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Green human resource management and environmental performance: The role of green innovation and environmental strategy in a developing country

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Abstract

A vast literature supports the notion that green human resource management leads to superior environmental performance. This study argues that green innovation, environmental strategy and pro-environmental behaviour facilitate the relationship between green human resource management and environmental performance in the manufacturing industry of developing countries. To test the mediating effect of green innovation and pro-environmental behaviour alongside the moderating role of environmental strategy in the proposed model, we collected and analysed data from 410 manufacturing firm managers operating in Pakistan using partial least square structural equation modelling. The mediating and moderating results highlighted the significance of green innovation, environmental strategy and pro-environmental behaviour to excel in environmental performance through operational efficiency, appropriate environmental strategy and human willingness to indulge in environmental activities. The findings also suggest implications for theory and practice in similar developing countries. The study offers generalisability in developing countries sharing the same economic and social structure.

KEYWORDS
developing country, environmental performance, environmental strategy, green human resource management, green innovation, manufacturing companies

1 | INTRODUCTION

In recent years, human resource management (HRM) scholars have begun to explore the green human resource management (GHRM) perspective to see how it serves to attain organisational environmental goals (Guerci et al., 2016; Roscoe et al., 2019; Yong et al., 2020; Zollo et al., 2013). GHRM can be identified as the HRM practices equipped with environmental concerns, policies, procedures and operational guidelines directly linked to the organisational mission (Anwar et al., 2020; Renwick et al., 2013). Furthermore, GHRM ensures environmental performance and preserves an organisation's long-run sustainability goals (Kim et al., 2019; Renwick et al., 2016). Indeed, researchers have started to study GHRM practices and green innovation (GRI) to construct a possible successful solution that guarantees environmental and organisational success in a hostile competitive environment. Even if it is evident that GHRM enhances environmental performance, very few studies have explored its role from a holistic perspective. According to Wang (2005), 'more future research is expected to build up a strategic and holistic model of human resource development so as to effectively integrate culture, organizational

change, and high technology' (p.486). One example of this could be Rompa's (2011) holistic model consisting of four approaches to sustainable HRM: sociological, psychological, strategic and green perspectives.

With a specific focus on GHRM processes, we argue that to holistically consider the phenomenon, the influence of GHRM processes on environmental performance needs to be considered in the context of other sub-processes functioning within the organisations. Furthermore, an examination needs to be undertaken to consider how these processes may mediate and moderate the relationships between GHRM and the overall environmental outcomes. In order to fill the research gap, this study formulated a multidimensional framework to comprehensively explore the relationships between GHRM and environmental performance in the presence of GRI, environmental strategy and pro-environmental behaviours.

Notably, to the best of our knowledge, no framework has included all the aforementioned variables in one study when specifically applied in the context of a rapidly developing country like Pakistan.

Therefore, the research question is:

RQ: What are the direct and indirect effects of GHRM, GRI, pro-environmental behaviour and environmental strategy on environmental performance?

This study targeted Pakistan as environmental concerns are vastly growing in this country (Abid et al., 2021). The reason to specifically focus on the manufacturing industry of Pakistan lies in the statistics, showing that the manufacturing sector is one of the largest contributors to the country's gross domestic product (GDP; Ritchie et al., 2020). Kraus et al. (2020) stressed the importance of manufacturing industries and argued that this sector is responsible for natural resource depletion, air, water and land pollution and, therefore, is directly responsible for significant environmental crises. Manufacturing industries generate the most harmful pollutants and wastages that lead to environmental catastrophes and pose a substantial threat to human lives (Zailani et al., 2012). For this reason, it is timely and relevant to magnify sustainable operations practices other than enhancing operational efficiency (Sharma et al., 2020).

According to Centobelli et al. (2020), harmful environmental emissions are at the highest level in history. Accordingly, Pakistan has witnessed a surge in harmful emissions, and its manufacturing industry alone produced 41.8 mt emissions (Ritchie et al., 2020), which is a major concern for us.

Consequently, our aim is to understand how GHRM, GRI, pro-environmental behaviour (E-PEB) and environmental strategy (ESTR) help abate organisations' environmental impacts and improve environmental performance (EnvP).

This paper contributes to the GHRM literature in the following ways.

First, although Pakistan has taken substantial steps to conserve the environment, studies addressing GHRM, GRI, E-PEB, ESTR and EnvP are limited (Fawehinmi et al., 2020; Kraus et al., 2020). Therefore, the present study will add to existing research lines and will help Pakistani—and possibly other developing countries'—industrial practitioners and policymakers to understand the crucial role of the aforementioned parameters and ascertain how they affect EnvP and shape sustainable EnvP with the help of GHRM.

Second, by exploring the moderating effect of ESTR as well as the mediating effect of GRI and E-PEB, this study will produce insights to understand the underlying impact of these variables in addressing global environmental concerns. The addition of these variables as moderator and mediator, respectively, will provide a new perspective for researchers.

The remaining paper is structured as follows. Section 2 explains the theoretical background. Section 3 focuses on the literature review at the base of the conceptual model, while Section 4 presents the research methods. Section 5 provides the study results and analysis. Finally, Section 6 discusses the results and concludes the study with some policy implications and suggestions.

2 | THEORETICAL BACKGROUND

The issue of sustainability is a priority for firms as the awareness of incorporating 'green' into the corporate strategy has recently gained momentum (Albino et al., 2009; Castellano et al., 2022; Khan et al., 2021). Facilitating the GHRM and implementing sustainable policies for employees is therefore emerging as one organisational response to environmental degradation (Renwick et al., 2013) and social sustainability (Amrutha & Geetha, 2020).

According to Saeed et al. (2019), the practice of environmental management is 'directly linked to human resources management as the human resources constitute the life–blood of the organization' (p. 425). Generally, GHRM practices help organisations to create a green workforce that is able to appreciate and understand green initiatives (Ahmad, 2015). GHRM, on the one hand, drives GRI and EnvP (Albort-Morant et al., 2016; Gunasekaran & Spalanzani, 2012); on the other hand, it upgrades organisational operations by indulging E-PEBs (Ari et al., 2020; Fawehinmi et al., 2020; Kim & Jackson, 2017; Ren et al., 2020; Saifulina et al., 2020). Recent studies propose exhaustive frameworks and strong evidence explaining the determinants supporting the investment decisions of small and medium-sized enterprises (SMEs) concerning GRI aimed at improving firms' EnvP and contributing to the achievement of the UN's Sustainable Development Goals (Carfora et al., 2021; Castellano et al., 2022) Along this vein, Chen and Chang (2013) reveal a clear impact of GHRM on GRI, with GRI positively influencing EnvP. Specifically, GRI refers to technical improvements in the production and administrative processes (Chen et al., 2006), which directly affect the product development and manufacturing processes in a way that is not harmful to the environment and helps an organisation to gain a competitive advantage (Huang et al., 2009; Nanath & Pillai, 2017). Employee E-PEBs refer to employees' willingness to engage in environmental activities (Scherbaum et al., 2008); GHRM positively influences employees' E-PEBs, leading to collective efforts resulting in superior EnvP (Anwar et al., 2020; Dumont et al., 2017; Hameed et al., 2019; Kim et al., 2019; Rubel et al., 2020).

