

# Uncertain Supply Chain Management

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## The moderating mediating model of green climate and green innovation's effect on environmental performance

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### ABSTRACT

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Implementing green HRM is expected to foster green innovation inside small and medium-sized enterprises (SMEs). The promotion of a sustainable environment and the implementation of organizational procedures contribute to the advancement of green innovation and the cultivation of a culture of responsibility. The implementation of Green Human Resource Management (HRM) practices, the cultivation of eco-friendly behavior among employees, and the adoption of HRM strategies aimed at fostering a sustainable environment within the business. To the extent of our current understanding, previous research has not investigated the potential influence of green climate in enhancing the effects of Green HRM in environmentally friendly behaviors and the development of green innovations. The assessment of the collective impact of these variables on environmental performance within a comprehensive model has not been previously examined. Therefore, this study has added significance by assessing the mediating role of employees' eco-friendly behavior between Green HRM practices and the organization's environmental performance. This study has been conducted in the context of SMEs in Saudi Arabia by taking responses on a self-administered questionnaire from 371 respondents from SMEs in Saudi Arabia Selected through cluster sampling technique. Hence, the findings of this study affirm the significance of Green HRM and Green Innovation in driving environmental performance within SMEs in Saudi Arabia. The underpinning theory for the study model is the ability motivation and opportunity (AMO) model, which has been validated in the context of the present study. By taking these practical steps, SMEs in Saudi Arabia can proactively contribute to environmental sustainability while reaping the benefits of improved organizational performance. However, other cultural, demographic, and governmental factors need consideration in future research studies that should include these external factors for further implications.

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### 1. Introduction

The growing industrial development has worsened environmental contamination recently (Jehan, Hussai, Batool, & Imran, 2020). Numerous industrial practices contribute to a rise in temperature, bringing climate change, dry conditions, wildfires, and environmental destruction (Jehan et al., 2020). Several organizations mistakenly believe that the operations they oversee have minimal negative effects on the environment (Malik et al., 2020). The organization ultimately chose to develop a way to lower emissions and preserve current resources after realizing the severity of the problem (Gill, Ahmad, & Kazmi, 2021). Pursuing financial gain and other commercial advantages is not necessarily the top focus for modern organizations (Adubor, Adeniji, Salau, Olajugba, & Onibudo, 2022). Using sustainable practices is one of the issues that influence businesses nowadays. The ability of an organization's internal human resources to implement green practices could prove to be extremely crucial (Adubor et al., 2022; Martins et al., 2021). Various organizations have shifted from traditional human resource

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management methods to green HRM practices, strongly emphasizing nurturing internal human resources (Xiao, Younus, Saeed, Ul Haq, & Li, 2022).

Human resource management must realize how important green practices are in building organizations with good environmental performance (Khalid et al., 2021). The involvement of HRM management will be very important in the success of organizations in improving organizational environmental performance through implementing green practices (Gill et al., 2021; Taiwo Hassan Ajadi et al., 2022). The influence of globalization on business can put pressure on the HR department to apply green organizational culture and behavior to employees, known as Green Human Resource Management (GHRM). Green Human Resource Management (GHRM) is the strategy of cultivating environmentally friendly mindsets and actions within a company's staff, particularly those who drive the agenda for sustainability. GHRM incorporates environmental consciousness through its workforce, focusing on three key elements: motivating greater employee involvement, fostering opportunities for environmentally responsible initiatives, and enhancing employees' eco-friendly skills (Renwick, 2023). "Green skills" refers to recruiting, selecting, and training individuals in environmentally sustainable practices. This encompasses staff engagement and environmentally conscious leadership as potential outcomes.

