innovation aimed at achieving sustainable performance (Martins et al., 2021). These efforts are also supported by the rapid advancement of digital technologies and information systems within the tourism industry.

Within this context, human resource managers increasingly view Green Human Resource Management practices as a strategic mechanism for formulating and implementing policies and procedures that encourage environmentally responsible employee behavior and ultimately enhance the sustainable performance of tourism organizations.

Amid growing environmental degradation concerns and the rapid rise of green consumption trends within the tourism industry, there is an urgent need to transform existing economic development models and tourism management practices (Sun et al., 2020). Consequently, green technologies have become a fundamental component of environmental preservation efforts while simultaneously supporting sustainable tourism growth (Zhang et al., 2020). Sustainable performance in tourism organizations can therefore be achieved through the effective implementation of green innovation processes designed to address environmental challenges and promote long-term destination sustainability.

Furthermore, in the context of risk management, green innovation plays an essential role in simultaneously enhancing environmental, socio-cultural, and economic performance within tourism organizations (Burlea-Schiopoiu et al., 2022). Previous studies also indicate that green innovation significantly contributes to sustainable development outcomes in service industries, including tourism (Asadi et al., 2020).

Prior research has examined the relationship between Green Human Resource Management practices and sustainable performance in industrial sectors (Mousa & Othman, 2020). However,

existing studies remain limited, particularly regarding how green innovation—often characterized by high levels of uncertainty—may influence the sustainable performance of organizations and strategic decision-making processes (Bi, 2022). As a result, more comprehensive research is required to better understand these relationships.

Therefore, this study investigates how GHRM practices can engage BUMDes managers, village governments, and frontline tourism operators in fostering environmentally responsible workplaces and sustainable tourism activities. In addition, within the context of risk mitigation and management, green innovation is expected to predict and enhance the sustainable performance of tourism-sector BUMDes while simultaneously contributing to environmental protection, strengthening socio-cultural values, and promoting local economic development.

The Ability–Motivation–Opportunity (AMO) theory explains that employees' abilities, motivation, and opportunities play a crucial role in fostering pro-environmental behavior within organizations. Organizations are increasingly adopting environmentally oriented practices—such as green recruitment and relevant training programs—to develop employees' environmental knowledge and skills (Gardas et al., 2019). These competencies can subsequently be utilized in innovative and creative ways to stimulate green innovation and achieve sustainable performance.

Previous studies indicate that employees who possess high levels of motivation and adequate skills tend to demonstrate more optimal performance in supporting the achievement of organizational sustainability goals (Yong et al., 2020). Moreover, competent employees are capable of generating creative ideas to manage risks associated with green innovation processes, thereby mitigating environmental impacts and strengthening organizational sustainability.

Furthermore, employee training and development have been shown to enhance motivation and empower employees to initiate various green innovation initiatives, which ultimately help reduce risks and generate sustainable benefits for organizations (Anuradha & Srivastava, 2019). Therefore, within the AMO theoretical framework, Green Human Resource Management (GHRM) practices play a significant role in strengthening employees' contributions to green innovation and sustainable organizational performance.

Another theoretical perspective relevant to this study is Resource Dependence Theory (RDT), which is widely used in organizational and management studies to analyze the relationship between organizations and their external environments. RDT suggests that organizations depend on various resources originating from their external environment. In the context of green innovation and sustainability, organizations may depend on resources such as green technologies and public perception (Saeed & Jun, 2018). These resources are often scarce and subject to fluctuations, making organizations vulnerable to uncertainties in resource availability.

To address such conditions, organizations typically attempt to control or influence the resources on which they depend. Green innovation can be achieved through investments in research and development aimed at creating environmentally friendly products and processes (Mardani et al., 2020). Meanwhile, risk management can be implemented by developing contingency plans to mitigate risks associated with resource scarcity or environmental regulations. RDT can therefore be applied to analyze how organizations manage risks arising from their dependence on external resources.

Organizations may diversify their sources of green technologies or invest in developing internal capabilities to reduce dependence on external suppliers for critical green resources. Accordingly,

RDT provides a useful framework for analyzing the complex relationships between organizations, their external environments, and their green innovation and risk management efforts in achieving sustainable performance (Attah-Boakye et al., 2020). Through understanding these dynamics, organizations can make more informed decisions and formulate strategies that support long-term sustainability objectives.

This study seeks to contribute to the limited literature by examining green innovation as a mediating variable and risk management as a moderating variable in the relationship between Green Human Resource Management (GHRM) practices and sustainable performance, grounded in the theoretical perspectives of AMO and RDT.

RESEARCH METHODS

A cross-sectional study was conducted to examine the sustainable performance of Village-Owned Enterprises (BUMDes) employees through the role of green innovation while accounting for the risks associated with such innovation. Specifically, the focus on the tourism sector was chosen due to its strategic significance and strong support from previous studies highlighting the importance of sustainability practices within tourism organizations (Burlea-Schiopoiu et al., 2022; Ren et al., 2018). Furthermore, a convenience sampling technique was employed to investigate the proposed sustainable performance model.

The respondents in this study consisted of managers and employees from BUMDes operating in the tourism sector across Banten Province, Indonesia. A total of 440 questionnaires were distributed to these organizations, of which 400 completed questionnaires containing valid and complete information were returned by respondents. This resulted in a response rate of approximately 90%. Consequently, the final sample comprised 400 tourism service providers aged between 20 and 44 years or older who participated in this empirical investigation.