Renwick et al. (2013) argued that other factors are crucial to ensuring EnvP, the most prominent of which are ESTR and employees' E-PEBs (Aboramadan, 2020; Boiral & Paillé, 2012; Saifulina et al., 2020). However, as noted by Renwick et al. (2013), 'studies that examine the impact of GHRM systems rather than individual practices would be especially useful' (p. 10).

Therefore, we sustain the idea that a 'bundles perspective', namely, a holistic approach, to the practices of GHRM is needed (Napathorn, 2022; Zaid et al., 2018).

The idea that 'bundles' of interrelated and internally consistent HR practices, rather than individual practices, are appropriate has already been discussed in the literature (Dyer & Reeves, 1995; MacDuffie, 1995).

By relying on the results of Agyabeng-Mensah et al. (2020), who examined the impact of internal green supply chain practices on GHRM, supply chain environmental cooperation and firm performance using a thorough empirical model, we sustain here that, similarly to other fields, more holistic and comprehensive approaches to sustainability assessments in GHRM practices are needed (Mehrajunnisa et al., 2021). This involves the idea that firms implementing a set of GHRM bundles are likely to deliver the business outcome of environmental sustainability (Napathorn, 2022). As the companies must embed sustainability in a systemic manner, the implementation of integrated GHRM practices leads to the development of a holistic framework of outstanding components. In doing so, we do not try to demerit the single components that explain other specificities of its process, but rather encourage the use of the holistic approach to successfully drive firms towards better EnvP.

Indeed, to achieve a sustainable competitive advantage, an organisation needs to instil GHRM practices (Yong et al., 2019). As a result, we would underline that the influence of GHRM processes on EnvP needs to be considered in the context of other sub-processes functioning within the organisations.

Despite this, although the connection between GHRM practices and environmental performance is well known, we suggest here that other key elements are missing in linking this relationship. In the following sections, we propose and test a holistic model to assess the role of all these components in firms' overall environmental performance.

3 | LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

3.1 | EnvP

EnvP refers to the environmental impact of organisational activities (Claver et al., 2007; Klassen & Whybark, 1999). Organisations can improve their EnvP by utilising recycled materials in their products, clean sources of production and clean administrative and operational activities, resulting in reduced environmentally hazardous wastage and harmful emissions of pollutants and waste materials (Lindell & Karagozoglu, 2001; Weng et al., 2015). Recently, the world has witnessed an increased awareness among industrial practitioners working to protect the environment through the sustainable management of resources (Roos & O'Connor, 2015). GHRM has emerged as an organisational practice aimed at enhancing the environmental effects of businesses (Dumont et al., 2017; Masri & Jaaron, 2017), specifically their performance (Roscoe et al., 2019). Researchers have identified GHRM as a strategic organisational orientation that will improve administrative processes and operations with the help of employees to reduce firms' environmental impacts (Berrone & Gomez-Mejia, 2009; Mishra et al., 2014; Oh et al., 2016). GHRM also ensures environmental activities in HR domains, namely, recruitment, training, development, performance management, evaluation, and recognition.

Therefore, we propose the following hypothesis:

H1. GHRM accelerates EnvP.

3.2 | Employee E-PEB

Human behaviour is considered to be a leading cause of the environmental crisis as post-industrialisation humans' financial values were the only global concern. The world has evolved and started encompassing environmental concerns in its core organisational plans (Evans et al., 2017). It is essential to study human behaviour in the workplace before implementing environmental procedures and programmes in an organisation (Renwick et al., 2013; Sawang & Kivits, 2014; Temminck et al., 2015). E-PEB refers to employees' willingness to engage in the organisation's environmental activities (Young et al., 2015). Employees' E-PEB includes different activities, be they job related or just as a concern for employees' surroundings, for example, better resource utilisation (recycling paper or other useable items) and conserving the use of resources (water or electricity), among other such activities that boost organisational efforts to protect the surrounding environment. Scholars have recently started stressing the importance of E-PEB and emphasised the need for research that describes elements through which E-PEB can be promoted (Anwar et al., 2020; Blok et al., 2015; Robertson & Barling, 2013). Moreover, Rubel et al. (2021) identify GHRM as a significant driver of E-PEB.

Zibarras and Coan (2015) argued that GHRM communicates an organisation's commitment toward the environment at employees' recruitment, training and development stages. GHRM then facilitates employees' adoption of the organisational environmental goals and encourages them to actively engage in green initiatives at the workplace (Ari et al., 2020; Kim et al., 2019). An employee's sensitivity towards the environment is directly related to their E-PEB (Singh et al., 2020). Boiral (2009), Boiral et al. (2015) and Robertson and Barling (2013) also consider GHRM to be a core driver of E-PEB, as GHRM improves the environmental commitments of the organisation and reduces the harmful by-products of its manufacturing activities (Kim et al., 2016; Tian & Robertson, 2019). If employees do not execute the environmental objectives, their behaviour is subject to

punishment as per organisational conduct. Francoeur et al. (2021) identify a gap in the research by arguing that there is no consensus among researchers on the antecedents of the E-PEB in an organisation. As a result, it is not appropriate to rate GHRM as the sole potential driver of E-PEB in different contexts. Additionally, very few studies have used the GHRM approach to explain how GHRM practices in an organisation affect E-PEB (Alnajdawi et al., 2017). Employees' willingness to participate in eco-friendly behaviours stimulates the organisation's goals and enhance their environmental goals by minimising human activities that drastically impact the environment (Djellal & Gallouj, 2016; Kangasniemi et al., 2014). Vicente-Molina et al. (2013) observed that E-PEB positively influences EnvP; GHRM instils employees' environmental awareness, which later engages them in environmentally oriented activities that improve EnvP (Chen & Chang, 2013). Previous studies have also explained how E-PEB increases employees' green performance (Guerci et al., 2016; O'Donohue & Torugsa, 2016).

Sufficient literature (Elshaer et al., 2021; Ojo et al., 2020; Umrani et al., 2020) supports the argument that E-PEB shares a significant relation with EnvP. However, Bandura (1986) builds his theoretical underpinning on the idea that E-PEB might intervene between two core variables. Cherian and Jacob (2012), Cincera and Krajhanzl (2013) and DuBois and DuBois (2012) backed the importance of GHRM in promoting and accelerating the E-PEB of an organisation's employees, which later affects their EnvP.

Based on the synthesis of the extensive literature, and building on the idea of Bandura (1986), this study proposes the following hypotheses:

H2a. GHRM is positively associated with E-PEB.

H2b. E-PEB is positively associated with EnvP.

H2. E-PEB mediates the relationship between GHRM and EnvP.

3.3 | GRI

A significant literature has stated that there is a direct link between GRI and EnvP (see Chang, 2011; Chiou et al., 2011; Qi et al., 2010). Huang et al. (2009) and Rennings (2000) defined GRI as technological advancement in manufacturing and administrative practices that help an organisation excel in production output and improve EnvP. Other researchers (Bernauer et al., 2007; Oltra & Saint Jean, 2009) consider GRI to be a mechanism to modify systems, products and processes for superior EnvP and sustainability.

GRI is 'comprised of green product innovation and green process innovation' (Tang et al., 2018, p. 40). Albort-Morant et al. (2017) argued that organisations that embody GRI are more successful and have better overall performance than their competitors. GRI adds intangible value, and such organisations gain a competitive advantage over their rivals with the successful utilisation of green resources and practices (Albort-Morant et al., 2018). Furthermore, GHRM promotes environmental commitment, and compliance with environmental-oriented conduct accelerates innovative activities and processes in the organisation (Verburg et al., 2007).

