frontiers | Frontiers in Environmental Science

ORIGINAL RESEARCH
published: 08 June 2022
doi: 10.3389/fenvs.2022.901235

Green Human Resource Management and Sustainable Performance With the Mediating Role of Green Innovation: A Perspective of New Technological Era

Awwad Saad Awwad Al-Shammari[1], *Shaher Alshammrei*[2], *Nishad Nawaz*[3] *and Muhammad Tayyab*[4]*

[1]Department of Management & Information System, University of Ha'il, Ha'il, Saudi Arabia, [2]Department of Mechanical Engineering, University of Ha'il, Ha'il, Saudi Arabia, [3]Department of Business Management, College of Business Administration, Kingdom University, Riffa, Bahrain, [4]Sir Syed CASE Institute of Technology, Islamabad, Pakistan

The purpose of this study is to investigate the relationship between green human resource management bundle practices and green innovation and their impact on sustainability performance as measured by the Triple Bottom Lines (i.e., environmental, social, and economic performance). It is decided to use a quantitative approach in order to collect data from 335 small- and medium-sized (SMEs) businesses operating in the Kingdom of Saudi Arabia, through a customized survey. Structure equation modeling was applied through smart PLS to analyze the collected data. Results show that green human resource management bundle practices have a positive and significant impact on the sustainable performance of SMEs. Furthermore, results indicate that green innovation has a significant impact on sustainable performance and green innovation partially mediates the relationship between green human resource practices and sustainable performance of SMEs. This study demonstrates that the implementation of GI by firms can be enhanced through the use of GHRM, which, in turn, would enhance the firms' sustainability. Additionally, this study both confirms and enhances the traditional understanding. The study also depicts that environmental management practices in the human resource and innovation sectors can result in greater sustainability.

Keywords: green skills, green human resource management, green innovation, sustainable performance, SMEs

OPEN ACCESS

Edited by:
Munir Ahmad,
Zhejiang University, China

Reviewed by:
Muhammad Idrees,
University of Agriculture, Faisalabad, Pakistan
Sobia Naseem,
Shijiazhuang Tiedao University, China

***Correspondence:**
Muhammad Tayyab
mtayyab1984@gmail.com

Specialty section:
This article was submitted to Environmental Economics and Management, a section of the journal Frontiers in Environmental Science

Received: *21 March 2022*
Accepted: *19 April 2022*
Published: *08 June 2022*

Citation:
Awwad Al-Shammari AS, Alshammrei S, Nawaz N and Tayyab M (2022) Green Human Resource Management and Sustainable Performance With the Mediating Role of Green Innovation: A Perspective of New Technological Era. Front. Environ. Sci. 10:901235. doi: 10.3389/fenvs.2022.901235

INTRODUCTION

Increasing environmental concerns and the need for sustainable practices have resulted in a call for environmentally, economically, and socially sustainable practices in manufacturing organizations. Every organization now has an obligation to balance its economic, social, and environmental performance, especially those that operate in a highly competitive and regulated environment. Balancing these factors is perceived as a challenging task, even controversial in some cases (Renwick et al., 2013).

When introducing environmental management systems into an organization, it becomes very difficult to improve its environmental and social performance and increase its economic performance while maintaining cultural norms and integrating green behaviors into the organization's operations (Al-Ghazali & Afsar, 2021). Dost et al. (2019) suggested that the cross-functional distribution of green ideologies can assist in addressing these challenges. Researchers

investigated how green management should be applied to two critical business functions: human resources and innovation (Roscoe et al., 2019).

The relationship between these two functions needs to be further researched, however. Recent studies suggest studying how green management is distributed within various functional areas of an organization in order to examine concurrent results and the mutual relations among the various functions (Lei et al., 2021). Our study investigated the use of green management systems in human resources, and the relationship between the two. It is well known that green human resource management (GHRM) and green innovation (GI) have a positive impact on the environment, but there have been few studies that investigate their interaction (Seeck & Diehl, 2017). First, despite acknowledging that GHRM practices define GSCM practices internally, some researchers have primarily focused on the pressures companies face from outside. There is very minimal discussion of a "green version" of human resource management (HRM) or innovation in the literature that deals more specifically with the relationship between HRM and innovation. As such, further studies are required in this area to explore the mutually reinforcing results that GHRM and GI might provide at the triple bottom line (TBL): the environmental, financial, and social performance of a company (Çop et al., 2021).

GHRM and GI are examined as attributes of sustainable performance for medium and large manufacturing companies in the Kingdom of Saudi Arabia, and how both factors can affect the TBL of sustainable performance (environmental, social, and economic). GHRM practices and GI in developing countries are seldom explored in studies, as noted earlier. For example, empirical studies surrounding green practices are relatively new, especially for emerging markets. As such, this study presents empirical evidence from GHRM and GI research conducted in a developing country.

LITERATURE REVIEW

Theoretical Background

In this study, we study and explain the HRM-performance relationship for manufacturing sector SMEs in the Kingdom of Saudi Arabia using a resource-based view (RBV). There is no doubt that human capital affects firm performance and these links have roots in the existing HRM and strategy literature (Barney, 2001). Firms with resource-based views examine how their ability to leverage their valuable, scarce, and difficult to imitate strategic resources may affect their competitive advantage and performance (Barney, 2001). The strategic resources provide long-term superior performance and continuous competitive advantage to the organization if they are hard to duplicate or extremely expensive for competitors to imitate (Santos et al., 2020). In GHRM practices, employee behavior is proactively identified, developed, motivated, and extended for the firm's sustained competitive advantage and superior performance based on RBV (Hameed et al., 2021). We have found that human capital, when integrated into a firm's complex social system, usually satisfies the RBV criteria, as it may contribute to higher performance and competitive advantage throughout the system. As discussed earlier, the following section focuses on the formulation of hypotheses, and we use RBV (Barney, 2001) in order to construct arguments and propose several hypotheses to empirically test in research.

Hypotheses Development

Green Human Resource Management Bundles and Sustainable Performance

There is a growing understanding that the environmental impacts of HRM processes should be taken into consideration throughout the entire process since HRM practices contribute to implementing and maintaining an environmental management system (EMS), thereby helping organizations to achieve higher environmental performance (EP) (Gilal et al., 2019; Yusoff et al., 2020). In fact, GHRM ensures that firms are spread effectively and become more environmentally friendly. GHRM is essential for company management for several reasons, including environmental benefits, employee retention, and increasing a company's appeal. Former HRM literature emphasized the effects of individual practices as opposed to a set of HRM practices on firm performance (Pham et al., 2020; Awan et al., 2022).

Renwick et al. (2013) suggested that GHRM policies acting in concert could even have a greater impact on organizational performance and the environment. Accordingly, recent literature on GHRM has focused primarily on how GHRM practices influence bundle performance. RBV can be used to distinguish the resources used by organizations, according to (Gul et al., 2021a; Rizvi & Garg, 2021). It could affect an organization's economic performance (Ec.P) and eventually increase its efficiency. Instituting GHRM practices into an organization's practices, therefore, can result in improved EP over time (Hameed et al., 2021).

Siyambalapitiya et al. (2018) suggested that if green practices in the workplace increase employee characteristics such as motivation, and competence, financial performance may improve as a result. Employers who take environmental responsibility into account when recruiting workers, or at least show they care about the environment, will draw candidates who will be drawn to the company's environmental consciousness (Tariq et al., 2016; Jamil et al., 2021a). Developing and encouraging the environment's interests and activities can also be helpful for companies, as it can result in increased skill and motivation, better retention and productivity, and overall improved Ec.P. Shah, (2019) argued that, as organizations go green, they aim to create a more sustainable corporate culture that leads to increased efficiencies and costs reductions, while improving employee satisfaction. Promoting a greener culture results in improved sales and lower costs (Longoni et al., 2018; Jamil, et al., 2021b).

