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# Effects of green human resource management on green innovation through green human capital, environmental knowledge, and managerial environmental concern

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ABSTRACT

The current literature in the environmental management domain proposes that employee behaviour is essential to enhancing environmental outcomes, but few studies have examined how human resource management (HRM) is linked with the green innovation of organisations. The study aims to investigate the interrelationship between green human resource management and green innovation in the hotel industry through the mediation of green human capital and environmental knowledge and moderation of managerial environmental concerns (MEC). The study was conducted on 209 participants from several occupational levels, including frontline workers, entry-level management, middle management, and top management employees of various hotel chains in Pakistan. Data were collected through stratified random sampling and analysed using the partial least structural equation modelling (PLS-SEM) technique. Resultantly, GHRM positively contributed to the green innovation of organisations. The mediating roles of green human capital and environmental knowledge were also statistically significant. Furthermore, the results reveal that the link between GHRM and green human capital is stronger with MEC as a moderator. The study contributes to the body of knowledge by investigating environmental protection based on the human capital theory through empirical evidence on hypothesised relationships. Moreover, the study extends the GHRM scope by adding predictors such as environmental knowledge for efficient hotel industry performance.

## 1. Introduction

Numerous environmental concerns have been raised due to rapid economic progress and development (Y. J. Kim, Kim, Choi, & Phetvaroon, 2019; Watson & Tidd, 2018). The hotel industry's actions may create environmental constraints, such as loss of natural resources, climate change, and discharge of different environmental toxins which cause water, air, light, and sound pollution and wildlife extinction. Various firms and governments have recognised the significance of environmental sustainability for economic and social development. The topic creates a need for public attention towards the environmental or green issues, which include conversion, recycling, and renewable sources of energy (Ecer, Pamucar, Mardani, & Alrasheedi, 2021). Industries attempt to follow environmentally responsible behaviours following pressure from corporate, stakeholders, and environmental rules (Paillé, Boiral, & Chen, 2013). The GHRM is a strategy to increase its popularity and achieve environmental objectives (Guerci, Longoni, & Luzzini, 2016; Tang, Chen, Jiang, Paille, & Jia, 2018). In order to gain a competitive edge and the best environmental performance, GHRM practices have become essential for innovativeness, which affects customer satisfaction, trust, credibility, and preference in the hotel industry (Hollebeek & Rather, 2019; E.; Kim, Tang, & Bosselman, 2019; Yen, Teng, & Tzeng, 2020).

Multiple industries (specifically the hotel industry) have performed considerable green efforts, such as water and energy conversion, waste reduction, addressing food waste, and educating workers and customers about the issues (Bohdanowicz, Zientara, & Novotna, 2011; Darvishmotevali & Altinay, 2022; Pham, Hoang, & Phan, 2019; Rahman, Reynolds, & Svaren, 2012). Furthermore (Yong, Yusliza, & Fawehinmi, 2019), noted that scholars began emphasising greening at work from 2007 onwards. Earlier studies demonstrated that large hotel chains have managed to effectively minimise their water and energy use between 2009 and 2014 by adopting operational goals, rules, and eco-friendly programmes. Consequently, the initiatives encourage businesses in

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other sectors to promote a culture that cultivates environmental preservation.

Several researchers highlighted the subject by outlining the impact of green HRM practices (green involvement and training, green performance and green hiring, and compensation) on environmental outcomes (Yong, Yusliza, & Fawehinmi, 2019; Zhang, Luo, Zhang, & Zhao, 2019). The practices demonstrate the industry's commitment to environmental protection, which could enhance its long-term reputation and performance environmentally (Tang et al., 2018). According to (Yang, Wang, Huang, & Chen, 2022), human intelligence, human skills, and human capacities are the most crucial factors in organisations to gain a competitive advantage. Ahmad, Salamuddin, and Surat (2022) stated that people are either born with inborn abilities or acquire them through learning where the latter eventually change them into human capital if they are given more attention.

Training and development, HRM, and incentives are ways to gain or attain green HRM. Employees can be more constructively connected with environmental concerns with greater environmental knowledge and their significant role in protecting the environment. According to Irani & Kiliç, 2022, knowledge-based training programmes will increase the personnel skills that could be encouraged in numerous operations in the industry by hiring environmentally concerned people to consistently and successfully teach other workers. Environmental knowledge involves the process of finding, capturing, producing, and implementing information to develop organisational performance and enhance competitiveness as an innovative strategy (Pham, Thanh, Tučková, & Thuy, 2020).

A recent study discovered that GHRM increases the skills of the human capital and the MEC of an industry, which affects organisational performance (Fawehinmi, Yusliza, Mohamad, Faezah, & Muhammad, 2020) and sustainable innovation progress (Roscoe, Subramanian, Jabbour, & Chong, 2019). Thus, studies should examine how environmental knowledge with the aid of green human capital impacts corporate green innovation. Despite being one of the most critical factors (Brookes & Altinay, 2017), the employees with no knowledge of environmental concerns fail to develop attitudes and behaviours to handle the environmental issues. Specifically, the study aims to demonstrate how GHRM influences corporate green innovation by converting employees into green human capital through MEC to improve environmental knowledge. The reasons for the research model development are: First, from the GHRM perspective, HR applications can support green inventions or courses of action in the industry. Second, based on the human capital theory, GHRM accompanies human capital and effective environmental knowledge, which increases green innovation in the industry. Third, the HRM of industries that experience environmental issues profoundly impacts the implication of management environmental exercises that ultimately leads to green innovation.