Albort-Morant et al. (2016) stated that GHRM and GRI compel organisations to adopt the practices that encourage the deployment of clean energy resources, environmentally friendly technology and a system that produces products with fewer emissions through efficient resource utilisation (Gunasekaran & Spalanzani, 2012). Although the aforementioned authors suggest a link between GHRM and GRI with unified results, Singh et al. (2020) argued that the link between GHRM and GRI is dynamic, and existing results are mixed and contradictory.

GRI and EnvP encompass the environmental outcomes of organisational activities (Dubey et al., 2015). Previous studies (e.g. Chen et al., 2015; Darnall et al., 2008) claim that EnvP depends on the type of raw material, the energy sources of production and the technology used in the process of product development, as well as the environmental footprints of businesses' operational and administrative tasks. Therefore, there is a need for a mechanism that supports the organisational objectives and sustains EnvP. GRI is deeply rooted in an organisation and is strongly associated with an organisation's environmental plan. Furthermore, GRI accelerates EnvP and helps achieve organisational goals efficiently (Chen et al., 2006; Kammerer, 2009). Green products, processes and GRI activities also minimise the environmental impacts of businesses and enhance overall firm performance (Weng et al., 2015).

GHRM promotes a firm's GRI activities through green creativity (Chen & Chang, 2013; Jia et al., 2018) and green firm performance (Chen et al., 2006; Guerci et al., 2016; O'Donohue & Torugsa, 2016). Previous studies (de Saá-Pérez & Díaz-Díaz, 2010; de Winne & Sels, 2010; Fu et al., 2015; Jiménez-Jiménez & Sanz-Valle, 2008; Verburg et al., 2007) have argued that GHRM practices are related to the innovation level of a firm. Other studies (Chen & Chang, 2013; Song et al., 2020) also suggest that GHRM positively influences GRI, but Singh et al. (2020) highlighted the scarcity of research on manufacturing firms located within hostile business environments in a developing country. On the one hand, GHRM stimulates GRI; on the other, GRI acts as a strategic resource to promote the EnvP of the organisation (Chen et al., 2006; El-Kassar & Singh, 2019; Kammerer, 2009) and create leverage for the organisation to achieve its environmental goals.

In the light of the explored literature, we predict that GHRM shares a two-way relationship with the EnvP, one that is direct (H2) and the other through the mediating role of GRI. Therefore, this study proposes the following hypotheses:

H3a. GHRM is positively associated with GRI practices.

H3b. GRI is positively associated with EnvP.

H3. GRI mediates the relationship between GHRM and EnvP.

3.4 | ESTR

ESTR refers to the series of initiatives and activities an organisation plans and executes to reduce its environmental, operational and production impact (Albino et al., 2009). ESTR is implemented through programmes, policies and processes and subsequently enhances product development. ESTR also helps to reduce energy consumption and waste products through sustainable energy sources and proper environmental management systems (Bansal & Roth, 2000). According to Hart and Dowell (2011), growing environmental issues and external pressures have prompted organisations to develop and implement effective ESTR. Organisations with intensive ESTR tend to have superior EnvP (Rodrigue et al., 2013). Zhou et al. (2019) argue that present-day researchers and industrial practitioners focus on ESTR to attain the organisation's environmental goals. Moreover, Solovida and Latan (2017) reveal that organisations with ESTR accomplished more environmental goals with benefits than organisations without such systems.

ESTR integrates ecological concerns into an organisation's operational plans and ensures the implementation of environmental programmes to accomplish sustainable EnvP (Cao & Chen, 2019). ESTR substantially impacts EnvP (Latan et al., 2018); however, Li et al. (2016) reported that it is not possible to track the direct influence of ESTR on EnvP. The author further stressed that the direct impact of the ESTR on EnvP is not significant. Such results create ambiguity in understanding the role of ESTR to promote an organisation's EnvP. A study by Ateş et al. (2012) suggests that the ESTR can identify an intermediary variable (Dai et al., 2017) as a direct link between ESTR and business performance (Feng et al., 2014), but this may generate inconsistent findings. However, other studies (Ahmad et al., 2018; Chen et al., 2015; Wu et al., 2014) used ESTR as a moderator. Other studies (Ateş et al., 2012; Dai et al., 2017; Ko & Liu, 2017) further contradicted existing findings and used ESTR as a mediator to ascertain how it affects the relationship between cause and effect variables in an organisation. In the light of this literature, we posit that ESTR could moderate the relationship between GRI and EnvP.

This leads us to hypothesise that:

H4. ESTR significantly moderates the relationship between GRI and EnvP.

On the basis of the proposed hypotheses, the conceptual model is shown in Figure 1.

4 | RESEARCH METHODS

4.1 | Population and procedure

Data were collected from managers of medium to large (e.g. >50 employees) manufacturing firms in Pakistan. The managers are the leading individuals within organisations and are aware of important