In addition to higher employee satisfaction, improved stakeholder relationships, and increased employee retention, firms that tackle environmental issues benefit in many ways (Yu et al., 2020; Naseem et al., 2021). Among the other benefits cited is an improved sense of social responsibility among the workforce and a better ability to recruit and retain

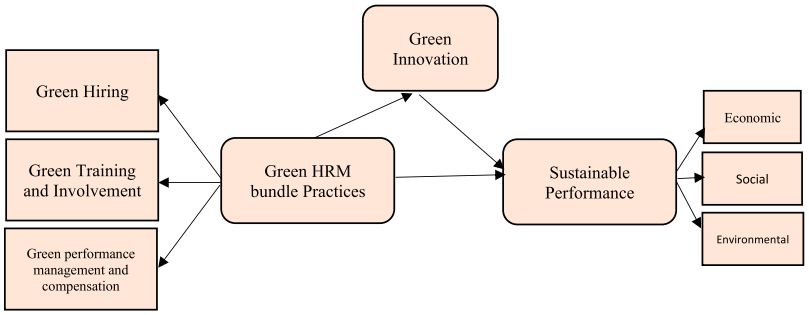

FIGURE 1 | Conceptual framework.

talent. As Paillé et al. (2020) documents, companies that invest in social responsibility are likely to benefit in a number of ways, including customer satisfaction, excellence in staff recruitment, and innovation, something that contributes directly to their social performance (Kim et al., 2019; Awan et al., 2021a). A significant step was taken by firms whose investments in social programs reinforced GHRM, as mentioned by Saeed et al. (2019). Such programs are designed to protect employee health and safety, such as preventing them from being exposed to harmful emissions. The incorporation of green programs will improve manufacturing companies' sustainability in addition to serving as a reporting tool (Jabbour and de Sousa Jabbour, 2016; Naseem et al., 2020).

In order for organizations to maximize the impact of their SP activities, they must ensure that they entail social activities that can impact both their internal communities (employees) and external communities (suppliers and customers) (Awan et al., 2021b; Samad et al., 2021). Additionally, research shows that organizations that have adopted GHRM practices contribute to employee welfare and environmental protection through their GHRM practices. Employee health and welfare are positively affected when GHRM practices and policies are implemented by a company, according to Mousa & Othman, (2020). Through this adoption, the company's Ec.P improved overall and the welfare of the employees. Therefore, we proposed the following hypothesis:

H1: GHRM practices have a significant impact on sustainable performance

Green Innovation and Sustainable Performance

The findings of Wang et al. (2020) on GI support the proposition that green purchase (GP) and cooperation with customers who are in GI or EP are positively correlated. Some evidence suggests that GP and environmental cooperation (EC) influence supplier and customer behavior in an environmentally friendly and sustainable manner, thus improving the EP of manufacturing organizations (Long et al., 2020; Li et al., 2021). Monitoring and educating suppliers may enable companies to provide products that are hardly harmful to the environment, therefore increasing their EP (Sarfraz et al., 2021).

By focusing on GI, which uses eco-friendly manufacturing practices, companies can achieve higher levels of efficiency and reduce the number of resources used, ultimately reducing total costs. Chen et al. (2014), for instance, determined that eco-design (ECO), an aspect of GI, leads to cost savings that have a significant influence on the Ec.P. of the company by reducing waste and enhancing materials efficiency. Also, Yang et al. (2021) cited ECO practices as a significant contributor to cost reductions through the increased likelihood of selling products abroad, and as a major benefit that outweighs the costs involved.

By adopting green practices, employers and local communities are believed to enjoy a healthier work environment and community, respectively (Jamil, et al., 2021c; Ullah et al., 2021). It has been shown that environmental-friendly manufacturing operations and less pollution are beneficial to the social dimensions of employees and society as a whole. This point is emphasized by Farza et al. (2021), who suggest that corporations can achieve a number of social objectives such as customer protection, market transparency, and environmental conservation. GI can, therefore, contribute to SP when organizations integrate it into their business operations (Gul, et al., 2021b; Mandal & Pal, 2021).

GI practices have generally been found to increase customer loyalty, enhance a company's brand identity, provide equal opportunities, assure safety, and promote ethical practices (Kraus et al., 2020; Mohsin et al., 2022). Although fewer empirical studies exist on the relationship between GIs and SPs, existing research does suggest eco-friendly practices may be effective in promoting customer loyalty and enhancing a company's brand identity (Asadi et al., 2020; Gul et al., 2021c). Therefore, the following hypotheses are proposed:

H2: GHRM practices have a significant impact on green innovation.

H3: Green innovation has a significant impact on sustainable performance.

Mediating Role of Green Innovation

As a result of this study, it suggests that studying the interaction between GHRM and GI may help to understand how these factors impact sustainable performance. Through the RBV, Barney, (2001) argued, that HRM practices could influence organizational performance through the transformation of employees into extraordinary, important, and unique resources. The company's goals can be better supported when it uses such a resource to develop its business. Zhang et al. (2020) argue that talent is utilized in innovation to achieve an

TABLE 1 | Characteristics of the respondents.

Characteristics	Range	Frequency	Percentage (%)
Age of the organization	Less than 10 years	60	17.90
	10–20 years	95	28.35
	20–30 years	95	28.35
	Above 30 years	85	25.04
	Total	**335**	**100.00**
Ownership of the organization	Government owned	115	34.32
	Private owned	220	65.68
	Total	**335**	**100.00**
Size of the organization	Less than 100 employees	78	23.28
	100–200 employees	77	22.98
	200–300 employees	91	27.16
	More than 300 employees	89	26.58
	Total	**335**	**100.00**

organization's goals. In addition, employees who work in innovation can also help the organization to perform better, which will lead to a sustainable competitive advantage (Rehman et al., 2021). The interaction mechanisms of various resources can also provide a competitive advantage. There is a general consensus in the literature that effective implementation of GI is largely determined by GHRM practices (Gul et al., 2021d; Fan et al., 2021). Thus, the lack of HRM practices may result in the inability to engage environmentally conscious employees, and the conventional organizational culture may contribute to the inability to implement GI. By investigating the impact on sustainable performance, this study expands on these experimental studies (Takalo & Tooranloo, 2021; Jamil et al., 2022).

GHRM provides technical support in attracting and hiring people with the necessary skills and commitment to implement environmental ideologies and standards in a context of an innovative business model, in addition to disseminating environmental ideologies and standards (Tang et al., 2018). In their study, Haddock-Millar et al. (2016) assert that GI mediates the relationship between GHRM and EP to a great extent. RBV facilitates a more systematic investigation of the relationship between GHRM-GI and sustainability outcomes by explaining the connection between green practices and sustainability outcomes. Therefore, the following hypothesis is proposed:

H4: Green innovation mediates the relationship between GHRM practices and sustainable performance (see **Figure 1** for all the relationships).

Methodology

We gathered data from small and medium enterprises (SMEs) working in the Kingdom of Saudi Arabia. A convenient sampling approach was employed (Kothari, 2004). A questionnaire was developed in the English language and translation in the Arabic language was also presented on the questionnaire for a better understanding of the responding employees. The overall sample size of this research was 335 medium and upper-level management of enterprises. A total of 515 questionnaires were distributed through emails, and 365 responses were received. There were 335 appropriate replies for the final analysis, with a response rate of 65%. Valid questionnaires are selected following the survey data cleaning procedure, which involves finding and eliminating responses from respondents who either do not meet our target requirements or did not react cautiously to the questionnaire survey, such as respondents only address part of our survey; respondents provide ambiguous answers or/and select the same answer option repetitively, and respondents provide incomprehensible suggestions for open-ended questions. We employed Armstrong & Overton, (1977) approach to determine perceived anti-reaction bias. Independent sample and chi-square T-tests were conducted to analyze the initial 55 and the final 55 respondents via demographic factors, that are age and gender. The findings revealed no major variations between the two response classes ($p > 0.05$). **Figure 1**

Measures

The study used items established from prior research to confirm the reliability and validity of the measures. All items are evaluated through five-point Likert-type scales where "1" (strongly disagree), "3" (neutral), and "5" (strongly agree).