Additionally, green performance management, assessment criteria, and incentives promote employee involvement (Paillé, Valéau, & Renwick, 2020). A company's internal capabilities and skills directly influence its environmental management systems. Unfortunately, many medium-sized businesses encounter substantial setbacks due to insufficient employee motivation, skill deficiencies, and a lack of organizational capabilities to address intricate challenges in their quest for environmental sustainability (Yu, Chavez, Feng, Wong, & Fynes, 2020). According to this proposal, the most reliable indicators for enhancing a company's environmental performance and fostering green innovation are Green Human Resource Management (GHRM) practices that oversee systems and procedures affecting employees. Furthermore, effective leadership strongly emphasizes comprehending, foreseeing, and managing individual and interpersonal dynamics regarding how employees interact with and influence each other (Al-Ghazali & Afsar, 2020).

Human resource management (HRM) academics have recently started to investigate the green human resource management (GHRM) approach to examine how it may help organizations achieve their sustainability objectives (Yong et al., 2020). GHRM is HRM practices incorporating environmental considerations, operational standards, and policies and procedures supporting the overall objective (Anwar et al., 2020). Additionally, GHRM guarantees environmental performance and upholds a company's long-term sustainability objectives (Kim, Kim, Choi, & Phetvaroon, 2019). However, researchers are investigating GHRM practices and green innovation (GRI) to develop a potentially effective solution that ensures organizational and environmental success in a challenging competition setting. Even though it is obvious that GHRM improves environmental performance, relatively not many studies have investigated its function through a comprehensive approach (Aftab, Abid, Cucari, & Savastano, 2023). Various authors have studied green HRM and green innovation practices and models describing their approaches to sustainable HRM and perspectives (Boudreau, 2003; Haddock-Millar, Sanyal, & Müller-Camen, 2016; Ren & Jackson, 2020; Stankevičiute & Savanevičiene, 2018; Tu & Wu, 2021). Scholars recognize management's role in green innovation's impact on green performance, but there is ambiguity about the direct effects of green innovation. The current literature often lacks clear definitions, focusing on various aspects of green innovation. Consequently, further research is needed in this area (Arici & Uysal, 2022; Ke, Dai, & Yu, 2021; Takalo & Production, 2021; Wang, Xue, Sun, & Yang, 2020; Wang, Jia, Zhou, & Fan, 2020; S. Wang, Wang, Wei, Wang, & Fan, 2021).

To achieve sustainable green innovation and improve environmental performance, a company's top management needs to embrace GHRM and green transformational leadership. Two key research areas must be focused on: (a) How does GHRM affect a company's environmental performance? (b) Is the adoption of HRM practices crucial for environmental performance? The present study investigates the role of GHRM in leveraging green innovation for better environmental performance, using the Ability Motivation and Opportunity (AMO) theory. To better understand how GHRM processes impact environmental performance, it's crucial to consider them within the broader organizational context. Our study has created a comprehensive framework to explore these relationships, incorporating GHRM, environmental performance, green innovation, environmental strategy, and pro-environmental behaviors. This framework is unique, particularly in the context of a rapidly developing country like Saudi Arabia (KSA).

The basic research question of this study is: What are the direct and indirect impacts of green HRM, green innovation, pro-environmental behavior, and green climate on environmental performance? This study focused on Saudi Arabia (KSA) due to the increasing environmental concerns in the country. The specific emphasis on the manufacturing industry of Saudi Arabia (KSA) is based on statistics indicating that this sector significantly contributes to the country's gross domestic product (Shoab, Nawal, Zámečník, Korsakienė, & Rehman, 2022). As Kraus et al. (2020) noted, manufacturing industries, especially oil and gas, play a pivotal role as they are directly accountable for significant environmental crises, including resource depletion and air, water, and land pollution. These sectors generate some of the most hazardous waste and pollutants, threatening human well-being and leading to environmental calamities (Kraus, Rehman, & García, 2020). Unprecedented levels of damaging environmental emissions have been recorded globally. As a result, Saudi Arabia (KSA) has also been affected by a significant rise in harmful emissions, wherein the industrial sector produces an alarming amount of emissions, which is a matter of grave concern (Chowdhury, 2023).