## 2. Literature review

### 2.1. Theoretical background

#### 2.1.1. Underpinning theory

Human Capital Theory is suitable and relevant to support the study's theoretical background. "Human Capital Theory is the combination of personality attributes, habits, knowledge, social life, and creativity considered in labour performance to contribute to economic value" (Oostendorp, 2009). The theory presents a different approach to human capital in economics and how it contributes to organisational productivity (innovation). Human capital is typically accomplished by a unit of human capital management (HCM) in firms currently known as the human resources (HR) department (Rusmingsih, Widarni, & Bawono, 2021). In executing HR applications, top-level management affairs significantly impact the rate at which organisations begin environmental practices (Eiadat, Kelly, Roche, & Eyadat, 2008). The results benefit individuals, industries, and society at large when the resource is utilised efficiently and effectively (Blake & Gano-an, 2020). Furthermore, knowledge about work practices creates an innovative environment (Antonioli, Mancinelli, & Mazzanti, 2013).

### 2.2. Hypothesis development

#### 2.2.1. Green human resource management and green innovation

The hotel industry must proactively adopt methods to manage environmental complexities under pressure from environmental policies and laws (Yong et al., 2020). The GHRM is becoming more widely acknowledged as a crucial practice for executing green practices, which enhances environmental performance and promotes long-term development (Dragomir, 2020; Ren, Tang, & Jackson, 2018). Thus, several studies have investigated how and when GHRM affects environmental performance, which can produce competitive advantages for businesses (Ali, Wang, Jiang, & Ali, 2019). For instance (Guerci et al., 2016), highlighted that green human resource management affects the relationship among environmental performance and stakeholder pressures, while few researchers examined the relationship between green innovation and GHRM. Recently (Harb & Ahmed, 2019; O'Donohue & Torugsa, 2016), examined the impact of GHRM on perceived financial sustainability in the hospitality sector.

Green innovation is a sort of innovation that minimises environmental outcomes while achieving the environmental goals of the industry and providing environmental benefits (Liu, Gao, Ma, & Chen, 2020; Wang, Cui, & Zhao, 2021). Innovativeness is an industry's willingness and capability to adopt new ideas, procedures, and technologies and create unique service offerings (Bibi et al., 2022; Xiong, Khan, Bibi, Hayat, & Jiang, 2022). Past research has emphasised that HRM improves employees' knowledge, abilities, and capabilities, hence encouraging the corporate process and product innovation (Seeck & Diehl, 2017). Therefore, the study included three dimensions to demonstrate GHRM positive impact on green innovation.

First, the hotel industry must appoint workers who actively contribute to environmental activities to produce and maintain innovation (Renwick, Redman, & Maguire, 2013). Second, employees can gain the learning and abilities needed to develop their creativity and innovation through organisational training and involvement activities (Singh & El-Kassar, 2019). Third, employee behaviour can be aligned with organisational environmental goals through green performance management and reimbursement practices (Sepahvand, Nazarpoori, Sepahvand, & Arefnezhad, 2022). Therefore, the following hypothesis is presented:

**H1**. The GHRM is positively related to green innovation.

#### 2.2.2. GHRM and green human capital

The theory of human capital describes human capital to include employees' traits, such as capabilities, wisdom, knowledge, commitments, skills, attitudes, experiences, and creativities which are accessible to raise values that ultimately lead to gaining a competitive edge (Sun, Li, & Ghosal, 2020). Human capital is unique to each organisation and provides essential resources and capabilities for competition in the hotel industry, which is challenging for other industries to duplicate (Zahra, Neubaum, & Hayton, 2020). When experiencing environmental pressures, industries may discover possibilities to get benefit from an improved environment by implementing proactive actions and approaches towards environmental challenges (Chen & Chang, 2013). Hence, several scholars have examined the factors that influence green human capital, such as corporate environmental beliefs and social concerns (Chang & Chen, 2012; Chen & Chang, 2013). Nonetheless, not any research has investigated the relationship among green human capital and GHRM.

Past research emphasised that HRM practices are a useful tool for growing and transforming the hotel industry resources into human capital, which facilitates the achievement of their goals and missions

(Haldorai, Kim, & Garcia, 2022). A recent study suggested that GHRM could positively impact green human capital. Industries employ HR practices as an essential tactic to create human capital to manage environmental concerns when experiencing external environmental pressures (Yong, Yusliza, Ramayah, & Fawehinmi, 2019). Moreover, organisational involvement and training can increase the pool of human capital. Therefore, industries can appoint workers with green awareness to fulfill the environmental standards, which can modify the workers' green ability to achieve environmental goals (Li, Naz, Khan, Kusi, & Murad, 2019). Furthermore, performance evaluation and compensation are critical HR practices that aid in developing the industry's human capital (Amrutha & Geetha, 2020; Arshad, Abid, Contreras, Elahi, & Ahmed, 2022; Jawaad, Amir, Bashir, & Hasan, 2019). Thus, the following hypothesis is proposed:

**H2**. The GHRM is positively related to green human capital.

*2.2.3. Green human capital and environmental knowledge*

Environmental knowledge describes the knowledge and understanding of environmental issues and their resolutions (Angreani, Saefudin, & Solihat, 2022; Zsóka, Szerényi, Széchy, & Kocsis, 2013). Suki et al. (2016) added that environmental knowledge is stakeholders' environmental knowledge, specifically regarding the products to be consumed. Workers familiar with the hotel industry environment tend to play a role in environmental protection by adopting green practices, such as waste management and reduction, saving energy, and reducing water consumption (Brunswicker & Chesbrough, 2018).