Dependent variable*:* sustainable performance was used as the dependent variable and measured with its three dimensions namely environmental, economic, and social, we used nine items adopted from the prior study of Jabbour & de Sousa Jabbour, (2016).

Independent variable*:* to analyze GHRM bundle practices as an independent variable with its three dimensions we used ten items adopted from a prior study by Yu et al. (2020).

Mediating variables*:* green innovation is used as mediating variable in this study. Green innovation is measured with six items adopted from the previous study by Zailani et al. (2015).

Sample Description

The demographic profile of 335 respondents, such as ownership form of the organization, age of the organization, and size of the organization, are shown in **Table 1**. Total sample is presented as bold in the table.

RESULTS

This study used smart PLS to evaluate the model. This study wants to use confirmatory and exploratory research so the PLS-

TABLE 2 | Inner model evaluation.

Variables	Constructs	Factor loading	AVE	CR	α
Green HR practices					
Green hiring	GH1	0.803	0.671	0.802	0.732
	GH2	0.835			
Green training and involvement	GT1	0.924	0.745	0.897	0.835
	GT2	0.883			
Green performance management and commitment	GPMC1	0.892	0.712	0.814	0.700
	GPMC2	0.793			
Green innovation	GI2	0.740	*0.637*	*0.898*	*0.857*
	GI3	0.851			
	GI4	0.786			
	GI5	0.762			
	GI6	0.846			
Sustainable performance					
Sustainable environmental performance	SEP1	0.862	0.696	0.872	0.778
	SEP2	0.751			
	SEP3	0.884			
Sustainable economic performance	SEP1	0.905	0.712	0.880	0.794
	SEP2	0.743			
	SEP3	0.875			
Sustainable social performance	SSP1	0.874			
	SSP2	0.891	*0.779*	*0.875*	*0.717*

SEM analysis was selected. Sarstedt et al. (2014) argue that Behind the Partial least square modeling, there are two approaches known as structural modeling and covariance bias. The hypothesis testing was done through PLS-SEM and the hypothesis expansions were usually tested through SEM (Hair et al., 2016). The PLS is best suited for multi constructs models and multiple order constructs models. The small sample size used for analysis is also advantageous in Smart PLS-SEM. Smart PLS-SEM provides it straightforward to compute all parameter computations (Hair et al., 2016; Usman Shehzad et al., 2022). The current study was done using Smart PLS 3.9.

The degree to which the study variables deviate from their latent variable is called unidimensional. In order to verify construct reliability and validity, an investigation of the study constructs' unidimensional is a criterion that must be achieved. According to Henseler et al. (2015), the factor loading of items within each construct was used to determine unidimensionally. There is strong evidence that all of the constructs indicated in the measurement model are unidimensional.

Model Measurement

The study is quantitative in nature and data was collected through a survey questionnaire. The study analyzed the Green HR practices, Green innovation, and environmental performance. First, we examine the construct reliability and validity of the external model through the Smart PLS algorithm (**Table 2**). The analysis shows that 21 indicators out of 28 have factor loading greater than 0.7. the model reliability was assessed through factor loading and Cronbach Alpha (Hair et al., 2016). Cronbach's alpha, Average variance extracted and composite reliability may be used to determine the degree of consistency between several measurements of a variable (Hair Joseph F et al., 2010). The value of Cronbach Alpha for all variables should be greater than the threshold level which is 0.7 (Sarstedt et al., 2014). The factor loading of 21 indicators is greater than o.7, and Cronbach's alpha (α) for all variables must be higher than the acceptance criteria which is 0.7. On the other hand, the composite reliability for all constructs exceeds the threshold level of 0.70 (Chin, 1998). All indicators or dimensional scales should have values greater than 0.60 (Bagozzi & Yi, 1988). it is shown in the table all 3 variables had Cronbach Alpha values above the suggested limit of 0.60 (Bagozzi et al., 1991). Composite reliability values ranged from 0.85–0.96 and were all above the recommended value of more than 0.60 (Bagozzi & Yi, 1988) or greater than 0.70 as suggested by (Vinzi et al., 2010). In light of these findings, it can be concluded that all of the research hypotheses examined in this study are valid and trustworthy. The factor loading, Cronbach's alpha (α), a composite reliability confirms the indicator reliability (Henseler et al., 2016).

The convergent validity of variables is evaluated by using the "composite reliability" (CR) and "Average variance extracted" (AVE) and construct reliability for all variables (Hair et al., 2016). The researchers say that CR and AVE must be higher than the minimum acceptable value which is 0.7 and 0.5 consecutively. By utilizing composite reliability and average variance extracted (Fornell & Larcker, 1981a). The **Table 3** indicates that all variables have loading higher than 0.70 and CR is greater or equal to 0.70, The AVE score should be greater than 0.50 which illustrates the convergent validity is the acceptable and internal consistency of items (Chin, 1998).

Discriminant Validity

Several tests were used to examine discriminant validity. As a first step, it may be explored in the measurement model by looking at the latent constructs' shared AVE. We determine whether the model is evaluated through the correlation among constructs. If there are any extremely high correlations among constructs, the model is likely to have discriminant validity issues. Construct

TABLE 3 | Discriminant validity.

Fornell–Larcker criterion				Heterotrait–monotrait (HTMT) ratios			
	GHRP	GI	EP		GHRP	GI	EP
GHR practices	0.844			GHRP	0.813		
Green innovation	0.682	0.908		GI	0.854	0.837	
Sustainable performance	0.622	0.714	0.860	SP	0.727	0.825	0.748

TABLE 4 | Hypothesis testing.

	Hypothesis	Beta and (*t* value)	Confidence interval	F^2	P values	Conclusion
H1	GHRMP -> SP	0.277 (5.817)	0.073 to 0.243	0.082	0.000	Supported
H2	GHRMP-> GI	0.8136 (28.106)	0.134 to 0.198	0.321	0.000	Supported
H3	GI -> SP	0.096 (2.561)	0.068 to 0.172	0.086	0.010	Supported