In 2014, Saudi Arabia had high per capita energy consumption (6937.23 kg of oil equivalent) and CO<sub>2</sub> emissions (19.53 metric tons). Vulnerable to climate change due to delicate ecosystems and limited resources, the country is adopting sustainable urban planning in major cities as part of its climate efforts (Abubakar & Dano, 2020). Research studies suggest Saudi Arabia must cap its emissions at around 347 million metric tons of CO<sub>2</sub> equivalent by 2030. This would leave an ambition gap of at least 177 million metric tons of CO<sub>2</sub> equivalent (Al-Sinan, Bubshait, & Alamri, 2023). To align with the Paris Agreement's 1.5°C warming limit, Saudi Arabia must enhance its unconditional commitment and implement more stringent policies than its "fair share" contribution (Iftikar et al., 2022). Therefore, the research objective of the study is to investigate how green HRM, green innovation, pro-environmental behavior, and the green climate contribute to reducing organizations' environmental footprint and enhancing environmental performance. This paper makes several contributions to the green HRM field. To begin with, despite Saudi Arabia (KSA) 's significant efforts in environmental conservation, there is a scarcity of research addressing these specific variables (Fawehinmi, Yusliza, Mohamad, Noor Faezah, & Muhammad, 2020; Kraus et al., 2020). This study will contribute to existing research and assist practitioners and policymakers in Saudi Arabia (KSA) and other developing countries understand how these factors impact environmental performance. Additionally, examining the moderating role of green climate and mediating role of green innovation will provide fresh insights for researchers.

The rest of the study is organized as follows. In Section 2, the theoretical foundation is explained. The conceptual model's foundational literature study is the subject of Section 3, while the research techniques are covered in Section 4. The study's findings and analyses are presented in Section 5. Section 6 finishes the study by discussing the findings and offering policy recommendations.

## 2. Theoretical Development

Based on the abovementioned literature, the Ability-Motivation-Opportunity (AMO) theory (Appelbaum, 2000) has been selected for this study. The theory states that increasing employee commitment to their job results from an organization's successful provision of skills, incentives, and opportunities (Iftikar et al., 2022). The AMO theory has been applied in previous studies (Hans, 2021; Obereder, Müller-Camen, & Renwick, 2022) to determine how Green Human Resource Management (GHRM) affects organizational performance. The theory claims that various HRM techniques may improve a company's human capital (Wood & Horwitz, 2015). These procedures align with GHRM and include enhanced productivity, higher quality standards, waste reduction, and improved profitability. The idea permits organized beliefs about HRM procedures and green organizational performance (Obereder et al., 2022). The basis of AMO is the concept that a range of employee works affects organizational performance (MacInnis & Jaworski, 1989). The contributions of (Blumberg & Pringle, 1982) supported the efforts of (Vroom, 1964). The theory was subsequently used by (Bailey, 1993) and (Appelbaum, 2000). It is often used at the moment to assess how Green Human Resource Management (GHRM) is being put into practice (Hooi, Liu, & Lin, 2022; Rizvi & Garg, 2021; Sibian & Ispas, 2021; Yong, Yusliza, Jabbour, & Ahmad, 2019). Considering the above literature, hypotheses and theoretical development following the research framework are proposed.