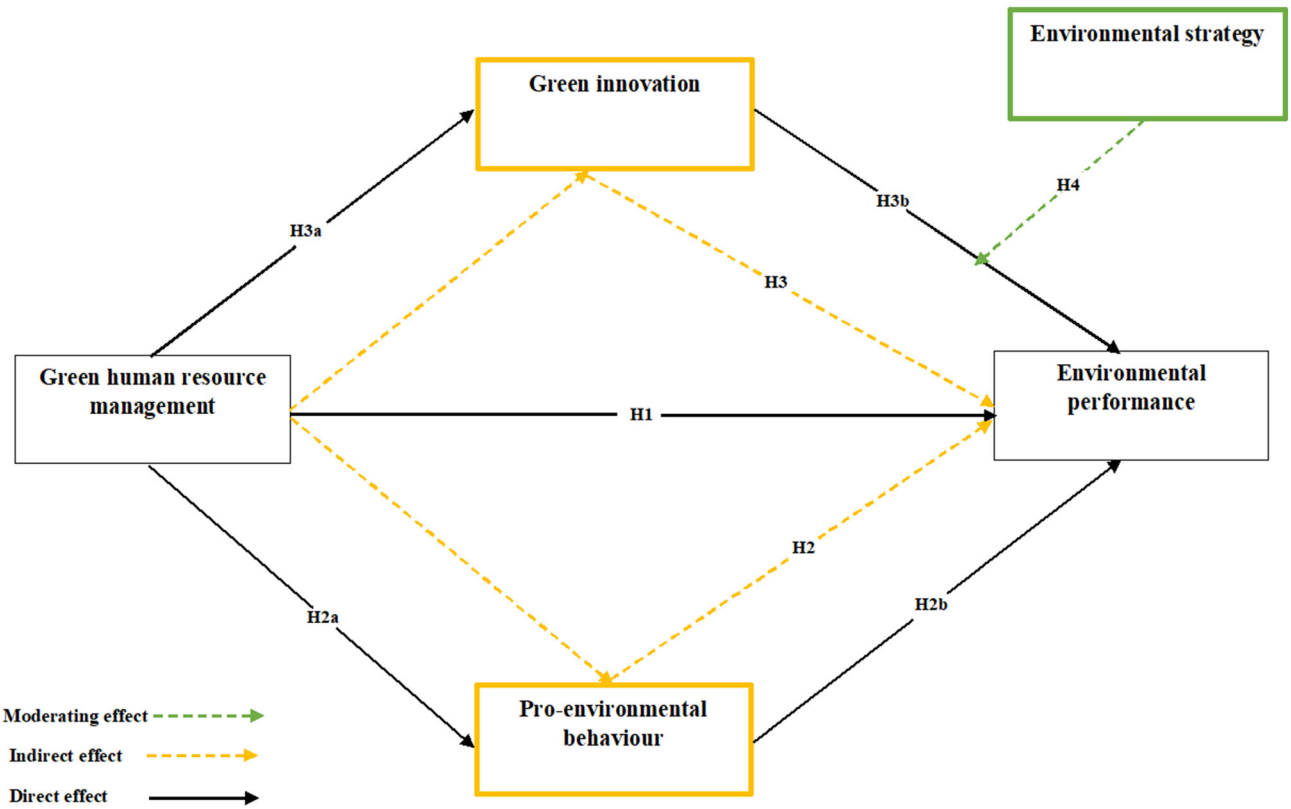

FIGURE 1 Conceptual model

details in the company. We chose the manufacturing sector as the context of the study because it is considered to be one of the most significant drivers of the economy (Rahman & Bakar, 2019). Collecting data from manufacturing firms can be justified based on the reasons subsequently detailed. First, Pakistan's manufacturing sector is the third-largest sector, contributing around 12.79% per year to the country's overall GDP (Pakistan Ministry of Finance, 2021), and is responsible for rapid technological development. Second, the rapid industrialisation and increasing urbanisation have identified the need for sustainable production and consumption (Farrukh et al., 2022). Third, this sector is notorious for its environmental record (Li & Zhang, 2014) and faces extensive institutional and environmental pressure both at home and abroad (Shah & Soomro, 2021). Four, manufacturing firms' carbon footprints have led to serious concerns regarding risks to public health and environmental pollution (Farrukh et al., 2022). Thus, it is essential to investigate how manufacturing firms can reduce their environmental footprint in Pakistan by employing GHRM practices, E-PEB, GRI and ESTR.

We adopted a cross-sectional design with a self-reported survey approach using multiple respondents to increase the efficiency of the data. Firstly, the researchers constructed a list of 120 randomly chosen manufacturing firms by contacting the relevant chamber of commerce. Secondly, the researchers contacted the directors of the human resource departments of these 120 manufacturing firms; they asked a question concerning the firm's education or training programmes for environmental sustainability to check whether the organisations applied GHRM practices in their workplace. Simply put, we only invited the firms that were implementing GHRM practices to participate in the survey. In sum, due to firms being disqualified or turning down the opportunity to participate, the authors narrowed the 120 firms down to 79 firms. After getting consent from firms, the researchers distributed 600 questionnaires from January 2021 to May 2021. The managers of 79 manufacturing firms were given a sealed packet containing a survey questionnaire and an introductory cover letter explaining the study's primary purpose and ensuring the anonymity of their responses. After three reminders, each at an interval of 2 weeks, we collected 428 completed questionnaires from managers from manufacturing firms in Pakistan. Of these, only 410 (68.33%) correctly completed questionnaires were included in our analysis. Here, it is worth mentioning that the original questionnaire was in English. We translated all English items into Urdu and back to English, as per the recommendations of Brislin (1986), to ensure the content clarity of the measuring instruments. The questionnaire was improved in the first and second rounds of pilot tests with 15 and 18 participants, respectively. The main goal of the piloting was to identify items that were unclear in Urdu. Comments from the first-round participants indicated that some items were ambiguous, and we rectified those items to enhance its precision. The second pilot round confirmed the complete clarity of the questionnaire.

The participating manufacturing firms in our study were established from 1997 to 2013. Twenty-one (26.58%) firms were set up between 1997 and 2002, while 39 (49.37%) and 19 (24.05%) firms were established between the years 2003–2008 and 2009–2013, respectively. Besides this, 73% of firms had employees ranging from 51 to 250 (e.g. 27% had 51–100 employees, 16% had 101–150 employees, 19% had 151–200 employees, and 11% had 201–250 employees), and 27% of firms had above 250 employees (e.g. 6% had 251–350 employees, 9% had 351–450 employees, and the remaining 12% had more than 450 employees) at the time of the survey. Moreover, the mean age of the managers (64.3% male and 35.7% female) was 41.7 years. Regarding the participants' qualifications, 35.6%, 52.8% and 9.2% had bachelor's, master's and PhD degrees, respectively, while 2.4% had professional certificates.

As the data on both endogenous and exogenous constructs were collected using a cross-sectional design, common method bias (CMB) could potentially cause a disturbance in our results. We thus checked the data for CMB using two statistical tests, including Harman's single factor test (Podsakoff & Organ, 1986) and variance inflation factor (VIF) (Kock, 2017).

First, Harman's single factor test was executed without rotation; five components were generated with eigenvalues above one, explaining 66.84% of the variance, while the first factor was responsible for 29.71% of the variance under the 50% limit. Second, the VIF test was used to verify the multicollinearity among the constructs. If the VIF value exceeds 5, it is a possible indication of CMB (Hair et al., 2021). However, the VIF values of all constructs were under the limit of 5, with the maximum being GHRM (3.087) and minimum E-PEB (1.421), thus confirming there were no critical CMB issues in our dataset.

4.2 | Measurements

The survey instruments used in this study were adapted from the available resources. A Likert-type scale varying from *I do not agree* (1) to *strongly agree* (5) measured each item of the GHRM, EnvP, GRI, E-PEB and ESTR variables. All the scales had an acceptable level of reliability ($\alpha > .70$; Hair et al., 2019). For instance, the exogenous variable GHRM was measured using a 6-item scale borrowed from Dumont et al. (2017); a sample reads, 'My company provides green training to develop knowledge and skills required for green management'. The α of the scale was .83. The 5-item scale by Chow and Chen (2012) was used to measure the endogenous variable EnvP. An item example is 'Our firm reduced purchases of non-renewable materials, chemicals, and components'. The scale had a Cronbach alpha value of .855. The mediators GRI and E-PEB were measured using a 7-item scale and 8-item scale adapted from Chen et al. (2006) and Robertson and Barling (2013), respectively. The GRI item sample is 'My company uses materials that consume less energy and resources', whereas the E-PEB item reads, 'I put compostable items in the compost bin'. The Cronbach's alpha of these two scales were .82 for GRI and .87 for E-PEB. Finally, Banerjee et al.'s (2003) 3-item scale was used to measure the moderator ESTR. A sample is 'We emphasize the environmental aspects of our products and services in our ads'. The scale had a reliability value of .72.

5 | ANALYSIS AND RESULTS

To analyse the collected data, structural equation modelling (SEM) has been used. SEM is a technique used to evaluate the validity of a theory through statistical estimations (Ringle et al., 2015). Furthermore, SEM is a multivariate statistical analysis method employed to analyse the structural relationships between latent variables and their constructs. SEM facilitates the discovery and confirmation of relationships among numerous variables. The main reason for using SEM is that it investigates the relationships among numerous latent constructs in a way that reduces the error in the model (Hair et al., 2021). There are two commonly used SEM techniques: (a) covariance-based and (b) variance-based. While covariance-based (CB-SEM) has traditionally been the dominant technique for analysing complex interrelationships between latent and observed variables, the number of published articles using variance-based partial least square (PLS-SEM) has increased significantly compared to CB-SEM in recent years (Hair et al., 2021). Although PLS-SEM appears to be the best option when a small population restricts the sample size, it also works smoothly with large sample sizes (Hair et al., 2019). Therefore, this study employed PLS-SEM to test the proposed hypotheses in a tool called SmartPLS V3.3.3 (Ringle et al., 2015).