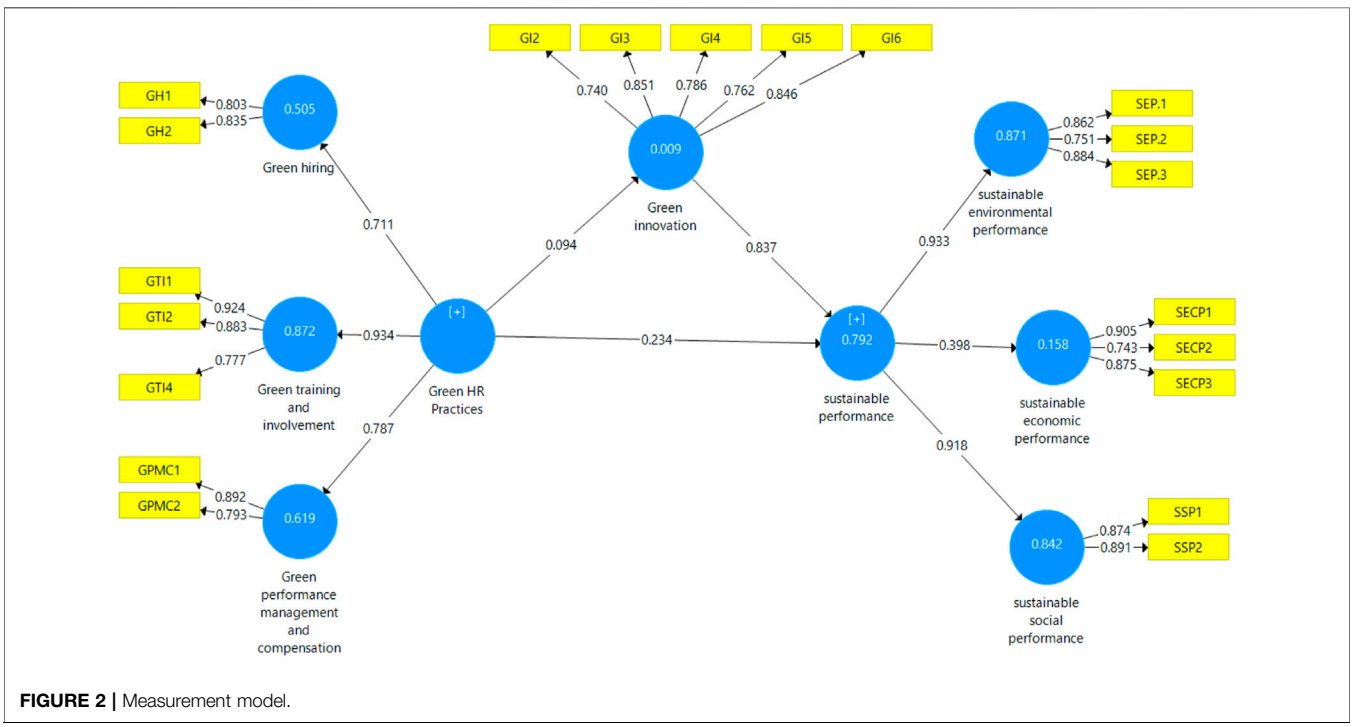

FIGURE 2 | Measurement model.

validity occurs when the square correlation for each construct surpasses the AVE for each of the other components (Fornell and Larcker, 1981b). AVE values for each construction were more than or equal to 0.50, as shown in **Table 4**, indicating that the constructions ranging from 0.54 to 0.71 were responsible for more than half of the variation in their respective measurement items, as recommended. Fornell–Larcker criteria and heterotrait–monotrait (HTMT) ratio are two strategies used to assess the discriminant validity of the model (Hair et al., 2016). Fornell and Larcker, (1981b) argue that it is important to keep in mind that the upper right side values of the diagonal which is the square root of AVE should be larger than the correlation with other constructs. However, values between 0.90 and 0.95 are acceptable for HTMT ratios but must be less than 0.85 (Hair et al., 2016). There are no HTMT ratios greater than 0.90 in **Table 3**, confirming the discriminant validity of the model.

The Variance Inflation Factor (VIF), values were computed in this study to check for Conceptual model collinearity concerns. VIF values below 5 indicate that no collinearity issues exist in the data, according to experts (Hair et al., 2014). It was found that the objects' inner VIFs ranged from 1.321 up to 1.876. The results of this investigation show that there is no evidence of data

TABLE 5 | Predictive accuracy.

	R square	R square adjusted
Green innovation	0.619	0.619
Sustainable performance	0.792	0.792

collinearity and that the conclusions remain constant throughout time. R2 greater than 0.5 indicates a suitable model. All exogenous constructs have R Squared values larger than 0.5 in **Figure 2**, indicating that the model's predictive accuracy is quite high (Hair et al., 2016). All of the model's latent variables have Q2 values suggesting that the model is highly predictive (Hair Joe F et al., 2016).

When assessing the model's "explanatory power," the R2 value for each predicted variable was computed. it indicated the degree to which the IV explains the DV. Predictive accuracy is measured by the R2 value, which ranges from 0 to 1. The R2 value is described as "weak," "moderate," and "strong," with R2 described as weak with a value of 0.25 and R2 value being moderate with 0.50. and the R2 value is 0.75 considered substantial. All exogenous constructs in **Table 5** have R Square values higher than 0.5, which indicates that the model has excellent predictive accuracy (Hair et al., 2016).

Model Assessment

This study examines the hypothesis by using bootstrapping at 5,000 with sample replacement (Hair et al., 2016). The above table illustrate that Green HRMP have significant positive impact on sustainable performance ($\beta = 0.277$, t value = 5.817, p-value = 0.000). green innovation has significant and positive relationship with sustainable performance ($\beta = 0.813$, t-value = 28.106, $p = 0.000$). Green HRM practices have significant relationship with green innovation ($\beta = 0.096$, t-value = 2.561, $p = 0.000$). the findings indicate the Hypothesis H1, H2, and H3 are accepted. **Table 6**

Mediation Analysis

Green Innovation plays a mediating role in the Green human resource management and environmental performance. the value for VAF of more than 80 percent implies complete mediation, whereas VAF larger than 20 percent and less than 80 percent suggests partial mediation for mediation effects, and VAF less than 20 percent indicates no mediation (Hayes & Preacher, 2010). The findings show that green innovation partially mediates the relationship between green human resource management practices and Sustainable performance. Using the t-test and p-value, the findings show that Green Innovation partially mediates the relationship between GHRMP and Sustainable Performance. There was an indirect impact (=0.078, t-value = 2.275, p-value = 0.000) with VAF 68 percent, which indicates partial mediation. VAF is used to indicate the amount of the indirect impact relative to overall effects, and it is calculated as a percentage of total effects. **Table 6** shows that there is partially mediating the impact of both the direct and indirect effects (Nitzl et al., 2016). **Figures 3**, **4.**

DISCUSSION

There is no doubt that the findings of this comprehensive study allow business enterprises to develop a deeper understanding of how to appropriately manage their ethical obligations to the natural environment. A range of organizational functions is considered in this study in relation to sustainability performance components (EP, Ec.P, and SP). Based on the results, we conclude that GHRM practices and SP (supporting H1) show a positive correlation, with GHRM bundles facilitating the dissemination of environmental management-based ideologies. In this way, employees are given a chance to properly contribute to the development of the environment within their organization. Having an inspired and dedicated workforce adds economic value to a company as well. Furthermore, it was an important finding which supports previous results of Saeed et al. (2019) that implementing green practices for GHRM bundles and SPs would bring benefits such as cost savings, sustainability, and increased corporate social responsibility, allowing a company to enhance its reputation and improve community health.

According to the findings of Mousa & Othman, (2020) and Longoni et al. (2018), GHRM has a significant positive influence on GI (supported H2). In order to improve innovation and create a sustainable competitive edge, GHRM is necessary to facilitate GI (Jose Chiappetta Jabbour, 2011).

It is important to examine the particular mechanisms underlying the relationship between GI and performance even though the results of the current study confirm GI's positive correlation with sustainable performance. A strategic fit might exist between GI and EP, Ec.P, and SP, and such practices may positively correlate with these three types of performance (supporting H3) and this finding is parallel with the previous results of Kim et al. (2019), they found an important correlation exists between GI and the optimization of inputs and assets. This results in cost savings through resource recycling, energy-saving initiatives, less rework and waste, improved quality, and a creative approach to creating new products and processes.

In addition to demonstrating how GI can be applied to "GHRM bundle-shaped employees' who are environmentally engaged, competent, and inspired (contributing to H4), the study also illustrates how shared environmental ideologies and standards may help improve SP. GI practices should be utilized in line with internal resources, as Yu et al. (2020) and Yusoff et al. (2020) have stated.