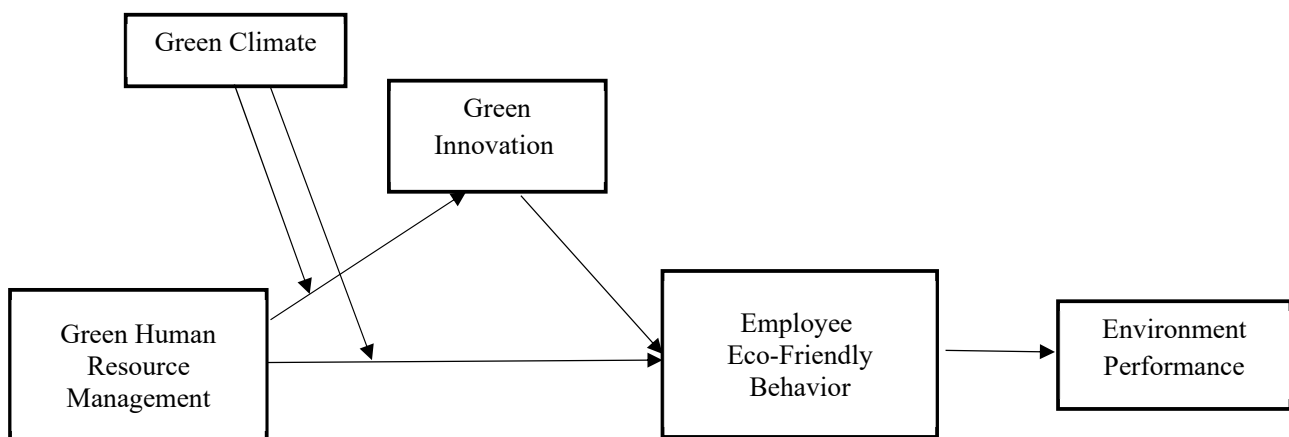


Fig. 1. Research Framework

## 2. Literature Review and Hypotheses Development

### 2.1 Green HRM

The word "Green" in the context of human resource management (HRM) refers to the protection and conservation of the environment, the avoidance or reduction of environmental contamination, and the development of surroundings that resemble the natural world (Khan & Liu, 2023). As a result, when employees align their behavior with these values, they are referred

to as “green” or environmentally concerned employees. This idea goes beyond traditional HRM by emphasizing sustainability and waste reduction (Suleman, Amponsah-Tawiah, & Ametorwo, 2023). Organizations employ a comprehensive set of policies, practices, and systems known as “Green Human Resource Management” (GHRM) to promote environmentally responsible behaviors among their workforce. This approach has positively impacted the well-being of individuals, society, and the environment (Zhang, Zhang, & Daim, 2023). The green HRM incorporates human resource management strategies integrating various environmental preservation tactics. To elucidate the role of GHRM in human resource management, a recent study on GHRM practices has elaborated three fundamental elements, including employees’ environmental awareness, adoption of eco-friendly behaviors, and seeking ecologically advantageous opportunities (Shaukat, Ong, Cheok, Bashir, & Zafar, 2023).

Green Human Resource Management (GHRM) aims to promote environmental objectives by incorporating diverse HRM approaches. GHRM establishes a range of policies to cultivate environmental awareness among staff, serving as a pivotal force in steering the organization toward sustainability (Shahzad, Jianguo, & Junaid, 2023). Many academics emphasize the goal of GHRM, which is to transform traditional businesses into environmentally conscious ones and stress the need for developing and implementing particular legislation (Ahmad Afgan, Mufti Sr Assistant Professor, Ahmed Nazir Professor, & Shah Sr Assistant Professor, 2023). Such environmentally conscious organizations also necessitate a workforce capable of comprehending and actively supporting the organization’s green directives. These elements collaborate harmoniously to accomplish the overarching objective of ensuring environmental sustainability (Shahzad et al., 2023).

## 2.2 Green Innovation

The concept of green innovation, which underscores the significance of sustainable economic development and environmentally responsible practices, originates from conventional innovation theory. It is also known by other terms like eco-innovation, sustainable innovation, and environmental innovation (Srisathan, Ketkaew, Phonthanukitithaworn, & Naruetharadhol, 2023). The core concept involves improving both ecological efficiency and creative effectiveness. In academia, substantial attention has been devoted to identifying the determinants of green innovation. When corporations spend funds to pay for environmental management costs, it favors the creation of environmentally friendly patents (Srisathan et al., 2023). A company’s profitability is key to fostering innovation for green products (Li et al., 2017). Liu et al. (2021) analyzed the link between foreign direct investment and green innovation, highlighting various significant outcomes. The study found the impact of political capital on corporate green innovation, leading them to the observation that an abundance of political capital often hampers the advancement of green innovation within corporate entities (Liu et al., 2021).