Top-level executives significantly influence the direction and success of managing environmental knowledge. Additionally, knowledge in the hotel sector creates an environment that allows employees to utilise their skills and abilities to encourage innovation (Yusliza et al., 2020). For example, a hotel in Baltimore executed a worker-owned cooperative model to make decisions about the menu, technology-based service, online or mobile ordering, and to accept profit share (Kim, Im, & Shin, 2022). Environmental awareness is the most critical factor in ensuring the economic development quality of the hotel industry (Zhu et al., 2022) (Chen, 2008). applied the concept to environmental protection by introducing green human capital (workers' environmental knowledge, attitude, creativity, experience, ability, capacity, innovation, and commitment).

Few researchers proposed that human capital might not influence economic and environmental development (Yusoff, Omar, Zaman, & Samad, 2019). Moreover (Yusliza et al., 2019), discovered that the aspects of green human capital positively impacted the hotel industry's social, economic, and environmental performance. Similarly (Mansoor, Jahan, & Riaz, 2021), revealed that green human capital significantly impacts the industry's environmental performance. Nonetheless, no studies have explored the relationship between green human capital and environmental knowledge. Therefore, recent research emphasised the importance of examining the connection between both aspects.

Workers who possess adequate environmental knowledge might utilise their capabilities and skills for organisational development. Generally, industries may appoint personnel with high hotel environmental knowledge to use the skills in environmental protection (Gunarathne, Lee, & HitigalaKaluarachchilage, 2021). Industries may also invest in personnel's guidance and distinctive knowledge through training on various projects, which can form unique abilities in the workplace, thus boosting human capital (Lepak & Snell, 2002). Furthermore, knowledge can raise employee motivation, which aids the hotel industry in defining its innovative goals and mission (Forés & Camisón, 2016). Thus, the following hypothesis is formed based on past research:

**H3**. Green human capital is positively related to environmental knowledge.

*2.2.4. Environmental knowledge and green innovation*

Green innovation can reduce pollution and provide economic benefits through the application of knowledge and technology in the hotel industry (Aldieri, Kotsemir, & Vinci, 2020; Fan, Lian, Liu, & Wang, 2021; Zhang et al., 2020). One of the main features that enable the hotel business to reduce global warming is the development of green products and process innovation (Awan, Arnold, & Gölgeci, 2021). Environmental knowledge involves seeking knowledge and awareness about environmental concerns to create solutions to the issues (Paço & Lavrador, 2017). Meanwhile, innovation refers to the results of an industry's innovative activities, such as new goods or services (Kim, Im, & Qu, 2018) Moreover, Innovation is a key technique for overcoming the hotel industry's concerns of low efficiency and excessive pollution output (Liu and Song, 2018). Therefore, a critical aspect involves promoting the high-quality growth of the Pakistani hotel industry based on green innovation.

Research in the hotel industry indicated that innovative practices significantly affect consumer happiness, trust, credibility, and preference (Jin, Line, & Merkebu, 2016). Furthermore (Arvanitis, Lokshin, Mohnen, & Wörter, 2015; Melander, 2017), stressed that environmental knowledge is critical for the industry's progress. Meanwhile (Xie, Zou, & Qi, 2018), discovered that external knowledge resources positively influenced the development of employees' innovative performance (Xie et al., 2018). Therefore, recent research has investigated the relationship between environmental knowledge and green innovation to minimise environmental impact. Workers' views and expertise often impact organisational goals and the decision-making process. Employees usually avoid situations where they feel ignorant (Otto & Pensini, 2017).

Consequently, senior management must share knowledge with employees, which is a relatively valuable and effective practice where the knowledge exchange occurs with trustworthy employees, hence enabling them to efficiently recognise and exploit innovation opportunities (Ojo, Raman, & Vijayakumar, 2020). Green innovation fostered within an industry becomes a distinguishing feature that produces outcomes that enhance environmental performance due to adequate environmental knowledge (Cheng, Huang, Zhao, & Wu, 2019). mentioned that an individual with a high level of industrial culture understanding demonstrates high green innovation at work. Therefore, the following hypothesis is presented:

**H4**. Environmental knowledge is positively related to green innovation.

*2.2.5. Managerial environmental concern as a moderator*

The MEC represents the top management attitude towards environmental invention (Kumar, Dhir, Talwar, Chakraborty, & Kaur, 2021; Papagiannakis, Voudouris, & Lioukas, 2014). Managerial environmental attitudes significantly impact the application of environmental management techniques, specifically for industries that encounter environmental challenges (Kushwah, Dhir, & Sagar, 2019). Top management concerns are crucial to their industry capability to reflect on and manage environmental problems swiftly (Johns, 2017; Tushman, Tushman, & O'Reilly, 2002). The top management holds authority over organisational resources, employment, and environmental practices (González-Benito & González-Benito, 2006González-Benito & González-Benito, 2006).

The current study proposed that MEC moderates the relationship among green human capital and GHRM. The human capital theory explains that a set of green HR practices can improve employee green behaviour (Dumont, Shen, & Deng, 2017). Top-level managers' attitudes and behaviours are essential to the implementation of environmental activities that contribute to human capital during green HR practices adaption and implementation (Yusliza et al., 2019). Therefore, the connection between GHRM and MEC is critical in encouraging worker capability, motivation, and environmental management potential (Kabongo & Boiral, 2017). The hotel industry with high MEC can

react quickly to environmental challenges to resolve them.