TABLE 6 | Mediation analysis.

Hypothesis	Direct effect	Indirect effect	Total effect	VAF (%)	Explanation	Result
GHRMP->GI->SP	0.277 (5.817)	0.078 (2.275)	0.3559 (5.351)	68	Partial mediation	H4, supported

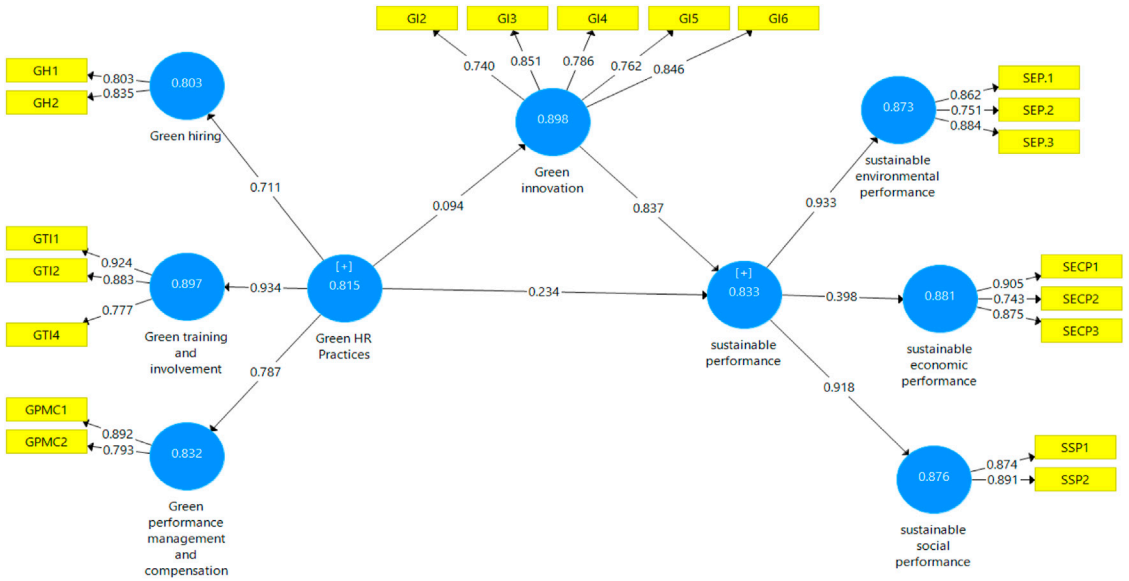

FIGURE 3 | Composite reliability.

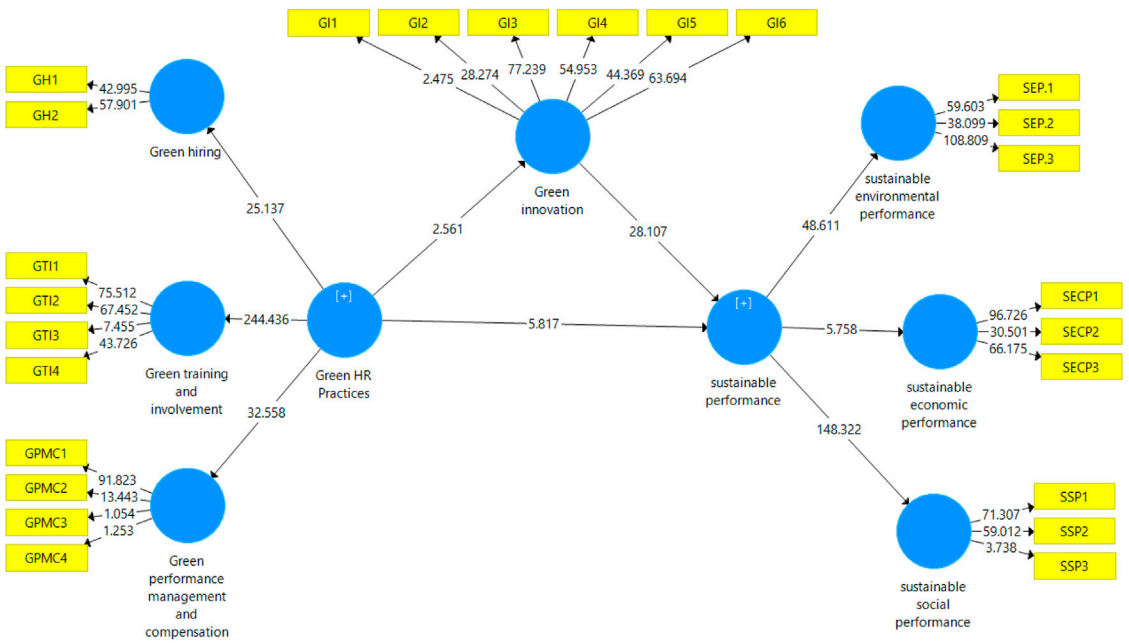

FIGURE 4 | Bootstrapping.

Taking an interdisciplinary approach, the study contributes to the debate on cross-functional environmental management systems. Earlier important theoretical studies have hypothesized that cross-functional integration is a key to effective environmental management, as demonstrated in this study. In conclusion, this study mostly supports the hypothesized mediation model in which GHRM and GI practices should be coordinated and designed cross-functionally. It is crucial that human resource practices align in order to reduce barriers to GI adoption, which in turn helps firms green. Thus, green training programs need to pay more attention to GI, which will improve the organization's SP (Gilal et al., 2019).

Theoretical Implications

Thus, the present study contributes to the RBV literature by examining the combined impacts of resources (GHRM and GI)

on sustainability performance and identifying which aspects contribute to improved performance (Renwick et al., 2013). Therefore, this study demonstrates that the implementation of GI by firms can be enhanced through the use of GHRM, which, in turn, would enhance firms' sustainability. Additionally, this study both confirms and enhances the traditional understanding. The study demonstrates that environmental management practices in the human resource and innovation sectors can result in greater sustainability. As a result, this study adds substance to previous meta-analyses that indicate that HRM practices and innovation can improve firms' competitiveness. Consequently, the present study contributes to implementing green management at the cross-functional level by demonstrating how green performance can be enhanced by creating a resource (for example, skilled, competent, and motivated staff) within GI through GHRM. In light of these findings, it is essential that environmental plans develop GI alongside GHRM practices. Consequently, this study's results are consistent with those of other studies that have highlighted how important it is to have an effective green HRM program (Pham et al., 2020).

Green human resource management and innovation initiatives can result in more sustainable firms through a link between green human resource management and innovation practices, which has not been explored in developing countries' manufacturing industries (Chaudhary, 2020). In addition, it continues to develop research on sustainable performance by studying how three major elements of GHRM can be interrelated in manufacturing for sustainability (EP, Ec.P, and SP). Therefore, identifying these links serves as a means of identifying the priority and validity of GHRM and GI in manufacturing contexts, thus adding to our understanding of the strategic links between human resources and innovation that manufacturing firms need to achieve environmental sustainability. In addition, because empirical research linking GHRM and GI is rare, this study brings evidence from a developing country (for example, the Kingdom of Saudi Arabia) into the literature.