Survey data indicate that the respondents consisted of 244 males (61%) and 156 females (39%). Additionally, this study specifically targeted employees working in BUMDes with professional experience ranging from three to eight years or more. A comprehensive summary of the demographic characteristics of the participants is presented in Table 1.

Data collection was conducted using a convenience sampling technique among tourism-sector BUMDes operating in Banten Province. The data were gathered through direct visits to BUMDes business units, during which the researchers explained the purpose of the study to the respondents. Subsequently, respondents were asked to complete a questionnaire containing demographic information as well as measurement items related to the study variables. The entire data collection process was conducted over a period of 78 days.

The research questionnaire consisted of two sections: respondent demographic information and items measuring Green Human Resource Management (GHRM) practices, green innovation, risk management, and sustainable performance in tourism-sector BUMDes. The questionnaire was administered online using Google Forms.

To ensure the reliability and validity of the study, the measurement instruments were adapted from validated scales used in previous studies and measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). GHRM practices were operationalized through three dimensions: green recruitment, green training, and green performance appraisal. Green innovation and risk management were measured using several standardized items, while sustainable performance was measured through three dimensions: social, economic, and environmental performance. The detailed measurement items are presented in the following table.

Table 1. Participant specifications (n = 400).

Demographics	*n*	Percentage (%)
Biological sex		
Male	244	61%,
Female	156	39%
Age		
20–28 years	121	30%
29–36 years	213	53%
37–44 years or above	66	17%
Occupational position		

Manager	112	28%
Employee	288	72%
Professional experience		
3–5 years	141	35%
6 years or above	259	65%
Regency work area		
Kabupaten Lebak	122	31%
Kabupaten Pandeglang	64	16%
Kabupaten Serang	98	25%
Kabupaten Tangerang	116	29%

ANALYSIS AND RESULTS

Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed in this study to evaluate the proposed sustainable performance model using the statistical software SmartPLS. This statistical approach is widely used to estimate complex relationships among independent, mediating, moderating, and dependent variables (Farrukh et al., 2023; Farrukh et al., 2024a; Farrukh et al., 2024b).

PLS-SEM is particularly appropriate for this study because it enables the analysis of complex models involving multiple mediation and moderation effects (Hair et al., 2020). Specifically, the PLS-SEM procedure follows a two-stage modeling approach to evaluate the measurement model and the structural model (Anderson & Gerbing, 1988; Farrukh et al., 2024a; Farrukh et al., 2024b).

First, the measurement model—an essential parameter in this study—was validated using the PLS-SEM approach. Confirmatory Factor Analysis (CFA) was conducted to examine the constructs and assess convergent validity. In addition, internal consistency reliability, discriminant validity, and overall model adequacy were evaluated within the measurement structure (Sarstedt et al., 2014).

Table 2. Factor analysis of constructs.

Constructs	Items	FL	α	CR	AVE	VIF
GHRM practices			0.956	0.963	0.741	
Green hiring	GH1	0.837				1.241
	GH2	0.844				2.359
	GH3	0.835				2.545
Green training	GT1	0.942				2.275
	GT2	0.880				1.217
	GT3	0.860				2.561
Green performance assessment	GPA1	0.879				1.781
	GPA2	0.848				2.890
	GPA3	0.816				2.661
Risk management (RM)			0.950	0.962	0.838	
	RM1	0.948				3.266
	RM2	0.923				2.439
	RM3	0.968				1.842
	RM4	0.964				2.274
	RM5	0.758				2.836
Green innovation (GI)			0.948	0.958	0.741	
	GI1	0.881				2.589
	GI2	0.884				1.416
	GI3	0.835				2.493
	GI4	0.907				2.589
	GI5	0.925				1.516
	GI6	0.910				2.892
Sustainable performance			0.958	0.964	0.690	
Social performance	SP1	0.848				1.417
	SP2	0.864				2.655
	SP3	0.885				2.741
	SP4	0.799				1.693
Economic performance	EP1	0.871				2.155
	EP2	0.706				2.561
	EP3	0.866				1.557

	EP4	0.850	1.411
Environmental performance	ENP1	0.914	2.881
	ENP2	0.795	1.778
	ENP3	0.784	2.081
	ENP4	0.759	2.591

Note(s): FL: Factor loading; α: Cronbach's alpha; VIF: Variance inflation factor; CR: Composite reliability; AVE: Average variance extracted.

The PLS-SEM algorithm was further applied to assess construct validity. Discriminant validity ensures that each construct is empirically distinct from other constructs within the model (Fornell & Bookstein, 1982). This validity was evaluated using the Fornell–Larcker criterion, which compares the square root of the AVE of each construct with its correlations with other constructs.

As presented in Table 3, the square root of the AVE for each latent variable is greater than the correlations with other variables. These results confirm that the model satisfies the discriminant validity requirement.

Structure model

To test the proposed hypotheses, the structural model was assessed using a bootstrapping procedure with 5,000 resamples to obtain estimates of the population mean (M), standard deviation (SD), path coefficient (β), t-values, and p-values for determining statistical significance (Shahzad, Xu, & Baheer, 2024; Zhang et al., 2024).

The coefficient of determination (R^2) was also examined to evaluate the explanatory power of the independent variables on the dependent constructs (Martins, Shahzad, & Xu, 2023). The results show that the R^2 value for green innovation is 0.271, while the R^2 value for sustainable performance is 0.274, indicating moderate explanatory power of the model. A visual representation of the estimated model is presented in Figure 2.