There are several justifications for choosing PLS-SEM for our analysis. To begin with, scholars believe that PLS-SEM is more appropriate for estimation than CB-SEM (Kraus et al., 2020). Additionally, PLS-SEM is an adequate method for evaluating more complex frameworks (Hair et al., 2021), particularly those containing moderation. Furthermore, PLS-SEM is better regarded in its assessment of estimations compared to regression for executing mediation (Preacher & Hayes, 2004). Moreover, PLS offers a graphical interface that is more user friendly compared to other path modelling software like MPLUS, AMOS and LISREL. Besides, it is not necessary to verify the normality assumption in SmartPLS analyses (Hair et al., 2021). Finally, PLS is a robust component-based technique that has been widely utilised in recent studies (Aftab et al., 2022; Albort-Morant et al., 2016, 2018; Ansari et al., 2021; Anwar et al., 2020; El-Kassar & Singh, 2019; Farrukh et al., 2022; Fawehinmi et al., 2020; Kim et al., 2019; Kraus et al., 2020; Umrani et al., 2020).

PLS-SEM follows a two-stage estimation model: measurement and structural models (Anderson & Gerbing, 1988). The measurement model is used to describe the relationships between latent variables and their indicators, whereas the structural model determines the relationship between predictor and criterion variables (Hair et al., 2021). The PLS algorithm method was used to verify the quality

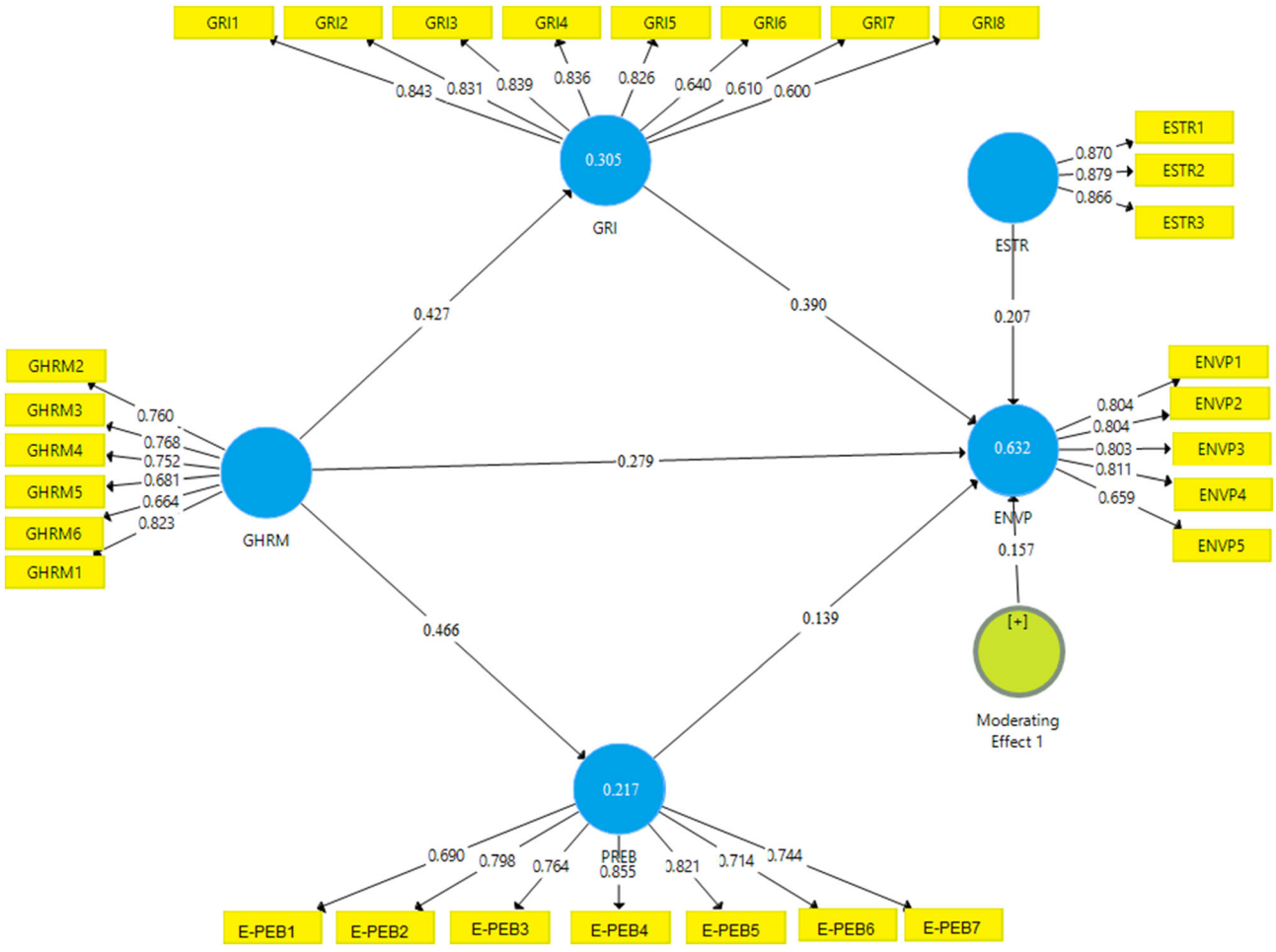

FIGURE 2 Measurement model

of the measurement model, and the bootstrapping technique of 5000 subsamples was employed to check the structural model (Hair et al., 2019).

In the measurement model, we evaluate the factor loadings, reliability and convergent and discriminant validities of the variables. To begin with, we check the factor loading, and individual items should have a minimum of .5 loadings (Hair et al., 2021). The minimum loadings were .600 (GRI8), and the maximum was .879 (EStr2). Thus, factor loadings of all individual items surpass the lowest value of .5 (Hair et al., 2021), as shown in Figure 2.

Composite reliability (CR) was used to examine the reliability of scales. As suggested by Hair et al. (2019), the CR value should be over .70. Our data analysis showed CR values between .884 (EnvP) and .915 (GRI). In addition, the convergent validity is evaluated with average variance extracted (AVE) and should not be less than .50 (Hair et al., 2019). All five constructs had AVE values above .5; thus, our study also met this criterion. With the satisfactory reliabilities and convergent validity results, we calculated the discriminant validity through the heterotrait–monotrait ratio (HTMT) correlation ratio (Henseler et al., 2015). The recommended value for HTMT is less than .90 (Henseler et al., 2015); otherwise, it shows a lack of discriminant validity. All the HTMT correlations were less than .90, as shown in Table 1, which displays the complete findings of the measurement model.

In the structural model (Figure 3), we evaluate the study hypotheses after analysing the link between the constructs of our proposed model. Additionally, we considered a standard *t*-value above 1.96 or a *p*-value below .05 for accepting the hypothesis. We developed five direct hypotheses; the obtained results after executing bootstrapping technique with 5000 resamples indicate that GHRM is positively and directly linked to EnvP (*t*-value = 4.694 and $\beta = .279$), GRI (*t*-value = 9.964 and $\beta = .427$) and E-PEB (*t*-value = 12.353 and $\beta = .466$). Moreover, the results revealed that GRI is positively associated with EnvP (*t*-value = 6.941 and $\beta = .390$) and E-PEB has direct and positive connections with EnvP (*t*-value = 3.364 and $\beta = .139$). Hence, our study supports all five (e.g. H1, H2a, H2b, H3a and H3b) direct hypotheses, as shown in Table 2.