Accordingly, GHRM can increase employee skills, knowledge, and abilities through green training and participation, therefore increasing organisational human capital for environmental concerns resolution (Pless, Maak, & Stahl, 2012). Additionally, the combination of HR practices and upper-level management beliefs can lead to a more successful execution of environmental practices, which enhances the hotel industry's green human capital (You, Zhou, & Jia, 2021). Conversely, a hotel industry with low MEC would pay little consideration to environmental sharing norms and values and devote limited resources to environmental concerns. The GHRM can affect an industry's green human capital, while the deficiency of top-level management awareness of environmental issues diminishes the relationship among green human capital and GHRM. Thus, the following hypothesis is constructed based on the above discussion:

**H5**. The MEC moderates the relationship between GHRM and green human capital.

*2.2.5.1. Research model.*

## 3. Methodology

### 3.1. Participants and procedure

The study participants were enrolled in reputable hotels in Lahore, Pakistan, which consistently perform well. For the structural equation modelling, this study had no consensus about the correct sample size, presented in the literature (Hoyle & Kenny, 1999). The study also enlisted assistance from seven hotel staff. All hotels employed over 200 people on average and the participants were from various occupational levels, including frontline workers, entry-level management, middle management, and top management. The participants were randomly selected using a stratified sampling technique. Each participating organisation was required to furnish a list of employees to the research team before the poll. The research team members randomly selected employees to complete the survey.

The members explained the study goal and highlighted anonymity before the survey. Additionally, the team placed the completed questionnaire in an envelope to ensure the anonymity of the responses. The questionnaire and the envelope cover contained the number (which was assigned by the researcher). Researchers were present to ensure that the subjects were not disturbed during the filling procedure and to answer the participants' queries. The participants completed the questionnaires during their working hours on GHRM, green human capital, environmental knowledge, green innovation, MEC, and demographic factors (gender, age, education, organisational name, nature of employment, and length of service).

After completing the surveys, participants were instructed to place them in a little envelope with a seal and handed over to the researchers on the spot. A total of 209 questionnaires were distributed and 205 were returned, which represents a 99% response rate. During the screening process, seven responses were eliminated due to being incomplete.

Table 1 represents the participant's demographic where 115 respondents (55.0%) were male and the remaining 94 (45.0%) were the female staff. For age, 58 participants (27.8%) were between 35 and 44 years old, and 151 participants (72.2%) were between 45 and 55 years old. For the study mode, 46 workers (22.0%) had Bachelor's degrees and 163 of the workers (78.0%) held Master's degrees. Regarding the nature of employment, 88 respondents were contractual (42.1%), 78 respondents were permanent (37.3%), and 43 were under other types of employment (37.3%). Notably, 71 employees (34.0%) had one year of service, 64 employees (30.6%) had two to five years of service, 46 (22.0%) employees had five to 10 years of service, while 28 (13.6%) employees had over 10 years of service.

### 3.2. Measures

The research model (see Fig. 1) illustrates that all construct items were adapted from previous scales. All variables were evaluated using a five-point Likert scale measured from "strongly disagree" (1) to "strongly agree" (5).

**Table 1**
Respondent profile.

| Demographic Variables | Categories | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 115 | 55.0 |
| | Female | 94 | 45.0 |
| Age Group | 18–24 | 0 | 0 |
| | 25–35 | 0 | 0 |
| | 35–44 | 58 | 27.8 |
| | 45–55 | 151 | 72.2 |
| | 55 + | 0 | 0 |
| Education | BS | 46 | 22.0 |
| | Master | 163 | 78.0 |
| | M.Phil. | 0 | 5.4 |
| | PhD | 0 | 0 |
| Nature of Employment | Contractual | 88 | 42.1 |
| | Permanent | 78 | 37.3 |
| | Others | 43 | 20.6 |
| Length of Services | Up to 1 Year | 71 | 34.0 |
| | 2–5 Years | 64 | 30.6 |
| | 5–10 Years | 46 | 22.0 |
| | 10 – Years | 28 | 13.6 |

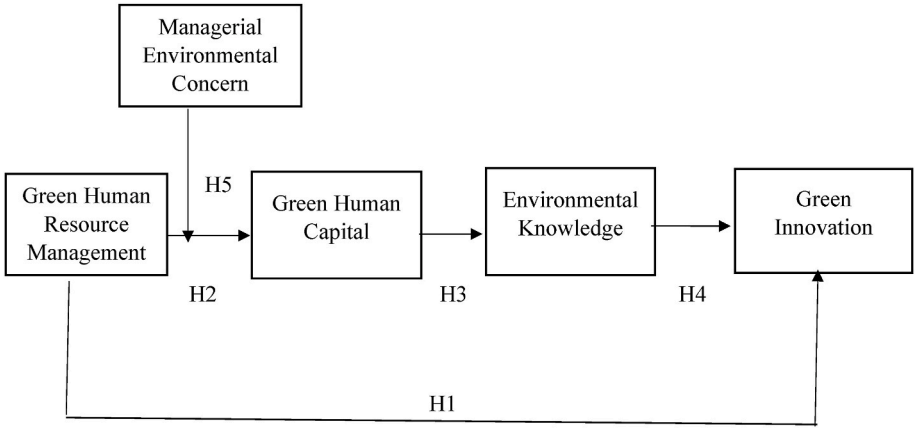


**Fig. 1.** Research model.

#### 3.2.1. Green human resource management

The GHRM scale was adopted with four items by (Guerci et al., 2016). The items were "In my organisation, employees' attraction can increase through environmental commitment (reward and compensation)", "In an organisation, employees' involvement in environmental issues is important or worthy", and "Environmental training for employees can increase their performance", and "non-monetary incentives and variable compensation based on environmental performance".