Table 3. Discriminant validity.

Variables	1	2	3	4	5
GHRMP	**0.861**				
GI	0.386	**0.891**			
Moderating effect of RM	−0.133	0.181	**1.000**		
RM	0.296	0.380	0.044	**0.916**	
SP	0.396	0.469	0.109	0.786	**0.830**

Note(s): GHRMP: Green human resource management practices; GI: Green innovation; RM: Risk management; SP: Sustainable performance.

Table 4. Summary of structure model.

Path	β-values	Mean	SD	t-values	p-values	Decision
Direct effect						
GHRMP → SP (H1)	0.252	0.249	0.049	5.164	0.000	Supported
GHRMP → GI (H2)	0.334	0.339	0.047	7.084	0.000	Supported
GI → SP (H3)	0.372	0.375	0.043	8.707	0.000	Supported
RM → GI (H5)	0.272	0.269	0.051	5.321	0.000	Supported
Mediation effect						
GHRMP → GI → SP (H4)	0.124	0.127	0.020	6.092	0.000	Supported
Moderation effect						
RM → GI (H6)	0.195	0.200	0.043	4.560	0.000	Supported

Note(s): GHRMP: Green human resource management practices; GI: Green innovation; RM: Risk management; SP: Sustainable performance.

The hypothesis testing results based on Structural Equation Modeling are summarized in Table 4, which reports the path coefficients (β), t-values, and p-values. The first hypothesis (H1) proposed that Green Human Resource Management (GHRM) practices positively influence the sustainable performance of tourism-sector BUMDes. The results indicate a significant positive

relationship ($\beta = 0.252$; $t = 5.164$; $p < 0.05$). Therefore, H1 is supported. This finding suggests that GHRM practices contribute positively to sustainable performance by fostering environmentally oriented work behaviors within organizations. This result is consistent with previous studies emphasizing the role of GHRM in enhancing sustainable organizational outcomes (Ahmad, 2015; Malik et al., 2021).

The results for H2 show that GHRM practices are positively associated with green innovation in tourism-sector BUMDes. As shown in Table 4, the relationship is statistically significant ($\beta = 0.334$; $t = 7.084$; $p < 0.05$). Thus, H2 is supported. This finding indicates that stronger implementation of GHRM practices—such as environmental training programs, employee participation in green initiatives, and sustainability-oriented reward systems—can significantly enhance the development of green innovation in tourism management, including sustainable destination management, waste reduction initiatives, and environmentally friendly tourism products.

The testing of H3 indicates that green innovation positively influences the sustainable performance of tourism-sector BUMDes. The empirical results confirm a significant relationship ($\beta = 0.372$; $t = 8.707$; $p < 0.05$). Hence, H3 is supported. This finding suggests that the implementation of green innovation—such as conservation-based destination management, energy efficiency initiatives, and environmentally responsible tourism products—contributes significantly to improved economic, environmental, and social performance within village-based tourism enterprises.

The study also hypothesized that green innovation mediates the relationship between GHRM practices and sustainable performance (H4). The mediation analysis results confirm a significant indirect effect ($\beta = 0.124$; $t = 6.092$; $p < 0.05$), supporting H4. This finding implies that GHRM practices not only influence sustainable performance directly but also enhance it indirectly through the development of green innovation. These results align with previous research highlighting the strategic integration of GHRM and green innovation in achieving sustainable organizational outcomes (Aftab et al., 2022; Munawar et al., 2022).

Furthermore, H5 proposed that risk management positively influences green innovation in tourism-sector BUMDes. The results reveal a significant positive relationship ($\beta = 0.272$; $t = 5.321$; $p < 0.05$), confirming H5. This finding suggests that effective risk management—such as environmental risk mitigation, operational risk control in tourism destinations, and anticipation of socio-economic risks—enhances the ability of BUMDes to systematically develop green innovation initiatives. This result supports prior studies emphasizing the role of risk management in fostering innovation and organizational sustainability (Jun & Rowley, 2014; Lee, 2018).

Finally, H6 proposed that risk management positively moderates the relationship between GHRM practices and green innovation. The moderation analysis reveals a significant interaction effect ($\beta = 0.195$; $t = 4.560$; $p < 0.05$), supporting H6. This finding indicates that when tourism-sector BUMDes implement effective risk management systems, the positive influence of GHRM practices on green innovation becomes stronger, thereby contributing more significantly to sustainable performance outcomes.

Overall, the findings suggest that the sustainable performance of tourism-sector BUMDes is not solely determined by the implementation of GHRM practices but also depends on the organization's ability to manage risks and develop green innovation in an integrated manner.

CONCLUSION

This empirical study promotes the broader implementation of Green Human Resource Management (GHRM) practices by examining sustainable performance through the mediating role of green innovation in tourism-sector Village-Owned Enterprises (BUMDes). The study also analyzes the moderating role of risk management in

the relationship between GHRM practices and green innovation. The results support all proposed hypotheses, indicating that GHRM practices significantly influence the sustainable performance of tourism-sector BUMDes, with green innovation acting as a mediating variable and risk management serving as a moderating variable.

The Ability–Motivation–Opportunity (AMO) theory and Resource Dependence Theory (RDT) further strengthen the research model by explaining that GHRM practices enable organizations to develop environmentally responsible systems and enhance sustainable performance by improving the abilities, motivation, and opportunities of BUMDes managers and employees.