Managerial Implications

From an operational point of view, this study can assist manufacturing firms in establishing environmental strategic objectives that are linked with particular aspects of their HRM and innovation practices. As a result, employees are likely to become deeply involved in shaping environmental policies (Mousa & Othman, 2020). Empirical evidence suggests that companies need to adopt an environmental management process that appeals to both human resource managers and operations managers, since such a shift may help ensure the long-term sustainability of a business. In addition, the study helps managers orient their GHRM efforts toward HR initiatives that enhance employee motivation and knowledge and synergistic investments in HR. The management should then continue to invest in innovative processes and create cross-functional management approaches for green management. Additionally, the findings of this study provide managers with suggestions that will help them improve sustainable performance. A GI-based approach can positively affect sustainable performance (Farza et al., 2021). Thus, integrating environmental standards beyond organizational limits is not a significant indicator of how a company will perform, so paying special attention to this issue may be inconvenient. As an example, managers should focus on human resources. Also, promoting green hires and selections while providing sufficient environmental awareness training to all employees, top management needs to acknowledge that resistance to change can hinder GI implementation. This barrier is easily overcome by promoting green hiring and selection. It was the goal of this study to provide manufacturers with empirical evidence as to what actions could have the most impact on the TBL of sustainability in order for them to better comprehend the impacts of such actions.

Limitations and Future Research Directions

The limitations of our study are presented and also the directions for future research. Our study was limited to the manufacturing sector in the Kingdom of Saudi Arabia, and therefore, cannot be generalized to non-manufacturing sectors. To that end, we recommend extending our conceptual research framework to non-manufacturing sectors in the future. In the present study, environmental beliefs and values, which moderate the relationship between HRM and performance, were not examined at the employee level. Therefore, we propose that future research should identify the contribution of employees' environmental values and beliefs to understanding how green HRM affects green innovation. The third limitation of this study was that only internal factors related to sustainable strategies were examined. A future study should encompass both internal and external factors in order to understand how proactive sustainable strategies can be developed, implemented, and maintained. We also surveyed how organization members perceive sustainability and green innovations. Future research should sample perceptions of internal and external stakeholders to better understand green innovation and sustainable performance.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

REFERENCES

Al-Ghazali, B. M., and Afsar, B. (2021). Retracted: Green Human Resource Management and Employees' Green Creativity: The Roles of Green Behavioral Intention and Individual Green Values. *Corp. Soc. Responsib. Environ. Manag.* 28 (1), 536. doi:10.1002/csr.1987

Armstrong, J. S., and Overton, T. S. (1977). Estimating Nonresponse Bias in Mail Surveys. *J. Mark. Res.* 14 (3), 396–402. doi:10.1177/002224377701400320

Asadi, S., OmSalameh Pourhashemi, S., Nilashi, M., Abdullah, R., Samad, S., Yadegaridehkordi, E., et al. (2020). Investigating Influence of Green Innovation on Sustainability Performance: A Case on Malaysian Hotel Industry. *J. Clean. Prod.* 258, 120860. doi:10.1016/j.jclepro.2020.120860

Awan, F. H., Dunnan, L., Jamil, K., Gul, R. F., Guangyu, Q., and Idrees, M. (2021a). Impact of Role Conflict on Intention to Leave Job with the Moderating Role of Job Embeddedness in Banking Sector Employees. *Front. Psychol.*, 4866. doi:10.3389/fpsyg.2021.719449

Awan, F. H., Dunnan, L., Jamil, K., Mustafa, S., Atif, M., Gul, R. F., et al. (2022). Mediating Role of Green Supply Chain Management between Lean Manufacturing Practices and Sustainable Performance. *Front. Psychol.* 12 (January), 1–11. doi:10.3389/fpsyg.2021.810504

Awan, F. H., Liu, D., Anwar, A., Jamil, K., Qin, G., and Gul, R. F. (2021b). Mediating Role of Innovative Climate Among Leadership and Employee Performance in Textile Exporting Firms of Pakistan. *Ind. Textila* 72 (6), 613–618. doi:10.35530/it.072.06.20206

Bagozzi, R. P., and Yi, Y. (1988). On the Evaluation of Structural Equation Models. *Jams* 16 (1), 74–94. doi:10.1007/bf02723327

Bagozzi, R. P., Yi, Y., and Phillips, L. W. (1991). Assessing Construct Validity in Organizational Research. *Adm. Sci. Q.* 36, 421–458. doi:10.2307/2393203

Barney, J. B. (2001). Resource-based Theories of Competitive Advantage: A Ten-Year Retrospective on the Resource-Based View. *J. Manag.* 27 (6), 643–650. doi:10.1177/014920630102700602

Chaudhary, R. (2020). Green Human Resource Management and Employee Green Behavior: An Empirical Analysis. *Corp. Soc. Responsib. Env.* 27 (2), 630–641. doi:10.1002/csr.1827

Chen, Y.-S., Chang, C.-H., and Lin, Y.-H. (2014). Green Transformational Leadership and Green Performance: The Mediation Effects of Green Mindfulness and Green Self-Efficacy. *Sustainability* 6 (10), 6604–6621. doi:10.3390/su6106604

Chin, W. W. (1998). The Partial Least Squares Approach to Structural Equation Modeling. *Mod. Methods Bus. Res.* 295 (2), 295–336.

Çop, S., Olorunsola, V. O., and Alola, U. V. (2021). Achieving Environmental Sustainability through Green Transformational Leadership Policy: Can Green Team Resilience Help? *Bus. Strategy Environ.* 30 (1), 671–682. doi:10.1002/bse.2646

Dost, M., Pahi, M. H., Magsi, H. B., and Umrani, W. A. (2019). Effects of Sources of Knowledge on Frugal Innovation: Moderating Role of Environmental Turbulence. *Jkm* 23 (7), 1245–1259. doi:10.1108/JKM-01-2019-0035

Fan, F., Lian, H., Liu, X., and Wang, X. (2021). Can Environmental Regulation Promote Urban Green Innovation Efficiency? an Empirical Study Based on Chinese Cities. *J. Clean. Prod.* 287, 125060. doi:10.1016/j.jclepro.2020.125060

Farza, K., Ftiti, Z., Hlioui, Z., Louhichi, W., and Omri, A. (2021). Does it Pay to Go Green? the Environmental Innovation Effect on Corporate Financial Performance. *J. Environ. Manag.* 300, 113695. doi:10.1016/j.jenvman.2021.113695

Fornell, C., and Larcker, D. F. (1981a). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *J. Mark. Res.* 18 (1), 39–50. doi:10.1177/002224378101800104

Fornell, C., and Larcker, D. F. (1981b). Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics. *J. Mark. Res.* 18 (3), 382–388. doi:10.2307/315098010.1177/002224378101800313

Gilal, F. G., Ashraf, Z., Gilal, N. G., Gilal, R. G., and Channa, N. A. (2019). Promoting Environmental Performance through Green Human Resource Management Practices in Higher Education Institutions: A Moderated Mediation Model. *Corp. Soc. Responsib. Environ. Manag.* 26 (6), 1579–1590. doi:10.1002/csr.1835

Gul, R. F., Dunnan, L., Jamil, K., Awan, F. H., Ali, B., Qaiser, A., et al. (2021a). Abusive Supervision and its Impact on Knowledge Hiding Behavior Among Sales Force. *Front. Psychol.* 12 (December), 1–13. doi:10.3389/fpsyg.2021.800778

Gul, R. F., Liu, D., Jamil, K., Baig, S. A., Awan, F. H., and Liu, M. (2021b). Linkages between Market Orientation and Brand Performance with Positioning Strategies of Significant Fashion Apparels in Pakistan. *Fash. Text.* 8 (1), 1–19. doi:10.1186/s40691-021-00254-9

Gul, R. F., Liu, D., Jamil, K., Hussain, Z., Awan, F. H., Anwar, A., et al. (2021c). Causal Relationship of Market Orientation and Customer-Based Performance of Fashion Apparel Brands. *FIBRES Text. East. Eur.* 29 (6), 11–17. doi:10.5604/01.3001.0015.2716

Gul, R. F., Liu, D., Jamil, K., Kamran, M. M., Awan, F. H., and Qaiser, A. (2021d). Consumers' Assessment of the Brand Equity of Garment Brands. *Ind. Textila* 72 (6), 666–672. doi:10.35530/it.072.06.18272

Haddock-Millar, J., Sanyal, C., and Müller-Camen, M. (2016). Green Human Resource Management: a Comparative Qualitative Case Study of a United States Multinational Corporation. *Int. J. Hum. Resour. Manag.* 27 (2), 192–211. doi:10.1080/09585192.2015.1052087

Hair, J. F., Jr, Sarstedt, M., Hopkins, L., and Kuppelwieser, G. (2014). Partial Least Squares Structural Equation Modeling (PLS-SEM). *Eur. Bus. Rev.* 26 (2), 106–121. doi:10.1108/EBR-10-2013-0128

HairJr, Joseph, F., Hult, G. T. M., Ringle, C., and Sarstedt, M. (2016). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage publications.