#### 3.2.2. Green human capital

The study assessed green human capital based on a four-item scale (Chang, 2016; Chen, 2008). These items were "The managers in the company can fully support their employees to achieve goals of environmental protection", "The employees' competence in environmental protection in the company is better than that of its major competitors", and "The cooperative degree of teamwork about environmental protection in the company is more than that of its major competitors", and "The production and contribution of employees about environmental protection in the company are more than that of its major competitors".

#### 3.2.3. Managerial environmental concern

The study evaluated MEC using Field Cordano and Frieze's (2002) four-item scale. The items were "Environmental innovation is an important component of organisational environmental strategy", "Most environmental innovations are worthwhile", "Environmental innovation is an ineffective environmental management strategy", and "Environmental innovation is not necessary to achieve a high level of environmental performance".

#### 3.2.4. Green innovation

Green innovation was measured using the (Chang, 2011) four-item scale. The items were "The company uses the fewest amount of material to comprise the product for conducting the product development or design", and "The company would circumspectly deliberate whether the product is easy to recycle, reuse, and decompose for conducting the product development or design", "The manufacturing process of the company effectively reduces the emission of hazardous substances or waste", and "The manufacturing process of the company reduces the use of raw materials".

#### 3.2.5. Environmental knowledge

Gillani, Iqbal, Akram and Rasheed's (2018) four-item scale was employed to calculate environmental knowledge**.** The items were **"**In my organisation, sharing knowledge and awareness about environmental issues and solutions with colleagues is a routine matter", "I have contributed knowledge to this organisation", and "I have contributed knowledge to other members that resulted in the development of new insights", and "Environmental knowledge and experiences were exchanged on various occasions in different departments."

#### 3.2.6. Control variables

The study control variables were the employees' demographic factors, such as gender, age, education, organisational name, nature of employment, and length of service based on previous studies (Ng, Yam, & Aguinis, 2019; Xia, Schyns, & Zhang, 2020). The factors were included to gain an actual result estimation and minimise biases. Practical studies (Appelbaum, Deguire, & Lay, 2005) outlined that permanent employees with more years in service tend to demonstrate lower deviance than contractual and daily wagers with fewer years of service. Age and gender are also vital where researchers (Greenberg & Barling, 1996) disclosed that young people tend to commit deviancy compared to older people. Furthermore, a more educated person is less likely to engage in deviant behaviour (Appelbaum et al., 2005) in the hotel industry of Lahore, Pakistan.

### 3.3. Pilot test

To ensure content validity, the assessment instrument was sent to five experts, including two human resource managers from selected organisations and three assistant professors specialising in HRM. Several modest changes were made in response to the comments. Pilot research was undertaken to ensure clarity and the questionnaire was delivered to 45 respondents for feedback. The questionnaires did not require any changes. Additionally, reliability analysis was performed to determine the internal consistency of the scales utilised as practised in the hospitality literature (Chi, Wen, & Ouyang, 2020; Ghaedi, Ozturen, & Safshekan, 2021; Karatepe, Rezapouraghdam, & Hassannia, 2021; Safshekan, Ozturen, & Ghaedi, 2020; Tsai, Hsu, & Chen, 2020; Ukeje, Lasisi, Eluwole, Titov, & Ozturen, 2021; Xu, Zhang, Zhang, & Wang, 2021).

## 4. Data analysis

Recent research employed PLS-SEM for data analysis by using the Smart PLS software (Ringle, Wende, & Becker, 2015) due to its advanced estimations and popularity in the GHRM domain (Rasoolimanesh, Ali, & Jaafar, 2018). The research attempted to predict and describe the constructs, hence PLS is more appropriate for analysis, as confirmed by (Hair Jr et al., 2020). The PLS-SEM is a useful tool when evaluating and applying the structural model to explain and assess the constructs. Moreover, the flexible tool is used for model formation when the study involves multiple theories. The tool is also used to get certain outcomes after preventing the issues of sample size and data normality. The study applied a two-step technique to examine the results as recommended by PLS-SEM literature (Anderson & Gerbing, 1988; Henseler, Ringle, & Sinkovics, 2009; Siyal, Donghong, Umrani, Siyal, & Bhand, 2019; Yap, Ramayah, & Shahidan, 2012). Measurement was analysed in the first step of the PLS-SEM technique to evaluate inter-item reliability, convergent validity, and internal consistency reliability, while the structural model was examined in the second step to test the hypotheses (Henseler et al., 2009).

### 4.1. Measurement model assessment

The measurement model and the convergent validity were calculated through alpha, factor loading, average variance extracted (AVE), and composite reliability (CR). Fig. 2 and Table 2 presented that loadings exceeded the suggested value of 0.60 excluding several values. Correspondingly, most values of the CR exceeded the proposed value of 0.70. Moreover, the AVE values of constructs exceeded the recommended value of 0.50.