This study contributes to narrowing the gap between theory and practice in the field of green human resource management, particularly within the context of village-based organizations. The findings provide empirical evidence that supports the role of GHRM in improving environmental performance and promoting sustainable rural tourism development. In particular, the adoption of environmentally friendly technologies and conservation-based innovations has become increasingly important in the management of village tourism destinations.

Therefore, the results encourage tourism-sector BUMDes to strengthen GHRM practices and adopt green innovation initiatives in order to maximize long-term sustainable performance while ensuring environmental protection and improving the welfare of rural communities. In addition, the findings highlight that the integration of green innovation and effective risk management significantly enhances sustainable organizational performance.

From a practical perspective, this study provides strategic insights for BUMDes managers, local governments, and policymakers in designing sustainable, competitive, and environmentally oriented village tourism development strategies. The practical implications emphasize the importance of increasing investment in green practices, enabling BUMDes to obtain optimal economic, social, and environmental benefits from their sustainability initiatives.

DAFTAR PUSTAKA

Abdullah, M., Zailani, S., Iranmanesh, M., & Jayaraman, K. (2016). Barriers to green innovation initiatives among man- ufacturers: the Malaysian case. *Review of Managerial Science*, *10*(4), 1–21. https://doi.org/10.1007/s11846-015- 0173-9

Aftab, J., Abid, N., Cucari, N., & Savastano, M. (2022). Green human resource management and environmental perfor- mance: The role of green innovation and environmental strategy in a developing country. *Business Strategy and the Environment*, *32*(4), 1782–1798. https://doi.org/10.1002/bse.3219

Ahmad, S. (2015). Green human resource management: Policies and practices. *Cogent Business & Management*, *2*(1), 103081. https://doi.org/10.1080/23311975.2015.1030817

Ahmed, U., Mozammel, S., & Zaman, F. (2020). Green hrm and green innovation: Can green transformational leader- ship moderate: Case of pharmaceutical firms in australia. *Systematic Reviews in Pharmacy*, *11*(7), 612–617. https:// doi.org/10.31838/srp.2020.7.86

Al Kerdawy, M. M. A. (2019). The Role of Corporate Support for Employee Volunteering in Strengthening the Impact of Green Human Resource Management Practices on Corporate Social Responsibility in the Egyptian Firms. *European Management Review*, *16*(4), 1079–1095. https://doi.org/10.1111/emre.12310

Alraja, M. N., Imran, R., Khashab, B. M., & Shah, M. (2022). Technological Innovation, Sustainable Green Practices and SMEs Sustainable Performance in Times of Crisis (COVID-19 pandemic). *Information Systems Frontiers: a Journal of Research and Innovation*, *24*(4), 1081–1105. https://doi.org/10.1007/s10796-022-10250-z

Amjad, F., Abbas, W., Zia-Ur-Rehman, M., Baig, S. A., Hashim, M., Khan, A., & Rehman, H. u (2021). Effect of green human resource management practices on organizational sustainability: the mediating role of environmental and employee performance. *Environmental Science and Pollution Research International*, *28*(22), 28191–28206. https:// doi.org/10.1007/s11356-020-

11307-9

Anderson, J. C., & Gerbing, D. W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, *103*(3), 411–423. https://doi.org/10.1037/0033-2909.103.3.411

Anuradha, A., & Srivastava, A. K. (2019). The Study of Green Human Resource Management and its effect on employ- ees' health in Automobile Industry. *International Conference on Advances in Business, Management and Law (ICABML)*, *2*(1), 149–158. https://doi.org/10.30585/icabml-cp.v2i1.258

Asadi, S., OmSalameh Pourhashemi, S., Nilashi, M., Abdullah, R., Samad, S., Yadegaridehkordi, E., Aljojo, N., & Razali, N. S. (2020). Investigating influence of green innovation on sustainability performance: A case on Malaysian hotel industry. *Journal of Cleaner Production*, *258*, 120860. https://doi.org/10.1016/j.jclepro.2020.120860

Attah-Boakye, R., Adams, K., Kimani, D., & Ullah, S. (2020). Technological Forecasting & Social Change The impact of board gender diversity and national culture on corporate innovation : A multi-country analysis of multinational cor- porations operating in emerging economies. *Technological Forecasting & Social Change*, *161*(August), 120247. https://doi.org/10.1016/j.techfore.2020.120247

Aven, T. (2016). Risk assessment and risk management: Review of recent advances on their foundation. *European Journal of Operational Research*, *253*(1), 1–13. https://doi.org/10.1016/j.ejor.2015.12.023

Awan, F. H., Dunnan, L., Jamil, K., & Gul, R. F. (2023). Stimulating environmental performance via green human re- source management, green transformational leadership, and green innovation: a mediation-moderation model. *Environmental Science and Pollution Research International*, *30*(2), 2958–2976. https://doi.org/10.1007/s11356-022- 22424-y

Bi, H. (2022). Risk innovation green innovation management of Chinese and Russian stock markets based on time-space kriging model. *International Journal of Frontiers in Engineering Technology*, *4*(3), 49–59. https://doi. org/10.25236/IJFET.2022.040307

Bombiak, E. (2018). Green Human Resource Management as a Tool for the Sustainable Development of Enterprises : Polish Young Company Experience. https://doi.org/10.3390/su10061739

Burlea-Schiopoiu, A., Shoukat, M. H., Shah, S. A., Ahmad, M. S., & Mazilu, M. (2022). The sustainability of the tobacco industry in the framework of green human resources management. *Sustainability (Switzerland)*, *14*(9), 5671. https://doi.org/10.3390/su14095671