Numerous studies have continuously demonstrated a link between environmental performance and green innovation. Green Innovation considers technology developments in both administrative and industrial procedures, enabling increased production productivity while enhancing environmental performance for businesses (Xie, Huo, & Zou, 2019). According to some authors, green innovation may be used to modify systems, goods, and practices to improve environmental sustainability and performance. Green innovation covers both the development of green products and green processes. Companies that employ green innovation tend to surpass their competitors in terms of their overall performance. They achieve this by effectively utilizing environmentally friendly resources and practices, generating intangible value (Aftab et al., 2023). Additionally, Green HRM promotes a strong commitment to environmental responsibility, and the organization’s adherence to environmentally responsible behaviors stimulates creative procedures and projects. Organizations are urged by green HRM and green innovation to create policies that support eco-friendly technology, renewable energy sources, and industrial processes that use resources effectively to reduce emissions (Saad, Al-Inizi, & Al-Dahhan, 2020). The above literature leads to the following hypothesis;

**H<sub>1</sub>:** *Green HRM has a significant positive influence on green innovation employed by an organization.*

## 2.3 Employee Eco-Friendly Behavior

The green behavior of employees enables them to endeavor environmental sustainability through utilizing green innovation (Faisal & Naushad, 2020). The environmentally responsible behavior of an organization’s workforce significantly influences the organization’s performance (Afsar & Umrani, 2020). The productivity of staff members who are encouraged to adopt organizational citizenship behavior and improve their green behavior for sustainability is higher (Huang, Liu, & He, 2023). On the other hand, putting less emphasis on employee behavior makes it harder for the company to adopt green behavior (Javaid, Kumari, Khan, Jaaron, & Shaikh, 2023). While a company can establish and sustain a culture of sustainability over time, this relies on each employee’s willingness to engage in environmentally friendly organizational practices (García-Salirrosas & Rondon-Eusebio, 2022; Sharma, Aswal, & Paul, 2023). Organizational culture is crucial for green behavior, and top management should encourage people to adopt it at work (Pan, Abbas, Álvarez-Otero, Khan, & Cai, 2022). Any nation’s ecological health depends on its workforce’s commitment to green innovation (Tuan, 2023). With the above discussion in view, the following hypothesis is developed.

**H<sub>2</sub>:** *Green Innovation has a significant positive influence on employee ecofriendly behavior.*

A firm's environmental performance and sustainability goals can be improved by encouraging sustainable behavior among personnel. This involves taking deliberate steps or acting in a manner intended to protect the environment, reduce the negative consequences of human activity on the environment, or promote environmentally friendly changes (Farrukh, Ansari, Raza, Wu, & Wang, 2022). When promoting an eco-friendly attitude in today's organizational setting, taking advantage of both natural resources and human capital is crucial. Therefore, encouraging environmentally responsible behavior may impact employee behavior at work (Usman, Rofcanin, Ali, Ogbonnaya, & Babalola, 2023). Eco-Friendly Behavior (EFB) is often synonymous with pro-social behavior, as it seeks to minimize pollution's impact and contribute positively to the environment. EFB signifies employers embracing environmentally friendly workplace practices, which have gained increased significance following the implementation of organizational sustainable development plans (Chi, Meng, Lee, Chua, & Han, 2023). Consequently, organizations and their employees adopt eco-friendly practices and other constructive actions to conserve resources in the workplace, fostering a heightened awareness of their sustainability efforts. This approach gauges the influence of green initiatives on organizational workflow and promotes social and economic advancement in an environmentally responsible manner (Tirmo, Islam, & Happy, 2023).