Hair, J. F., Jr, Black, W. C., Babin, B. J., and Anderson, R. E. (2010). *Multivariate Data Analysis. Vectors*. 7th Editio. Pearson Prentice Hall.

Hair, J. F., Jr, Sarstedt, M., Matthews, L. M., and Ringle, C. M. (2016). Identifying and Treating Unobserved Heterogeneity with FIMIX-PLS: Part I–Method. *Eur. Bus. Rev.* 28 (1), 63–76. doi:10.1108/ebr-09-2015-0094

Hameed, Z., Naeem, R. M., Hassan, M., Naeem, M., Nazim, M., and Maqbool, A. (2021). How GHRM Is Related to Green Creativity? A Moderated Mediation Model of Green Transformational Leadership and Green Perceived Organizational Support. *Int. J. Manpow. ahead-of-p*(ahead-of-print). doi:10.1108/IJM-05-2020-0244

Hayes, A. F., and Preacher, K. J. (2010). Quantifying and Testing Indirect Effects in Simple Mediation Models when the Constituent Paths Are Nonlinear. *Multivar. Behav. Res.* 45 (4), 627–660. doi:10.1080/00273171.2010.498290

Henseler, J., Hubona, G., and Ray, P. A. (2016). Using PLS Path Modeling in New Technology Research: Updated Guidelines. *Industrial Manag. Data Syst.* 116 (1), 2–20. doi:10.1108/imds-09-2015-0382

Henseler, J., Ringle, C. M., and Sarstedt, M. (2015). A New Criterion for Assessing Discriminant Validity in Variance-Based Structural Equation Modeling. *J. Acad. Mark. Sci.* 43 (1), 115–135. doi:10.1007/s11747-014-0403-8

Jabbour, C. J. C., and de Sousa Jabbour, A. B. L. (2016). Green Human Resource Management and Green Supply Chain Management: Linking Two Emerging Agendas. *J. Clean. Prod.* 112, 1824–1833. doi:10.1016/j.jclepro.2015.01.052

Jamil, K., Dunnan, L., Gul, R. F., Shehzad, M. U., Gillani, S. H. M., and Awan, F. H. (2022). Role of Social Media Marketing Activities in Influencing Customer Intentions: A Perspective of New Emerging Era. *Front. Psychol.* 12, 808525. doi:10.3389/fpsyg.2021.808525

Jamil, K., Hussain, Z., Gul, R. F., Shahzad, M. A., and Zubair, A. (2021a). The Effect of Consumer Self-Confidence on Information Search and Share Intention. *Inf. Discov. Deliv. June*. doi:10.1108/IDD-12-2020-0155

Jamil, K., Liu, D., Anwar, A., Rana, M. W., Amjad, F., and Liu, M. (2021b). Nexus between Relationship Marketing and Export Performance of Readymade Garments Exporting Firms. *Ind. Textila* 72 (6), 673–679. doi:10.35530/IT.072.06.202028

Jamil, K., Liu, D., Gul, R. F., Hussain, Z., Mohsin, M., Qin, G., et al. (2021c). Do remittance and Renewable Energy Affect CO2 Emissions? an Empirical Evidence from Selected G-20 Countries. *Energy & Environ.*, 0958305X211029636. doi:10.1177/0958305x211029636

Jose Chiappetta Jabbour, C. (2011). How Green Are HRM Practices, Organizational Culture, Learning and Teamwork? A Brazilian Study. *Industrial Commer. Train.* 43 (2), 98–105. doi:10.1108/00197851111108926

Karimi Takalo, S., Sayyadi Tooranloo, H., and Shahabaldini parizi, Z. (2021). Green Innovation: A Systematic Literature Review. *J. Clean. Prod.* 279, 122474. doi:10.1016/j.jclepro.2020.122474

Kim, Y. J., Kim, W. G., Choi, H.-M., and Phetvaroon, K. (2019). The Effect of Green Human Resource Management on Hotel Employees' Eco-Friendly Behavior and Environmental Performance. *Int. J. Hosp. Manag.* 76, 83–93. doi:10.1016/j.ijhm.2018.04.007

Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. New Age International.

Kraus, S., Rehman, S. U., and García, F. J. S. (2020). Corporate Social Responsibility and Environmental Performance: The Mediating Role of Environmental Strategy and Green Innovation. *Technol. Forecast. Soc. Change* 160, 120262. doi:10.1016/j.techfore.2020.120262

Lei, H., Khamkhoutlavong, M., and Le, P. B. (2021). Fostering Exploitative and Exploratory Innovation through HRM Practices and Knowledge Management Capability: the Moderating Effect of Knowledge-Centered Culture. *Jkm* 25 (8), 1926–1946. doi:10.1108/JKM-07-2020-0505

Li, N., Bao, S., Naseem, S., Sarfraz, M., and Mohsin, M. (2021). Extending the Association between Leader-Member Exchange Differentiation and Safety Performance: a Moderated Mediation Model. *Prbm* Vol. 14, 1603–1613. doi:10.2147/prbm.s335199

Long, X., Sun, C., Wu, C., Chen, B., and Boateng, K. A. (2020). Green Innovation Efficiency across China's 30 Provinces: Estimate, Comparison, and Convergence. *Mitig. Adapt Strateg. Glob. Change* 25 (7), 1243–1260. doi:10.1007/s11027-019-09903-3

Longoni, A., Luzzini, D., and Guerci, M. (2018). Deploying Environmental Management across Functions: the Relationship between Green Human Resource Management and Green Supply Chain Management. *J. Bus. Ethics* 151 (4), 1081–1095. doi:10.1007/s10551-016-3228-1

Mandal, A., and Pal, B. (2021). Effects of Green Innovation and Advertisement in an Imperfect Production-based Competitive Supply Chain under Two-tier Credit Facility. *Math. Meth Appl. Sci.* 44 (17), 13227–13251. doi:10.1002/mma.7620

Mohsin, M., Jamil, K., Naseem, S., Sarfraz, M., and Ivascu, L. (2022). Elongating Nexus between Workplace Factors and Knowledge Hiding Behavior: Mediating Role of Job Anxiety. *Prbm* Vol. 15, 441–457. doi:10.2147/prbm.s348467

Mousa, S. K., and Othman, M. (2020). The Impact of Green Human Resource Management Practices on Sustainable Performance in Healthcare Organisations: A Conceptual Framework. *J. Clean. Prod.* 243, 118595. doi:10.1016/j.jclepro.2019.118595

Naseem, S., Fu, G. L., Mohsin, M., Aunjam, M. S., Rafiq, M. Z., Jamil, K., et al. (2020). Development of an Inexpensive Functional Textile Product by Applyingaccounting Cost Benefit Analysis. *Ind. Textila* 71 (1), 17–22. doi:10.35530/IT.071.01.1692