Chen, Y. Y., & Huang, H. L. (2012). Knowledge management fit and its implications for business performance: A pro- file deviation analysis. *Knowledge-Based Systems*, *27*, 262–270. https://doi.org/10.1016/j.knosys.2011.11.012

Chowdhury, S. R., Mendy, J., & Rahman, M. (2023). A systematic literature review of GHRM: organizational sustainable performance reimagined using a new holistic framework. *Sustainability (Switzerland)*, *15*(9), 7513. https://doi.org/10.3390/su15097513

Doghan, M. A. A., Abdelwahed, N. A. A., Soomro, B. A., & Alayis, M. M. H. A. (2022). Organizational environmental culture, environmental sustainability and performance: The mediating role of green HRM and green innovation. *Sustainability (Switzerland)*, *14*(12), 7510. https://doi.org/10.3390/su14127510

Duong, T. T., Brewer, T., Luck, J., & Zander, K. (2019). A global review of farmers' perceptions of agricultural risks and risk management strategies. *Agriculture (Switzerland)*, *9*(1), 10. https://doi.org/10.3390/agriculture9010010

Durst, S., Hinteregger, C., & Zieba, M. (2019). The linkage between knowledge risk management and organizational performance. *Journal of Business Research*, *105*(July), 1–10. https://doi.org/10.1016/j.jbusres.2019.08.002

Farrukh, M., Javed, I., & Zahid, I. (2024a). The Influence of the Marketing Orientation of Textile Companies in Increasing Their Competitiveness. In Industry and Innovation:

Textile Industry (pp. 95-118). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-57804-5

Farrukh, M., Xu, S., An, X., & Javed, I. (2024b). Assessing the impact of AI-chatbot service quality on user e-brand loyalty through chatbot user trust, experience and electronic word of mouth. *Journal of Retailing and Consumer Services*, *79*(March), 103867. https://doi.org/10.1016/j.jretconser.2024.103867

Farrukh, M., Xu, S., Baheer, R., & Ahmad, W. (2023). Unveiling the role of supply chain parameters approved by block- chain technology towards firm performance through trust: The moderating role of government support. *Heliyon*, *9*(11), e21831. https://doi.org/10.1016/j.heliyon.2023.e21831

Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research*, *19*(4), 440–452. https://doi.org/10.2307/3151718

Gardas, B. B., Mangla, S. K., Raut, R. D., Narkhede, B., & Luthra, S. (2019). Green talent management to unlock sus- tainability in the oil and gas sector. *Journal of Cleaner Production*, *229*, 850–862. https://doi.org/10.1016/j.jclepro. 2019.05.018

Govindan, K., Seuring, S., Zhu, Q., & Azevedo, S. G. (2016). Accelerating the transition towards sustainability dynamics into supply chain relationship management and governance structures. *Journal of Cleaner Production*, *112*, 1813– 1823. https://doi.org/10.1016/j.jclepro.2015.11.084

Guerci, M., & Carollo, L. (2016). A paradox view on green human resource management: Insights from the Italian context. *The International Journal of Human Resource Management*, *27*(2), 212–238. https://doi.org/10.1080/09585192.2015.1033641

Haddock-Millar, J., Sanyal, C., & Müller-Camen, M. (2016). Green human resource management: A comparative quali- tative case study of a United States multinational corporation. *The International Journal of Human Resource Management*, *27*(2), 192–211. https://doi.org/10.1080/09585192.2015.1052087

Hair, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, *109*, 101–110. https://doi.org/10.1016/j.jbusres.2019.11.069

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structur- al equation modeling in marketing research. *Journal of the Academy of Marketing Science*, *40*(3), 414–433. https://doi.org/10.1007/s11747-011-0261-6

Hamdollah, R., & Baghaei, P. (2016). Partial least squares structural equation modeling with R. *Practical Assessment, Research and Evaluation*, *21*(1), 1–16. https://doi.org/10.7275/d2fa-qv48

Howard-Grenville, J., Buckle, S. J., Hoskins, B. J., & George, G. (2014). Climate change and management. *Academy of Management Journal*, *57*(3), 615–623. https://doi.org/10.5465/amj.2014.4003

Imran, R., Alraja, M. N., & Khashab, B. (2023). Sustainable performance and green innovation: green human resources management and big data as antecedents. *IEEE Transactions on Engineering Management*, *70*(12), 4191–4206. https://doi.org/10.1109/TEM.2021.3114256

Jerónimo, H. M., Henriques, P. L., Lacerda, T. C. d., da Silva, F. P., & Vieira, P. R. (2020). Going green and sustainable: The influence of green HR practices on the organizational rationale for sustainability. *Journal of Business Research*, *112*(June 2019), 413–421. https://doi.org/10.1016/j.jbusres.2019.11.036

Joshi, G., & Dhar, R. L. (2020). Green training in enhancing green creativity via green dynamic capabilities in the Indian handicraft sector: The moderating effect of resource commitment. *Journal of Cleaner Production*, *267*, 121948. https://doi.org/10.1016/j.jclepro.2020.121948

Jun, W., & Rowley, C. (2014). Change and continuity in management systems and corporate performance: Human resource management, corporate culture, risk management and corporate strategy in South Korea. *Business History*, *56*(3), 485–508. https://doi.org/10.1080/00076791.2013.809522