The items with the least possible factor loading (<0.50) were removed. A new criterion in discriminant validity projected the Heterotrait-Monotrait ratio (HTMT) to evaluate the data validity and reliability (Table 3). Although the Fornell-Larker criterion was one of the effective and efficient methods for evaluation in certain situations, the approach does not reveal the deficiency of discriminant validity (Henseler, Ringle, & Sarstedt, 2015). Therefore, for construct discriminant validity, HTMT ratio was used to assess. Values under 0.9 demonstrate discriminant validity.

### 4.2. Structural Model Assessment

After the measurement model evaluation for reliability and validity, a structural model was assessed to test the hypotheses. The model's importance is based on the t-value, standard errors, and path coefficient. The path coefficient values depicted whether the hypotheses are accepted or excluded through a bootstrapping process in Smart Partial Least Squares (SmartPLS). In Table 4 and Fig. 3, GHRM depicts a positive relationship with green innovation. Thus, H1 is accepted ($\beta = 0.194$, LL = 0.155, UL = 0.342, t = 2.179). The findings also revealed a positive

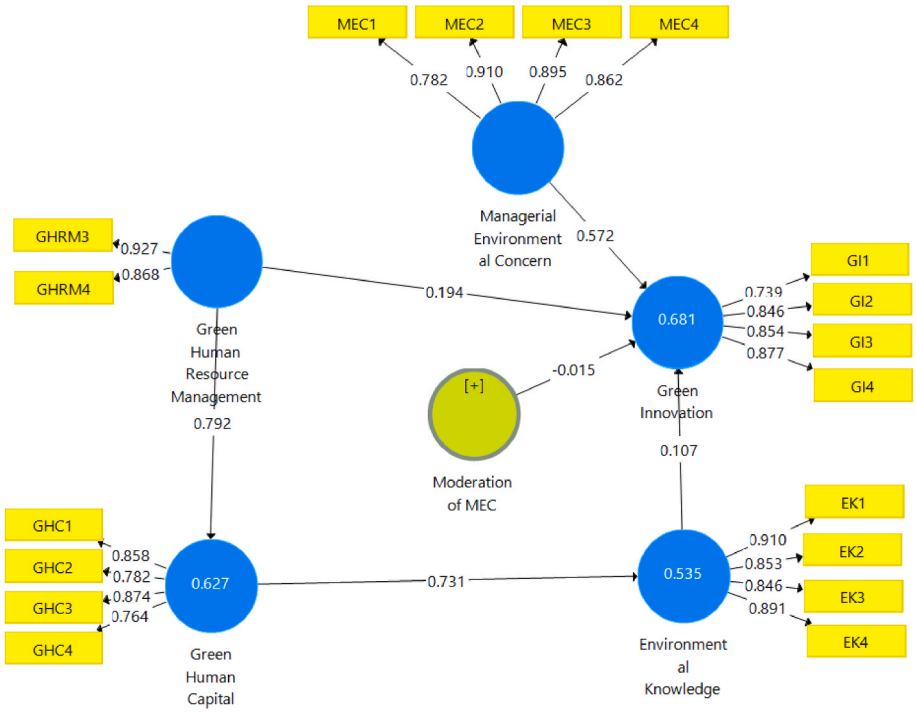


**Fig. 2.** Measurement assessment model.

**Table 2**
Convergent validity.

| Constructs | Items | Loadings | Alpha | CR | AVE |
|---|---|---|---|---|---|
| Environmental Knowledge | EK1 | 0.910 | 0.899 | 0.929 | 0.766 |
| | EK2 | 0.853 | | | |
| | EK3 | 0.846 | | | |
| | EK4 | 0.891 | | | |
| Green Human Capital | GHC1 | 0.858 | 0.838 | 0.892 | 0.674 |
| | GHC2 | 0.782 | | | |
| | GHC3 | 0.874 | | | |
| | GHC4 | 0.764 | | | |
| Green HRM | GHRM3 | 0.927 | 0.764 | 0.893 | 0.806 |
| | GHRM4 | 0.868 | | | |
| Green Innovation | GI1 | 0.739 | 0.849 | 0.899 | 0.690 |
| | GI2 | 0.846 | | | |
| | GI3 | 0.854 | | | |
| | GI4 | 0.877 | | | |
| Managerial Environmental Culture | MEC1 | 0.782 | 0.886 | 0.921 | 0.746 |
| | MEC2 | 0.910 | | | |
| | MEC3 | 0.895 | | | |
| | MEC4 | 0.862 | | | |

**Note:** CR: Composite Reliability, AVE: Average Variance Extracted.

**Table 3**
Discriminant Validity (HTMT Ratio).

| | EK | GHC | GHRM | GI | MEC |
|---|---|---|---|---|---|
| EK | | | | | |
| GHC | 0.814 | | | | |
| GHRM | 0.800 | 0.771 | | | |
| GI | 0.859 | 0.817 | 0.809 | | |
| MEC | 0.748 | 0.767 | 0.815 | 0.828 | |

linkage between GHRM and green human capital (β = 0.792, LL = 0.701, UL = 0.869, t = 18.117), thus H2 is accepted. Furthermore, the results disclosed a statistically significant relationship between green human capital and environmental knowledge, hence accepting (β = 0.731, LL = 0.615, UL = 0.830, t = 13.440).