Naseem, S., Mohsin, M., Zia-Ur-Rehman, M., Baig, S. A., and Sarfraz, M. (2021). The Influence of Energy Consumption and Economic Growth on Environmental Degradation in BRICS Countries: an Application of the ARDL Model and Decoupling Index. *Environ. Sci. Pollut. Res.*, 1–14. doi:10.1007/s11356-021-16533-3

Nitzl, C., Roldan, J. L., and Cepeda, G. (2016). Mediation Analysis in Partial Least Squares Path Modeling. *Imds* 116 (9), 1849–1864. doi:10.1108/IMDS-07-2015-0302

Paillé, P., Valéau, P., and Renwick, D. W. (2020). Leveraging Green Human Resource Practices to Achieve Environmental Sustainability. *J. Clean. Prod.* 260, 121137. doi:10.1016/j.jclepro.2020.12113

Pham, N. T., Vo Thanh, T., Tučková, Z., and Thuy, V. T. N. (2020). The Role of Green Human Resource Management in Driving Hotel's Environmental Performance: Interaction and Mediation Analysis. *Int. J. Hosp. Manag.* 88, 102392. doi:10.1016/j.ijhm.2019.102392

Rehman, S. U., Kraus, S., Shah, S. A., Khanin, D., and Mahto, R. V. (2021). Analyzing the Relationship between Green Innovation and Environmental Performance in Large Manufacturing Firms. *Technol. Forecast. Soc. Change* 163, 120481. doi:10.1016/j.techfore.2020.120481

Renwick, D. W. S., Redman, T., and Maguire, S. (2013). Green Human Resource Management: A Review and Research Agenda*. *Int. J. Manag. Rev.* 15 (1), 1–14. doi:10.1111/j.1468-2370.2011.00328.x

Rizvi, Y. S., and Garg, R. (2020). The Simultaneous Effect of Green Ability-Motivation-Opportunity and Transformational Leadership in Environment Management: the Mediating Role of Green Culture. *Bij* 28 (3), 830–856. doi:10.1108/BIJ-08-2020-0400

Roscoe, S., Subramanian, N., Jabbour, C. J. C., and Chong, T. (2019). Green Human Resource Management and the Enablers of Green Organisational Culture: Enhancing a Firm's Environmental Performance for Sustainable Development. *Bus. Strat. Env.* 28 (5), 737–749. doi:10.1002/bse.2277

Saeed, B. B., Afsar, B., Hafeez, S., Khan, I., Tahir, M., and Afridi, M. A. (2019). Promoting Employee's Proenvironmental Behavior through Green Human Resource Management Practices. *Corp. Soc. Resp. Env. Ma* 26 (2), 424–438. doi:10.1002/csr.1694

Samad, S., Nilashi, M., Almulihi, A., Alrizq, M., Alghamdi, A., Mohd, S., et al. (2021). Green Supply Chain Management Practices and Impact on Firm Performance: The Moderating Effect of Collaborative Capability. *Technol. Soc.* 67, 101766. doi:10.1016/j.techsoc.2021.101766

Santos, L. L., Borini, F. M., and Oliveira Júnior, M. d. M. (2020). In Search of the Frugal Innovation Strategy. *Ribs* 30 (2), 245–263. doi:10.1108/RIBS-10-2019-0142

Sarfraz, M., Mohsin, M., Naseem, S., and Kumar, A. (2021). Modeling the Relationship between Carbon Emissions and Environmental Sustainability during COVID-19: A New Evidence from Asymmetric ARDL Cointegration Approach. *Environ. Dev. Sustain.*, 1–19. doi:10.1007/s10668-021-01324-0

Sarstedt, M., Ringle, C. M., Henseler, J., and Hair, J. F. (2014). On the Emancipation of PLS-SEM: A Commentary on Rigdon (2012). *Long. Range Plan.* 47 (3), 154–160. doi:10.1016/j.lrp.2014.02.007

Seeck, H., and Diehl, M.-R. (2017). A Literature Review on HRM and Innovation - Taking Stock and Future Directions. *Int. J. Hum. Resour. Manag.* 28 (6), 913–944. doi:10.1080/09585192.2016.1143862

Shah, M. (2019). Green Human Resource Management: Development of a Valid Measurement Scale. *Bus. Strat. Env.* 28 (5), 771–785. doi:10.1002/bse.2279

Siyambalapitiya, J., Zhang, X., and Liu, X. (2018). Green Human Resource Management: A Proposed Model in the Context of Sri Lanka's Tourism Industry. *J. Clean. Prod.* 201, 542–555. doi:10.1016/j.jclepro.2018.07.305

Tang, G., Chen, Y., Jiang, Y., Paillé, P., and Jia, J. (2018). Green Human Resource Management Practices: Scale Development and Validity. *Asia Pac J. Hum. Resour.* 56 (1), 31–55. doi:10.1111/1744-7941.12147

Tariq, S., Jan, F. A., and Ahmad, M. S. (2016). Green Employee Empowerment: a Systematic Literature Review on State-Of-Art in Green Human Resource Management. *Qual. Quant.* 50 (1), 237–269. doi:10.1007/s11135-014-0146-0

Ullah, H., Wang, Z., Mohsin, M., Jiang, W., and Abbas, H. (2021). Multidimensional Perspective of Green Financial Innovation between Green Intellectual Capital on Sustainable Business: the Case of Pakistan. *Environ. Sci. Pollut. Res.*, 1–17. doi:10.1007/s11356-021-15919-7

Usman Shehzad, M., Zhang, J., Le, P. B., Jamil, K., and Cao, Z. (2022). Stimulating Frugal Innovation via Information Technology Resources, Knowledge Sources and Market Turbulence: a Mediation-Moderation Approach. *Ejim. ahead-of-p* (Issue ahead-of-print). doi:10.1108/EJIM-08-2021-0382

Vinzi, V. E., Chin, W. W., Henseler, J., and Wang, H. (2010). *Handbook of Partial Least Squares*, 201. Springer.Issue 0

Wang, J., Xue, Y., Sun, X., and Yang, J. (2020). Green Learning Orientation, Green Knowledge Acquisition and Ambidextrous Green Innovation. *J. Clean. Prod.* 250, 119475. doi:10.1016/j.jclepro.2019.119475

Yang, Q., Gao, D., Song, D., and Li, Y. (2021). Environmental Regulation, Pollution Reduction and Green Innovation: The Case of the Chinese Water Ecological Civilization City Pilot Policy. *Econ. Syst.*, 100911. doi:10.1016/j.ecosys.2021.100911

Yu, W., Chavez, R., Feng, M., Wong, C. Y., and Fynes, B. (2020). Green Human Resource Management and Environmental Cooperation: An Ability-Motivation-Opportunity and Contingency Perspective. *Int. J. Prod. Econ.* 219, 224–235. doi:10.1016/j.ijpe.2019.06.013

Yusoff, Y. M., Nejati, M., Kee, D. M. H., and Amran, A. (2020). Linking Green Human Resource Management Practices to Environmental Performance in

Hotel Industry. *Glob. Bus. Rev.* 21 (3), 663–680. doi:10.1177/0972150918779294

Zailani, S., Govindan, K., Iranmanesh, M., Shaharudin, M. R., and Sia Chong, Y. (2015). Green Innovation Adoption in Automotive Supply Chain: the Malaysian Case. *J. Clean. Prod.* 108, 1115–1122. doi:10.1016/j.jclepro.2015.06.039

Zhang, J., Kang, L., Li, H., Ballesteros-Pérez, P., Skitmore, M., and Zuo, J. (2020). The Impact of Environmental Regulations on Urban Green Innovation Efficiency: The Case of Xi'an. *Sustain. Cities Soc.* 57, 102123. doi:10.1016/j.scs.2020.102123

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors, and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.