Kanan, M., Taha, B., Saleh, Y., Alsayed, M., Assaf, R., Hassen, M. B., Alshaibani, E., Bakir, A.,

& Tunsi, W. (2023). Green innovation as a mediator between green human resource management practices and sustainable performance in palestinian manufacturing industries. *Sustainability*, *15*(2), 1077. https://doi.org/10.3390/su15021077

Khan, N. U., Bhatti, M. N., Obaid, A., Sami, A., & Ullah, A. (2020). Do green human resource management practices contribute to sustainable performance in manufacturing industry? *International Journal of Environment and Sustainable Development*, *19*(4), 412–432. https://doi.org/10.1504/IJESD.2020.110647

Khurshid, F., Park, W. Y., & Chan, F. T. S. (2019). Innovation shock, outsourcing strategy, and environmental perfor- mance: The roles of prior green innovation experience and knowledge inheritance. *Business Strategy and the Environment*, *28*(8), 1572–1582. https://doi.org/10.1002/bse.2333

Kramar, R. (2014). Beyond strategic human resource management : is sustainable human resource management the next approach ? *The International Journal of Human Resource Management*, *25*(8), 1069–1089. https://doi.org/10.10 80/09585192.2013.816863

Kuckertz, A., & Wagner, M. (2010). The influence of sustainability orientation on entrepreneurial intentions - Investigating the role of business experience. *Journal of Business Venturing*, *25*(5), 524–539. https://doi.org/10.1016/ j.jbusvent.2009.09.001

Kumar, V., Bak, O., Guo, R., Shaw, S. L., Colicchia, C., Garza-Reyes, J. A., & Kumari, A. (2018). An empirical analysis of supply and manufacturing risk and business performance: a Chinese manufacturing supply chain perspective. *Supply Chain Management: An International Journal*, *23*(6), 461–479. https://doi.org/10.1108/SCM-10-2017-0319

Lee, D. H. (2018). The effect of safety management and sustainable activities on sustainable performance: Focusing on suppliers. *Sustainability (Switzerland)*, *10*(12), 4796. https://doi.org/10.3390/su10124796

Lenderink, B., Halman, J. I. M., Boes, J., Voordijk, H., & Dorée, A. G. (2022). Procurement and innovation risk manage- ment: How a public client managed to realize a radical green innovation in a civil engineering project. *Journal of Purchasing and Supply Management*, *28*(1), 100747. https://doi.org/10.1016/j.pursup.2022.100747

Liu, J., Gao, X., Cao, Y., Mushtaq, N., Chen, J., & Wan, L. (2022). Catalytic effect of green human resource practices on sustainable development goals: Can individual values moderate an empirical validation in a developing economy? *Sustainability*, *14*(21), 14502. https://doi.org/10.3390/su142114502

Malik, S. Y., Cao, Y., Mughal, Y. H., Kundi, G. M., Mughal, M. H., & Ramayah, T. (2020). Pathways towards sustainability in organizations: Empirical evidence on the role of green human resource management practices and green intel- lectual capital. *Sustainability (Switzerland)*, *12*(8), 3228. https://doi.org/10.3390/su12083228

Malik, S. Y., Mughal, Y. H., Azam, T., Cao, Y., Wan, Z., Zhu, H., & Thurasamy, R. (2021). Corporate social responsibility, green human resources management, and sustainable performance: is organizational citizenship behavior towards environment the missing link? *Sustainability*,)*13*(3), 1044. https://doi.org/10.3390/su13031044

Mardani, A., Kannan, D., Hooker, R. E., & Ozkul, S. (2020). Evaluation of green and sustainable supply chain man- agement using structural equation modelling : A systematic review of the state of the art literature and recom- mendations for future research. *Journal of Cleaner Production*, *249*, 119383. https://doi.org/10.1016/j.jclepro.2019. 119383

Martins, J. M., Aftab, H., Mata, M. N., Majeed, M. U., Aslam, S., Correia, A. B., & Mata, P. N. (2021). Assessing the impact of green hiring on sustainable performance: mediating role of green performance management and compensa- tion. *International Journal of Environmental Research and Public Health*, *18*(11), 5654. https://doi.org/10.3390/ ijerph18115654

Martins, J. M., Shahzad, M. F., & Javed, I. (2023). Assessing the impact of workplace harassment on turnover inten- tion : Evidence

from the banking industry, *Emerging Science Journal*, *7*(5), 1699–1722. https://doi.org/10.28991/ ESJ-2023-07-05-016

Martins, J. M., Shahzad, M. F., & Xu, S. (2023). Factors influencing entrepreneurial intention to initiate new ventures: evidence from university students. *Journal of Innovation and Entrepreneurship*, *12*(1), 63. https://doi.org/10.1186/ s13731-023-00333-9

Mousa, S. K., & Othman, M. (2020). The impact of green human resource management practices on sustainable per- formance in healthcare organisations: A conceptual framework. *Journal of Cleaner Production*, *243*, 118595. https:// doi.org/10.1016/j.jclepro.2019.118595

Mugiono, M., Purwoko, B. H., Soelton, M., & Yuvitasari, R. (2020). Recognizing how the job involvement, burnout, and self-efficacy work influences the work stress at international hospitals. *Atlantis Press*, *120*(Icmeb 2019), 264–270. https://doi.org/10.2991/aebmr.k.200205.046