In Table 2, the results of two mediating and one moderating hypotheses are also presented. The results reveal that both GRI (*t*-value = 6.543 and $\beta = .283$) and E-PEB (*t*-value = 3.313 and $\beta = .086$) mediate the GHRM and EnvP nexus. We used 'variance accounted for' (VAF) to verify the strength of the GRI and E-PEB mediators in the GHRM and EnvP relationship. Hair et al. (2014) stated that VAF values of less than .20 show the absence of mediation, .20–.80 some mediation and above .80 full mediation. The VAF calculation exhibits values of .235 for E-PEB and .504 for GRI, and so they fall in the partial mediation range as per the guidelines by Hair et al. (2021). Hence, H2 and H3 partially mediate the relationship between GHRM and EnvP.

Additionally, we proposed in H4 that ESTR positively moderates the GRI and EnvP relationship. To test this nexus, we applied the product indicator method by multiplying GRI*ESTR to predict the outcome variable EnvP. The result of PLS-SEM indicates that ESTR positively moderates the relationship between GRI and EnvP (*t*-value = 4.450 and $\beta = .157$).

The graph of moderating effect can be seen in Figure 4.

5.1 | Coefficient of determination, effect size, predictive relevance and model fit

We used different criteria to check the relevance and fitness of our model. Firstly, the coefficient of determination, commonly known as R^2, was used to determine the model's explanatory power. R^2 shows variations in the endogenous variables due to exogenous variables. As outputs in Table 3 demonstrate, the R^2 value of the primary dependent variable EnvP was .632, GRI was .305, and E-PEB was .217. Secondly, the effect size (f^2) was also determined, indicating whether the model's predictor variable significantly influences the criterion variable (Götz et al., 2010). As a guideline, this study followed Cohen (1988), who stated that f^2 greater than .02, .15 and .35 show small, medium and large effect sizes, respectively. This study's results reveal that GHRM has a negligible effect on EnvP (.068), a significant impact on GRI (.402) and a medium effect on E-PEB (.278). Similarly, GRI and E-PEB have a medium (.178) and small (.057) effect on GHRM, respectively. Thirdly, we also investigated the predictive relevance of our research model using the blindfolding procedure in SmartPLS to obtain the value of Q^2 (Geisser, 1974). According to Cohen et al. (2000), Q^2 values of .02 (minor), .15 (medium) and .35 (large) show predictive relevance and should always be larger than 0 (Chin, 1998). The results in Table 3 portray that Q^2 values for EnvP, GRI and E-PEB were .370, .293 and .116, respectively. These values fall in the range of medium and large predictive relevance (Cohen et al., 2000). Finally, we determined the model fit through 'standard root means square residual' (SRMR), which is 'the root mean square discrepancy between the observed correlations and the model-implied

TABLE 1 Convergent and discriminant validities

Constructs	FL range	CR	AVE	1	2	3	4	5
1. EnvP	0.659–0.811	0.884	0.605					
2. ESTR	0.866–0.879	0.905	0.759	0.764				
3. GHRM	0.664–0.768	0.881	0.553	0.836	0.864			
4. GRI	0.600–0.833	0.915	0.579	0.792	0.667	0.843		
5. E-PEB	0.690–0.855	0.911	0.595	0.550	0.577	0.501	0.393	

Abbreviation: FL, factor loadings.

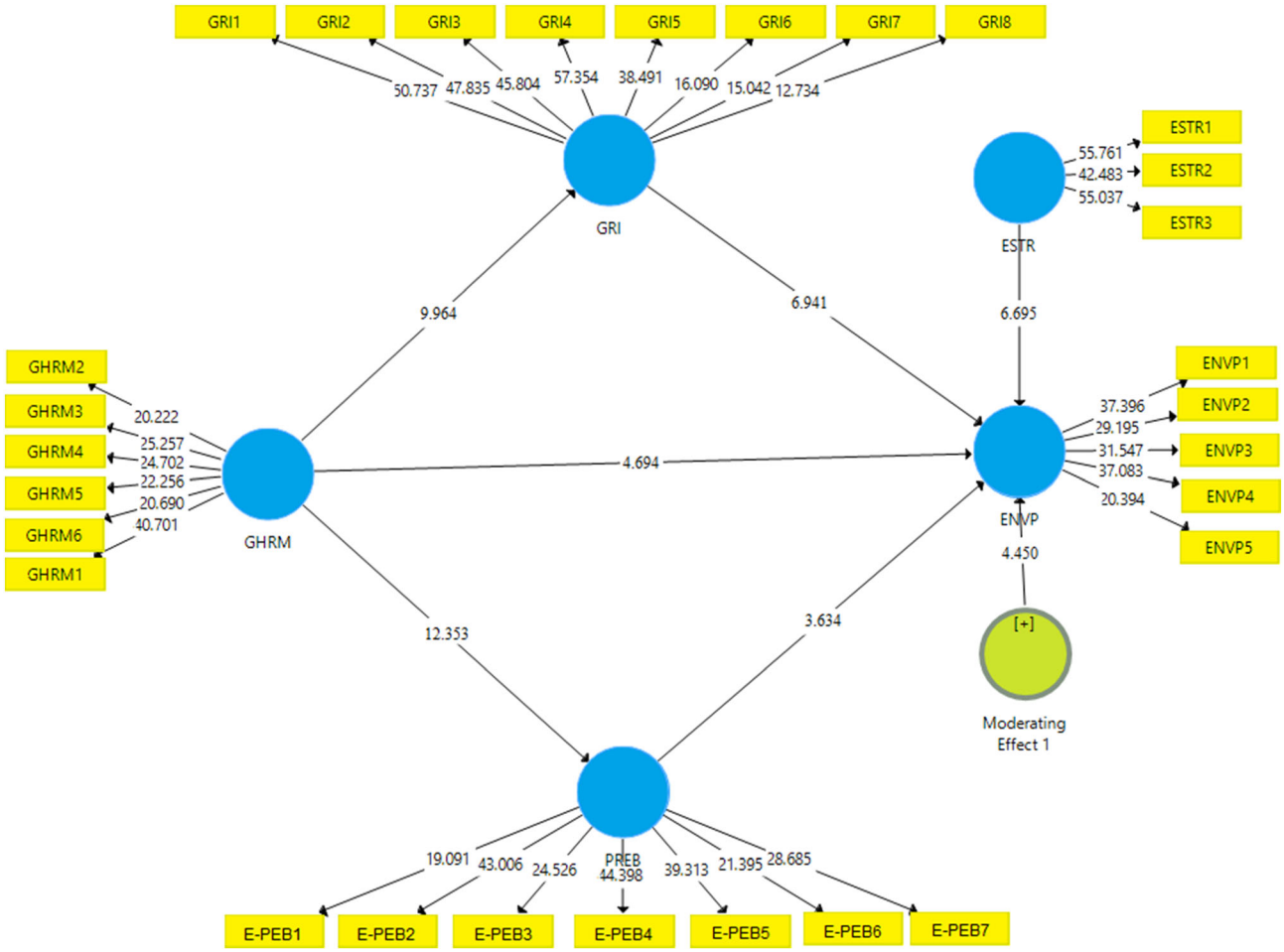

FIGURE 3 Structural model

TABLE 2 Results of hypotheses testing

Relationships	β	*t*-value	*p*-value	LLCI	ULCI	Decision
GHRM → EnvP	.279	4.694	.000	0.165	0.392	Accepted
GHRM → GRI	.427	9.964	.000	0.672	0.776	Accepted
GHRM → E-PEB	.466	12.353	.000	0.400	0.543	Accepted
GRI → EnvP	.390	6.941	.000	0.274	0.492	Accepted
E-PEB → EnvP	.139	3.634	.000	0.068	0.215	Accepted
GHRM → GRI → EnvP	.283	6.543	.000	0.196	0.365	Partially mediated
GHRM → E-PEB → EnvP	.086	3.313	.001	0.039	0.113	Partially mediated
GRI*ESTR → EnvP	.157	4.450	.000	0.073	0.214	Moderated

correlations' (Hu & Bentler, 1998); they added that a model is a good fit if the SRMR score is less than .08. The criteria of good fit are met in the study model, as the SRMR value is .074.