Green Human Resource Management (GHRM) influences green behavior by enhancing employee knowledge, skills, and environmental consciousness. This, in turn, motivates employees to engage in environmentally responsible actions, including the implementation of green initiatives and the provision of eco-friendly training (Chaudhary, 2020; Gill et al., 2021). As a result, GHRM practices are most successful when personnel recognize the necessity and importance of implementing them (Dumont, Shen, & Deng, 2017).

Certainly, GHRM practices play a pivotal role in fostering employees' environmental values and enhancing their eco-friendly actions. This is achieved by emphasizing the importance of incorporating sustainability measures into an organization's human resource management systems and allocating resources to support these systems. Consequently, this promotes greener behaviors and ultimately stimulates employee performance. In addition, eco-friendly behavior can be incorporated into GHRM practices. (Chaudhary, 2020; Parida, Ananthram, Chan, & Brown, 2021). This indicates that the GHRM may motivate employees to practice employee ecofriendly behavior. Therefore, the following hypothesis is developed.

**H<sub>3</sub>:** *Green HRM has a significant positive influence on employee ecofriendly behavior.*

#### 2.4 Environmental Performance

As previously said, eco-friendly behavior is consciously and purposefully participating in sustainability projects (Foster et al., 2022). Employees who practice eco-friendly behavior take additional, voluntary responsibility to improve the organization's performance and benefit society—giving feedback on how to enhance the environment, recycling, switching off appliances when not in use, using double-sided paper, and limiting consumption of disposable things are a few examples of this behavior. These acts show a dedication to eco-friendly behavior (Naz, Jamshed, Nisar, & Nasir, 2023). Customer interactions, customer satisfaction, organization-wide commitment, and support represent a company's environmental performance, which aims to benefit the outside world and the organization itself (Raza, Farrukh, Iqbal, Farhan, & Wu, 2021). Researchers have been more interested in the effects of ecological leadership on environmental performance than in the effects of green behaviors (Suganthi, 2019). The effectiveness of an organization's efforts toward sustainability is evident in its pro-environmental behavior. Research indicates that environmental management-backed HR practices enhance environmental performance (Hans, 2021). Additionally, research showed that firms that address sustainability issues use HR procedures, especially by educating their staff about environmental protection and enhancing their environmental performance (Ali, Nisar, Abidin, Qammar, & Abbas, 2022). Therefore, the following hypothesis is developed;

**H<sub>4</sub>:** *Employee Eco-Friendly Behavior has a significant positive influence on Organizational Performance.*

#### 2.5 Green Innovation as Mediator Between Green HRM and Employee Eco-Friendly Behavior

As described earlier, Green Human Resource Management (GHRM) encompasses a comprehensive set of policies and practices to promote environmentally responsible behaviors among employees. This approach extends beyond traditional HRM by emphasizing sustainability and waste reduction (Suleman et al., 2023). Organizations implementing GHRM practices have demonstrated increased employee awareness and commitment toward environmental sustainability (Khan & Liu, 2023). One of the key objectives of GHRM is to steer organizations toward sustainability by cultivating environmental awareness among staff, thereby inducing employee environmentally conscious behavior and serving as a pivotal force in achieving environmental objectives along with the organizational objectives (Shahzad et al., 2023). This emphasis on sustainability has positively impacted individual well-being, societal benefits, and environmental preservation (Zhang et al., 2023). Furthermore, GHRM practices have been associated with developing Green Innovations within organizations. These innovations significantly influence eco-friendly behavior, creating a pathway through which GHRM positively impacts employees' environmental consciousness and behaviors (Faisal & Naushad, 2020; Khan & Liu, 2023). Therefore, the following is the mediation hypothesis of green innovation.