Meanwhile, the association between environmental knowledge and green innovation is significant, therefore H4 is accepted (β = 0.107, LL = 0.345, UL = 0.446, t = 2.633). Lastly, MEC significantly and positively moderated the link between green human capital and GHRM (β = 0.572, LL = 0.258, UL = 0.881, t = 3.843), thus H5 is accepted.

## 5. Discussion

To the best of the authors' knowledge, the current study examined the relationship between GHRM and green innovation and recommended GHRM practices as a new approach to improve environmental performance in the hotel industry. The study enhanced the literature by extending earlier research on HRM and environmental management by investigating the influence of GHRM on green innovation in the hotel sector using the theoretical framework of Human Capital Theory. Second, recent studies assisted in the investigation of whether green human capital mediates the relationship between GHRM and hotel environmental knowledge. Third, the study contributed by investigating whether environmental knowledge mediates the link between green human capital and green hotel innovation. Fourth, the current research examined whether MEC moderates the relationship between green human capital and GHRM.

The findings suggested that GHRM positively impacted green hotel innovation, which aligns with the study expectations. The finding supports the recommendation that hotels improve innovation by employing green HR practices. Previous research (Gilal, Ashraf, Gilal, Gilal, & Channa, 2019; Y. J.; Kim, Kim, et al., 2019) discovered that GHRM motivates employees to care for the environment and participate in environmentally-friendly activities. Consequently, the findings prove that green practices in hotel environmentally-friendly activities increase innovation.

The findings revealed that GHRM increases employee abilities, behaviour, and attitude, which enhances environmental performance (Dumont et al., 2017). Summarily, green human capital mediates the relationship between GHRM and environmental knowledge. The result is consistent with previous research (Cincera & Krajhanzl, 2013; Tseng, Tan, & Siriban-Manalang, 2013), which disclosed that the role of GHRM is critical in developing employees' environmental knowledge and

**Table 4**
Path analysis.

| Hypothesis | Relationships | Beta | S. D | T-Value | P-Value | LL | UL | Decision |
|---|---|---|---|---|---|---|---|---|
| H1 | Green HRM - > Green Innovation | 0.194 | 0.089 | 2.179 | 0.030 | 0.155 | 0.342 | Supported |
| H2 | Green HRM - > Green Human Capital | 0.792 | 0.044 | 18.117 | 0.000 | 0.701 | 0.869 | Supported |
| H3 | Green Human Capital - > Environmental Knowledge | 0.731 | 0.054 | 13.440 | 0.000 | 0.615 | 0.830 | Supported |
| H4 | Environmental Knowledge - > Green Innovation | 0.107 | 0.169 | 2.633 | 0.152 | 0.345 | 0.446 | Supported |
| H5 | Managerial Environmental Concern - > Green HRM | 0.572 | 0.149 | 3.843 | 0.000 | 0.258 | 0.881 | Supported |

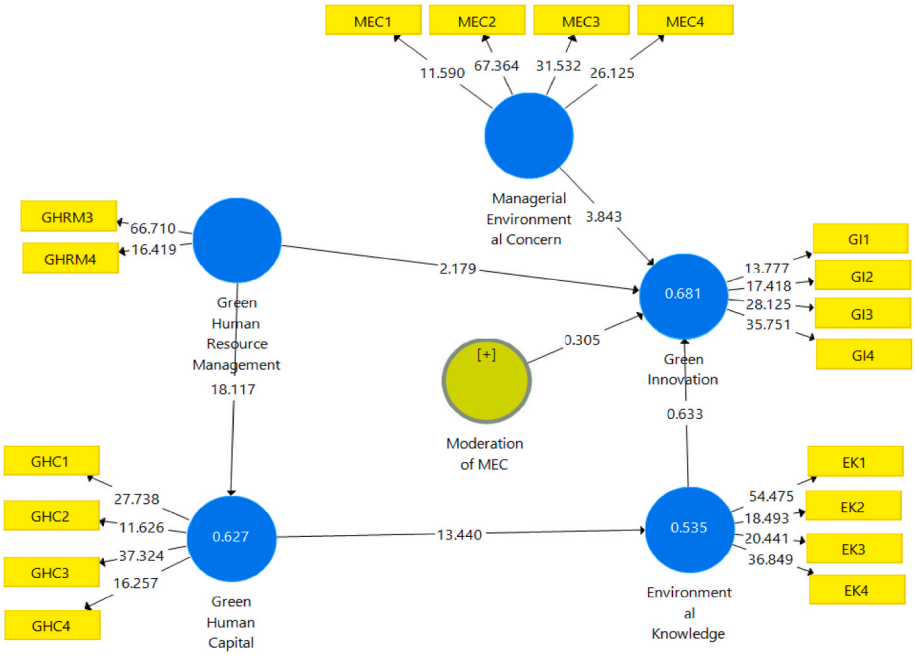


**Fig. 3.** Structural model assessment.

environmental knowledge contributes to employees' extra-role behaviour and motivates them to adopt green behaviour while improving organisational environmental performance (Gilal et al., 2019).

The findings indicated that environmental knowledge raises employees' environmental awareness, which enhances organisational environmental performance. Thus, employees' environmental knowledge mediates the relationship between green human capital and green innovation. Knowledge empowers employees to recognise their environmental responsibilities and encourages them to utilise their skills, abilities, and experiences to protect the hotel industry environment (da Silva, da Costa, & Kniess, 2019).