Munawar, S., Yousaf, D. H. Q., Ahmed, M., & Rehman, D. S. (2022). Effects of green human resource management on green innovation through green human capital, environmental knowledge, and managerial environmental con- cern. *Journal of Hospitality and Tourism Management*, *52*(March), 141–150. https://doi.org/10.1016/j.jhtm.2022.06.009

Nawaz, R., Muhammad, L., & Aliya, A. (2024). Impact of innovation and sustainability on green entrepreneurship: a bibliometric exploration. *Environment, Development and Sustainability*, ahead-of-print. https://doi.org/10.1007/s10668-024-05053-y

Niazi, U. I., Nisar, Q. A., Nasir, N., Naz, S., Haider, S., & Khan, W. (2023). Green HRM, green innovation and environ- mental performance: the role of green transformational leadership and green corporate social responsibility. *Environmental Science and Pollution Research*, *30* (15), 45353–45368. https://doi.org/10.1007/s11356-023-25442-6

Olechowski, A., Oehmen, J., Seering, W., & Ben-Daya, M. (2016). The professionalization of risk management: What role can the ISO 31000 risk management principles play? *International Journal of Project Management*, *34*(8), 1568– 1578. https://doi.org/10.1016/j.ijproman.2016.08.002

Ramachandran, V. (2011). Strategic corporate social responsibility: A "dynamic capabilities" perspective. *Corporate Social Responsibility and Environmental Management*, *18*(5), 285–293. https://doi.org/10.1002/csr.251

Rehman, M. A., Seth, D., & Shrivastava, R. L. (2016). Impact of green manufacturing practices on organisational per- formance in Indian context: An empirical study. *Journal of Cleaner Production*, *137*, 427–448. https://doi.org/10.1016/ j.jclepro.2016.07.106

Ren, S., Tang, G., & E. Jackson, S. (2018). Green human resource management research in emergence: A review and future directions. *Asia Pacific Journal of Management*, *35*(3), 769–803. https://doi.org/10.1007/s10490-017-9532-1

Renwick, D. W. S., Redman, T., & Maguire, S. (2013). Green human resource management: A review and research agenda. *International Journal of Management Reviews*, *15*(1), 1–14. https://doi.org/10.1111/j.1468-2370.2011.00328.x

Rizvi, Y. S., & Garg, R. (2022). Environmental sustainability performance: A study of the role of green human resource management and other green internal intellectual capital components. *International Journal of Business and Systems Research*, *16*(1), 65–105. https://doi.org/10.1504/IJBSR.2022.119598

Saeed, A., & Jun, Y. (2018). Institutional pressures, green supply chain management practices on environmental and economic performance : A two theory view. *Sustainability*, *10*, 1517. https://doi.org/10.3390/su10051517

Sarkar, A. N. (2013). Promotion of eco-innovation to leverage sustainable development of eco-industry and green growth. *European Journal of Sustainable Development*, *2*(1), 71–104. https://doi.org/10.14207/ejsd.2013.v2n1p171

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2014). PLS-SEM: Looking Back and Moving Forward. *Long Range Planning*, *47*(3), 132–137. https://doi.org/10.1016/j.lrp.2014.02.008

Shahzad, F., Shahzad, M. F., Dilanchiev, A., & Irfan, M. (2022). Modeling the influence of paternalistic leadership and personality characteristics on alienation and organizational culture in the aviation industry of Pakistan: The medi- ating role of

cohesiveness. *Sustainability (Switzerland)*, *14*(22), 15473. https://doi.org/10.3390/su142215473

Shahzad, M. F., Khan, K. I., Saleem, S., & Rashid, T. (2021). What factors affect the entrepreneurial intention to start-ups? The role of entrepreneurial skills, propensity to take risks, and innovativeness in open business models. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(3), 173. https://doi.org/10.3390/joitmc7030173

Shahzad, M. F., Xu, S., & Baheer, R. (2024). Assessing the factors influencing the intention to use information and communication technology implementation and acceptance in China's education sector. *Humanities and Social Sciences Communications*, *11*, 283. https://doi.org/10.1057/s41599-024-02777-0

Shahzad, M. F., Xu, S., Khan, K. I., & Hasnain, M. F. (2023). Effect of social influence, environmental awareness, and safety affordance on actual use of 5G technologies among Chinese students. *Scientific Reports*, *13*(1), 22442. https://doi.org/10.1038/s41598-023-50078-4

Shahzad, M. F., Xu, S., Lim, W. M., Hasnain, M. F., & Nusrat, S. (2024). Cryptocurrency awareness, acceptance, and adoption: the role of trust as a cornerstone. *Humanities & Social Sciences Communications*, *11*, 4. https://doi.org/ 10.1057/s41599-023-02528-7

Shahzad, M. F., Xu, S., Lim, W. M., Yang, X., & Khan, Q. R. (2024). Artificial intelligence and social media on academic performance and mental well-being : Student perceptions of positive impact in the age of smart learning. *Heliyon*, *10*(8), e29523. https://doi.org/10.1016/j.heliyon.2024.e29523

Shahzad, M. F., Xu, S., Naveed, W., Nusrat, S., & Zahid, I. (2023). Investigating the impact of artificial intelligence on human resource functions in the health sector of China : A mediated moderation model. *Heliyon*, *9*(11), e21818. https://doi.org/10.1016/j.heliyon.2023.e21818

Shahzad, M. F., Xu, S., Rehman, O., & Javed, I. (2023). Impact of gamification on green consumption behavior inte- grating technological awareness, motivation, enjoyment and virtual CSR. *Scientific Reports*, *13*(1), 21751. https://doi.org/10.1038/s41598-023-48835-6