**H<sub>5</sub>:** *Green Innovation mediates the relationship between Green HRM and Employee Eco-friendly Behavior.*

## 2.6 Green Eco-Friendly Behavior as Mediator Between Green HRM and Environmental Performance

The environmentally responsible behavior of an organization's workforce has been identified as a significant influencer of the organization's overall performance (Afsar & Umrani, 2020). Employees who adopt organizational citizenship behavior and engage in eco-friendly practices contribute to higher productivity levels (Huang et al., 2023). Establishing and sustaining a culture of sustainability within an organization hinges on each employee's willingness to engage in environmentally friendly practices, demonstrating the critical role of employee behavior in achieving environmental objectives (García-Salirrosas & Rondon-Eusebio, 2022; Sharma et al., 2023). Moreover, organizational culture plays a key role in shaping green behavior, highlighting the importance of top management's encouragement for employees to adopt environmentally responsible practices at work (Pan et al., 2022). The commitment of a workforce to green innovation is not only integral to organizational performance but also holds significant implications for a nation's ecological well-being, emphasizing the broader societal impact of employee eco-friendly behavior (Tuan, 2023).

**H<sub>6</sub>:** *Employee Eco-Friendly Behavior mediates the relationship between Green HRM and Environmental Performance.*

## 2.7 Green Climate

According to Dumont et al. (2017a, b), the "green psychological climate" refers to how all employees collectively perceive the organization's capacity to raise green standards (Dumont et al., 2017). Companies that use Green Human Resource Management Practices aim to provide value beyond economic considerations and take environmental advantages into account as well. Therefore, such organizations aspire to provide a green climate by building capacity to promote green standards (Chatelain et al., 2018). Thus, the organization's strategic management works to increase workers' pro-environmental and green psychological awareness to accomplish the organization's green climate (Saeed et al., 2019). By implementing green goals and encouraging environmentally friendly behaviors, organizations want to change the mentality of their staff members, thereby inculcating a green climate. People who don't embrace green behaviors may be considered less socially responsible, which might deteriorate psychological climate views and encourage anti-environmental behaviors (Whitmarsh & O'Neill, 2010). To improve organizational environmental performance, organizations must define the responsibilities of the stakeholders in everything from job design to environmental management for developing a green psychological climate (Saeed et al., 2019). This way, employees know their obligations when engaging in environmentally friendly activities. This study aims to clarify how employees' pro-environmental behavior and the green psychological climate are related (Chatelain et al., 2018).

## 2.8 Moderation Hypotheses

Green Human Resource Management (GHRM) represents a paradigm shift in human resource practices, emphasizing environmental protection and sustainability (Khan & Liu, 2023). It encompasses policies and strategies for waste reduction and ecological conservation, transcending conventional HRM approaches (Suleman et al., 2023). GHRM has demonstrated its efficacy in promoting environmentally responsible behaviors among employees, positively impacting individual well-being, societal welfare, and ecological integrity (Zhang et al., 2023). This innovative approach integrates elements such as employees' environmental awareness, adopting eco-friendly behaviors, and pursuing ecologically advantageous opportunities (Shaukat et al., 2023). The essence of GHRM lies in steering organizations towards sustainability aligning human resource practices with environmental objectives (Shaukat et al., 2023). The notion that a "greener" climate amplifies the influence of GHRM on green innovation speaks to the pivotal role of the environmental context in enhancing the positive effects of GHRM on an organization's innovative endeavors (Flagstad, 2022).

**H<sub>7</sub>:** *Green Climate moderates the relationship between green HRM and green innovation, indicating that in a greener climate, green HRM exerts a more positive influence on the green innovation of an organization.*

Green Human Resource Management (GHRM) emphasizes fostering environmentally responsible employee behavior (Chaudhary, 2020; Gill et al., 2021). GHRM practices are pivotal in instilling environmental values, knowledge, and personnel skills, motivating them towards eco-friendly actions. This proactive approach is particularly effective when employees recognize the essentiality of such practices (Dumont et al., 2017). Concurrently, employee eco-friendly behavior is a linchpin in advancing organizational performance, significantly influencing the effectiveness of sustainable initiatives (Afsar & Umrani, 2020). Cultivating a sustainability culture hinges on employees' willingness to actively engage in environmentally friendly practices, thereby contributing to an organization's broader environmental goals (García-Salirrosas & Rondon-Eusebio, 2022; Sharma et al., 2023). The assertion that a greener climate amplifies the impact of Green HRM on employee eco-friendly behavior underscores the significance of environmental context in enhancing the efficacy of HRM strategies to promote sustainable practices within an organization.