6 | DISCUSSION AND IMPLICATIONS

In recent years, scholars have shown a keen interest in understanding the role of HRM in improving environmental management (Kim et al., 2019; Ren et al., 2018). To our understanding, this research is among the first to explore the nexus of GHRM and EnvP by highlighting GHRM practices as a new way to enhance EnvP in Pakistan's emerging economy. Pakistan is the 5th most populous country in the world, with a population of around 227 million and the 33rd largest country by area, comprising more than 880,000 km^2. The GDP per capita is around $1630 (Pakistan Ministry of Finance, 2021). Additionally, the sector-wise contributions to GDP are as follows: service sector (61.7%), agriculture sector (19.2%) and the industrial sector including manufacturing (19.12%) (Pakistan Ministry of Finance, 2021). According to the Pakistan Bureau of Statistics

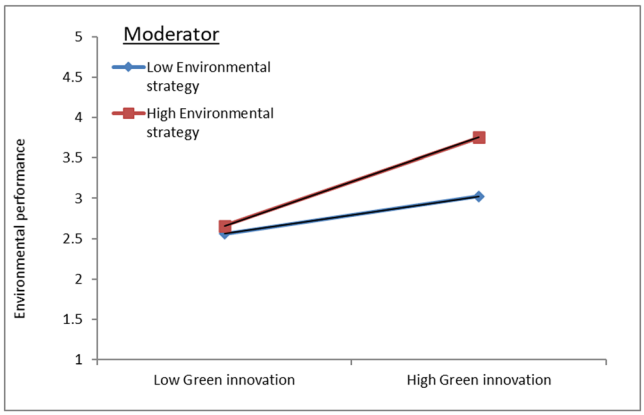

FIGURE 4 Moderation (GRI*EStr → EnvP)

TABLE 3 R^2 and Q^2

Variables	R^2	Q^2
Environmental performance	.632	.370
Green innovation	.305	.293
Pro-environmental behaviour	.217	.116

(PBS, 2021) report, Pakistan has a large labour market of 71.76 million (67.25 million employed and 4.51 million unemployed). A recent PBS (2021) report summarised the share of each industry in the job market: agriculture/hunting/forestry (37.4%), community/social and personal services (16.0%), manufacturing (14.9%), wholesale and retail trade (14.4%), construction (9.5%), transport storage and communication (6.2%) and other categories (1.5%).

This research contributes to extending the previous literature on HRM and environmental management by examining the effect of GHRM practices on EnvP in manufacturing firm settings because they are one of the main reasons for environmental pollution, degradation and climate change (Kraus et al., 2020), especially in developing countries such as Pakistan (Ansari et al., 2021; Farrukh et al., 2022).

To our anticipation, PLS-SEM results indicate that GHRM practices relate positively to EnvP (H1). GHRM is a crucial resource through which to achieve organisational goals and boost an organisation's EnvP through employee participation. López-Gamero et al. (2009) confirmed the essential role that proactive environmental management, termed GHRM, plays in intensifying an organisation's EnvP. These results are consistent with other studies (Gilal et al., 2019; Mousa & Othman, 2020; Paillé et al., 2014) and valid for both developing and developed countries. Thus, the study results validate that GHRM practices promoting eco-friendly activities, including hiring and rewarding staff members, can contribute to an enhanced organisational EnvP.

Second, we investigated whether E-PEB mediates the effect of GHRM practices on EnvP.

The study argued that GHRM practices help employees in developing greener minds and motivate them to take part in E-PEB activities, which helps to enhance EnvP. Several environmental scholars have suggested exploring employees' E-PEB in organisations (Ansari et al., 2021; Kim et al., 2019; Lo et al., 2012). Consequently, the present study underlines employees' psychological process of involving themselves in their organisation's green efforts. This shows that the more effective an organisation's GHRM initiatives, the more its workers display eco-friendly behaviour (Cincera & Krajhanzl, 2013). Our study findings reveal that the presence and effective implementation of GHRM practices can make employees exhibit E-PEB (H2a). When manufacturing firms consider environmental management in the hiring process, provide appropriate environmental training, reward green behaviour and have a pro-environmental policy, employees respond by E-PEB. Additionally, when firms motivate their employees to give suggestions and ideas for environmental improvements, employees become more eco-friendly and work in a team to resolve environmental problems. Thus, this justifies how firms may positively affect employees' E-PEB by providing a GHRM-enriched environment. The results are consistent with previous studies (e.g. Ansari et al., 2021; Saeed et al., 2019), which stated that firms employ GHRM practices as a valuable motivational tool for staff members to display E-PEB. Similarly, when employees display E-PEB at the workplace, it can enhance EnvP (H2b). This implies that E-PEB has a considerable positive impact on conserving energy and water usage, waste reduction, reductions in overall costs, reductions in buying non-renewable materials and enhancing the marketplace position and reputation of the firm (Elshaer et al., 2021). Our results support previous studies (Kim et al., 2019; Ojo et al., 2020). Moreover, our results indicate that GHRM practices boost employees' E-PEB, which subsequently enhances EnvP. In simple terms, employees' E-PEB mediates the influence of GHRM practices on EnvP (H2). This result is similar to prior research by Elshaer et al. (2021), who argued that GHRM practices are key to encouraging E-PEB in employees and that green minds can enhance the EnvP of the firm.

Third, this study explored whether GRI indirectly influences the association between GHRM and EnvP. The empirical outcomes reveal that GHRM directly and positively links to GRI (H3a). According to Malik et al. (2021), GHRM, along with green creativity, helps organisations attain sustainable competitive advantages by using GRI. We confirmed that GHRM accelerates the GRI of manufacturing enterprises in Pakistan. Recent research by Singh et al. (2020) also established that effective GHRM practices accelerate GRI. Furthermore, we argued that GRI shares a positive connection with EnvP (H3b). Kraus et al. (2020) wrote that GRI improves EnvP by reducing energy usage, air emissions, material usage and the consumption of harmful materials. As a result, GRI significantly decreases the adverse environmental effect of the business, if any, and improves organisational performance, including social, financial and environmental, through waste and cost reduction that saves resources, money and time (Weng et al., 2015). Our findings also advance the extant literature in environmental management. We discovered that GHRM indirectly influences EnvP (H3) through GRI. Simply stated, GRI mediates the GHRM and EnvP nexus. When firms employ green practices, they follow GRI in their product design and development, reducing detrimental environmental effects and eventually improving EnvP. Kraus et al.