Singh, N. (2018). Strategic human resource practices for innovation performance: An empirical investigation.*Benchmarking: An International Journal*, *25*(9), 3459–3478. https://doi.org/10.1108/BIJ-08-2017-0215

Singh, S. K., Chen, J., Del Giudice, M., & El-Kassar, A. N. (2019). Environmental ethics, environmental performance, and competitive advantage: Role of environmental training. *Technological Forecasting and Social Change*, *146*(May), 203–211. https://doi.org/10.1016/j.techfore.2019.05.032

Singh, S. K., Giudice, M. D., Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technological Forecasting and Social Change*, *150*(October 2019), 119762. https://doi.org/10.1016/j.techfore.2019.119762

Song, W., Yu, H., & Xu, H. (2020). Effects of green human resource management and managerial environmental con- cern on green innovation. *European Journal of Innovation Management*, *24*(3), 951–967. https://doi.org/10.1108/ EJIM-11-2019-0315

Sun, J., Sarfraz, M., Ivascu, L., & Ozturk, I. (2023). Unveiling green synergies: sustainable performance through human resource management, CSR, and corporate image under a mediated moderation framework. *Environmental Science and Pollution Research*, *30*(45), 101392–101409. *0123456789*. https://doi.org/10.1007/s11356-023-29468-8

Sun, Y., Bi, K., & Yin, S. (2020). Measuring and integrating risk management into green innovation practices for green manufacturing under the global value Chain. *Sustainability*,)*12*(2), 545. https://doi.org/10.3390/su12020545

Syafri, W., Prabowo, H., Ashari Nur, S., & Muafi, M. (2021). The Impact of Workplace Green Behavior and Green Innovation on Green

Performance of SMEs: A Case Study in Indonesia. *Journal of Asian Finance*, *8*(5), 365–0374. https://doi.org/10.13106/jafeb.2021.vol8.no5.0365

Wang, L., Wu, W. M., Bolan, N. S., Tsang, D. C. W., Li, Y., Qin, M., & Hou, D. (2021). Environmental fate, toxicity and risk management strategies of nanoplastics in the environment: Current status and future perspectives. *Journal of Hazardous Materials*, *401*, 123415. https://doi.org/10.1016/j.jhazmat.2020.123415

Wang, Y., & Yang, Y. (2021). Analyzing the green innovation practices based on sustainability performance indicators: a Chinese manufacturing industry case. *Environmental Science and Pollution Research International*, *28*(1), 1181– 1203. https://doi.org/10.1007/s11356-020-10531-7

Wijethilake, C., & Lama, T. (2019). Sustainability core values and sustainability risk management: Moderating effects of top management commitment and stakeholder pressure. *Business Strategy and the Environment*, *28*(1), 143–154. https://doi.org/10.1002/bse.2245

Yong, J. Y., Sehnem, S., & Mani, V. (2020). Pathways towards Sustainability in manufacturing organizations : Empirical evidence on the role of green human resource management. *Business Strategy and the Environment*, *29*, 212–228. https://doi.org/10.1002/bse.2359

Yusliza, M. Y., Yong, J. Y., Tanveer, M. I., Ramayah, T., Noor Faezah, J., & Muhammad, Z. (2020). A structural model of the impact of green intellectual capital on sustainable performance. *Journal of Cleaner Production*, *249*, 119334. https://doi.org/10.1016/j.jclepro.2019.119334

Zaid, A. A., Jaaron, A. A. M., & Talib Bon, A. (2018). The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study. *Journal of Cleaner Production*, *204*, 965–979. https://doi.org/10.1016/j.jclepro.2018.09.062

Zailani, S., Govindan, K., Iranmanesh, M., Shaharudin, M. R., & Sia Chong, Y. (2015). Green innovation adoption in automotive supply chain: The Malaysian case. *Journal of Cleaner Production*, *108*, 1115–1122. https://doi.org/10.1016/ j.jclepro.2015.06.039

Zhang, J., Liang, G., Feng, T., Yuan, C., & Jiang, W. (2020). Green innovation to respond to environmental regulation: How external knowledge adoption and green absorptive capacity matter? *Business Strategy and the Environment*, *29*(1), 39–53. https://doi.org/10.1002/bse.2349

Zhang, X., Abbas, J., Shahzad, M. F., Shankar, A., Ercisli, S., & Dobhal, D. C. (2024). Association between social media use and students ‘ academic performance through family bonding and collective learning : The moderating role of mental well-being. *Education and Information Technologies*, ahead-of-print. https://doi.org/10.1007/s10639-023-12407-y

Zhao, W., & Huang, L. (2022). The impact of green transformational leadership, green HRM, green innovation and organizational support on the sustainable business performance: evidence from China. *Economic Research-Ekonomska Istraživanja*, *35*(1), 6121–6141. https://doi.org/10.1080/1331677X.2022.2047086

Zhong, Y., Li, Y., Ding, J., & Liao, Y. (2021). Risk Management: Exploring Emerging Human Resource Issues during the COVID-19 Pandemic. *Journal of Risk and Financial Management*, *14*(5), 228. https://doi.org/10.3390/jrfm14050228

Zibarras, L. D., & Coan, P. (2015). HRM practices used to promote pro-environmental behavior: a UK survey. *The International Journal of Human Resource Management*, *26*(16), 2121–2142. https://doi.org/10.1080/09585192.2014.972429