The findings suggested that deeper environmental concern among employees strengthens the impact of GHRM on environmental performance. The relationship between GHRM and green human capital is moderated by MEC, which aligns with recent studies (Gilal et al., 2019; Han, Yu, & Kim, 2019) that discovered environmental concerns strengthen the link between green human capital and GHRM.

### 5.1. Theoretical implications

The findings contribute to various aspects of the HRM and green innovation literature for environmental management. First, the study outcomes demonstrate a relationship between GHRM and green innovation based on the principle of human capital. Accordingly, the current study contributes and proposes that greening HRM and creative methods might facilitate hotels to improve environmental performance (Ren et al., 2018). Second, the current study enhances the existing literature by addressing environmental performance in the hotel industry, which encounters numerous challenges. Previous research has proven that HRM methods could enhance and convert the hotel industry resources into human capital, thus improving organisational consequences for environmental protection (Sheikh, 2021). Few types of research highlighted green human capital in the environmental management (Yong, Yusliza, Ramayah, & Fawehinmi, 2019), and most studies identified the aspect as a long-term performance factor (Malik et al., 2020; Yusliza et al., 2020; Yusoff et al., 2019).

The study analysed green human capital from an environmental management aspect and improved the understanding of how the aspect contributes to the generation or fostering of employee skills and behaviours rather than directly influencing environmental performance. Although several studies have suggested a connection between green human capital and environmental knowledge, no research investigates how environmental knowledge moderates the relationship between green human capital and green innovation. Thus, the current study contributes and proves that employees with good environmental knowledge enhance environmental performance in innovation (Ojo & Raman, 2019).

The study highlighted that MEC is a requisite for environmental behaviour and moderates the relationship between GHRM and green human capital. Moreover, the top manager management is critical in resolving environmental challenges and achieving human capital in the hotel industry. The study stressed that when senior executives in the hotel industry become concerned about environmental issues, they tend to embrace green behaviour and contribute to environmental protection and performance (Cabral & Jabbour, 2020).

### 5.2. Practical implications

The findings outline important managerial implications. First, the study proposed that hotels practice and promote green behaviours in their entire operational line to manage environmental challenges. The practice could encourage pride among workers in reviewing how their hotel contributes to environmental protection. Green behaviours could also increase staff commitment and enhance financial performance, hence hotels should focus on GHRM practices (hiring, training and involvement, and performance management and compensation) if they wish to be rewarded and fulfil green environmental goals for environmental sustainability.

Second, hotels should hire new employees who are passionate about environmental preservation and green principles. Hotel managers are encouraged to design their recruiting policies accordingly to attain environmental sustainability. Third, the present study emphasised that hotel employees can only modify their abilities and behaviour towards greening the workplace if they possess a positive attitude towards the environment and deep environmental concern. Hence, highlighting environmental concerns will aid managers in the industry achieve the desired objectives.

Fourth, the findings aid managers in identifying and focusing on specific practices and relevant knowledge to encourage environmental behaviours among staff members to enhance hotel environmental performance. Moreover, policymakers in the hospitality sector should outline and utilise GHRM techniques to enhance the sector's repute as a positive work environment (Becherel & Cooper, 2002). Lastly, high-level management of hotels should incorporate green practices and encourage their staff to contribute to green management systems to promote green innovation (Gohar, Rady, & Zaki, 2019; Li et al., 2019; Naz et al., 2020; Ren et al., 2018; Saeed et al., 2019).

### 5.3. Limitations and future directions

The current research noted various critical limitations despite its vital contributions. First, MEC mediated the relationship between green innovation and GHRM. Hence, future studies should include two other mediators: organisational strategy and organisational climate. The mediators could provide the right direction for progress, affecting the hotel industry's productivity, motivation, and innovative staff behaviour. Second, management methods vary between industries, sectors, and nations (Bloom & Reenen 2010). Based on this rationale, GHRM practices differ between nations, sectors, industries, and developing and established economies. Therefore, the findings have limited generalisability as the study specifically focused on the hotel industry in a single location (Pakistan).

Third, the study investigated the mediating role of environmental knowledge between green human capital and green innovation. Employees are performing additional responsibilities due to efficient organisational knowledge to assist the industry in accomplishing goals. Resultantly, future studies should examine the moderating effect of organisational citizenship attitude at the organisational and individual levels, which would significantly contribute to the GHRM and green innovation literature. Fourth, data were collected solely from the hotel industry. Therefore, future research should consider more than one industry, such as the manufacturing and technical industry, which involves more innovation to address environmental challenges.

## 6. Conclusion

The current study enhances the existing literature on improving environmental performance, specifically in Pakistani hospitality. The GHRM methods were linked to green human capital among hospitality workers. Summarily, hotels may increase their green human capital by employing conscientious staff, providing training and development, and maintaining green discipline. The findings suggest that green human capital motivates employees to believe in their ability to conduct green behaviours as they possess the necessary skills, talents, and processes. Ultimately, the situation raises environmental knowledge, which increases innovation for environmental performance.

The MEC is needed to meet organisational environmental expectations and standards, which may lead to green innovation. The findings are not limited to intellectual conclusions and demonstrated how to utilise human capital to improve environmental knowledge among hotel personnel, thus enhancing hotel environmental performance. The study provided proof from a process viewpoint of how GHRM methods increase innovation when combined with environmental knowledge. The study also extended the existing knowledge on the theory of human capital by emphasising GHRM strategies that might produce human capital rather than behaviour reinforcement.

## Declaration of competing interest

Paper doesn't have any conflict of interest.

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