(2020) reported similar results; they found that GRI significantly mediates the link between the predictor variable (e.g. corporate social responsibility CSR) and EnvP.

Finally, this study examined whether ESTR moderates the relationship between GRI and EnvP, that is, whether firms' ESTR improves the effect of GRI and EnvP.

H4 proposed that ESTR positively moderates the GRI and EnvP nexus. According to Hart (1995), firms must use waste mitigation strategies, sustainable development and product stewardship to attain a competitive advantage. Based on this perspective, we explored the role of ESTR in helping an organisation boost its EnvP. A prior investigation by Kraus et al. (2020) ascertained that CSR has no direct connection with EnvP but is positively linked with ESTR, which is closely related to EnvP. Other researchers have established that a dynamic ESTR increases the operational performance of firms (Dai et al., 2017). We argued that a firm with proactive ESTR creates a favourable environment for green practices and strengthens the GRI and EnvP relationship. This is what we established in our paper: A proactive ESTR positively moderates the GRI effect on EnvP.

In conclusion, GHRM practices have a defining role in environmental management. The empirical results indicate that the adoption of GHRM practices positively affects the EnvP of manufacturing firms. In addition, E-PEB and GRI can act as a mediating bridge between GHRM and EnvP. Furthermore, the presence of proactive ESTR strengthens the GRI and EnvP nexus. These findings could be highly illustrative for firms in both developing and industrialised countries that still follow traditional unsustainable practices. The study results are beneficial for every country where sustainable green practices are not common and the environmental situation is worsening with every passing day. These results confirm the importance of the study's variables in the current deteriorating environment and how eco-friendly practices and mindsets can save the world.

6.1 | Theoretical implications

Theoretical contributions require a particular kind of research discovery that is able to offer a fresh understanding of a phenomenon that is crucial for improving organisational outcomes. Our study presents original knowledge through a holistic view based on the inclusion in the same conceptual model of the empirical information on GHRM, E-PEB, GRI, ESTR and EnvP and different contributions to scholars, professionals and policymakers. It thereby contributes by determining the nexus between GHRM and EnvP with the mediating role of E-PEB and GRI, as well as the moderation of ESTR on the GRI and EnvP nexus.

Specifically, we contribute to the environmental management literature by incorporating the concepts of GHRM and EnvP in the context of the manufacturing sector of a rapidly changing developing country such as Pakistan, which is still an underexplored yet important context.

Secondly, we discovered that GRI directly, and under the influence of GHRM, affects firms' EnvP. This indicates that GHRM practices via green recruitment, training, empowerment and performance-based incentives help organisations attract, retain and sustain green principles in their employees, contributing towards GRI in both processes and products (Gerhart, 2005) for continual superior EnvP. Consequently, our study recommends that firms need to embed GHRM practices in organisations' multifaceted social systems to allow human capital to tackle organisation-specific features that are sufficiently beneficial for a particular firm rather than for rival firms in the market (Takeuchi et al., 2007). In addition, firms should have an aggressive GHRM style to attract, develop and retain green staff members for GRI and enhance EnvP to achieve a competitive advantage over their market competitors by creating greater firm-level employee-based resources that are rare, valuable and suit other organisational capabilities; these enable the firm to effectively orchestrate them for valuable use (Collins, 2021; Lin et al., 2013).

Thirdly, we noticed in our study that the GRI and EnvP relationship improves in the presence of ESTR. Specifically, when firms develop and actively follow ESTR, it creates an environment that is conducive to practicing GRI, which leads to improving EnvP. Previous research has revealed that a firm's ESTR and specific proactive techniques focusing on creating green technologies can boost its financial performance (Fousteris et al., 2018). On the contrary, an ineffective managerial culture could make ESTR reactive, which could potentially increase the risk of disasters and damage a firm's reputation (Zhang et al., 2019). Our empirical findings suggest that firms should develop and actively follow ESTR because it strengthens the GRI and EnvP nexus and could reduce the risk of harmful effects on the firm's reputation and financial outcomes.

6.2 | Managerial implications

Nowadays, top managers and policymakers are keenly focused on environmental goals (Bhatt et al., 2020; Neri et al., 2018; Yang et al., 2019); they can utilise our research framework in emerging economies to minimise air emissions, conserve energy, conserve water and conserve non-renewable resources that enhance EnvP. This study offers several novel suggestions to owners/managers on how to integrate GHRM, E-PEB, GRI and ESTR for superior EnvP and to achieve sustainable development goals.

For instance, our research can assist managers in their efforts to encourage employees to implement pro-environmental initiatives in their daily roles. Our findings reveal that HR directors can use GHRM practices to develop the E-PEB. Hiring employees who are aware of environmental issues and establishing an effective training and measurement system both promote environmental consciousness across different functions. These activities guarantee that environmental awareness is embedded in the habits and behaviours of employees (Roscoe et al., 2019). With time, these behaviours become habits that can shape E-PEB (Ansari et al., 2021). Our research shows that GHRM mirrors the firm's strategic orientation towards environmental management and motivates workers to exhibit E-PEB to reduce the adverse environmental effects that lead to EnvP. Therefore, the

manufacturing firms have to invest in GHRM practices and regard them as a strategic resource to channel human potential towards their environmental management goals.

Second, our study found that GHRM practices are vital for acquiring, developing and sustaining employees who bring green values and beliefs to work and support a firm's strategy to compete with market rivals through GRI practices that may help firms gain competitive advantage and enhance EnvP. We subsequently propose that owners and managers in manufacturing firms recognise GRI as a strategic asset and leverage it to achieve their environmental objectives. Such an arrangement can work wonders for GRI and thus EnvP if the GHRM practices receive unconditional commitment and support from top management. Additionally, we suggest that firms should not stop at merely conducting exploitative GRI that improves current processes and products to make them eco-friendly but also focus on an exploratory GRI that could perhaps reverse adverse environmental damage and positively influence the environment in the future.

Third, our study established that the GRI and EnvP relationship positively moderates the presence of firms' ESTR. This shows that firms' ESTR is essential in achieving environmental goals. If the firm has proactive ESTR, it could create a conducive environment for GRI practices, which in turn improves EnvP. Alternatively, the absence of ESTR or the lack of participation could hamper the firms' environmental targets. Therefore, we suggest that firms should develop and strictly follow ESTR and integrate it with GRI to reduce negative environmental impacts, if any, and enhance EnvP.

6.3 | Limitations and future research directions

Despite notable implications, this study has some limitations, and we discuss them here to provide future research directions. Bloom and Reenen (2010) wrote that management practices vary across firms, sectors and countries. Keeping this view in mind, we conducted this research focusing on the manufacturing industry in Pakistan. It is possible that GHRM practices may vary across manufacturing and non-manufacturing sectors, as well as developing and developed countries, and thus, it limits the generalisability of this study. As a result, future researchers may consider extending our conceptual framework to non-manufacturing sectors and developed countries. Furthermore, we used perceptual or primary data, which can sometimes fail to provide a complete picture of the situation. We suggest including organisations' secondary environmental data to improve the study results. Moreover, similarly to the vast majority of empirical surveys, only some selected determinants of the variables were investigated and measured, even though both could exist in the scientific literature, and different ones could be practised. Future empirical studies could enlarge these determinants in order to add new evidence to our results.

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