**H<sub>8</sub>:** *Green Climate moderates the relationship between Green HRM and Green Eco-Friendly Behaviour, such that Green HRM has a greater impact on Employee Eco-Friendly Behaviour in greener climates.*

### 3. Methodology

This is a quantitative study; data on all variables is collected through a self-administered questionnaire to quantify the relationship between various study variables mentioned in the research framework Fig. 1. The study questionnaire has been prepared on a five-point Likert scale. A questionnaire as a data collection method is rational and comprehensive in a limited time. Survey questionnaires have been recognized in several research papers as a primary instrument for data acquisition due to their efficiency in terms of time and money (Wybo Wiersma, 2013). The scale items were significant and correctly developed to measure the multiple variables derived from various past studies and then adapted/adjusted for the current study questionnaire (Hardigan, Popovici, & Carvajal, 2016). The exogenous variable GHRM, for instance, was assessed using a 6-item scale that was adapted from Dumont et al. (2017); an example is, “My company offers green training to develop knowledge and skills required for green management”. Environmental performance was measured using the 5-item scale developed by Chow and Chen (2012). “Our firm reduced purchases of non-renewable materials, chemicals, and components”, as an example. A 6-item scale and an 8-item scale modified from Chang (2011) and Robertson and Barling (2013) were used to measure the mediator’s green innovation and EEFB, respectively. The employee eco-friendly behavior item sample is “I put compostable items in the compost bin”, while the green innovation item sample is “My company uses materials that consume less energy and resources”. A 5-item scale was used to measure the green organizational climate in this study (Norton, Zacher, Parker, & Ashkanasy, 2017)

The data was collected from the respondents of Saudi Arabia working in SMEs. SMEs are distributed in various states, having more concentration in Riyadh, Makkah, Eastern Province, Aseer, Madina, Jazan, Qassim, Hali, and others, wherein the major share lies in Riyadh 31% and Makkah 20% (SHAERI, 2022). Therefore, the study used cluster sampling due to the nature of the research study, its objectives, and its design (Kasunic, 2005). The SME population is divided into clusters concerning SMEs’ concentration in various states. The major population share is allocated to Riyadh and Makkah, as described above. The experts appraised the questionnaires and confirmed its appropriateness for the study and respondents. To ensure a reliable sample, 500 respondents were chosen, aligning with a 95% confidence interval. This exceeded the minimum requirement of 383 respondents for a large population. Out of the 700 questionnaires distributed to the target population of Workers and Supervisors/managers in SMEs found in Riyadh, Makkah, and other states. The respondents were approached through the *Small and Medium Enterprises General Authority*, which maintains lists and contacts, email addresses, and phone numbers of all registered SMEs and their distribution based on states. The study’s reliability is obvious. Several target respondents filled out and returned the questionnaires with a healthy response rate of 68%. After filtering the incomplete questionnaires, all completed responses were reviewed, and 371 questionnaires were selected for analysis.

#### 3.1 Data Analysis

##### Measurement Model Assessment

PLS-SEM is used in which a two-step process is proposed by (Sarstedt, Ringle, Smith, Reams, & Hair, 2014). One is assessing the measurement model, and the second is assessing the structural model. In the measurement model, the analysis depicts that variable items that were surveyed tend to measure the correct construct for which they were designed to measure, thus, the validity and reliability of variables under study are ensured. The measurement model assessment was also revealed in Table 1 and Fig. 2. Moreover, Hair, Black, and Babin (2010) recommend that 150 is the minimum sample required for CFA. The study has used 371 items in the current study.

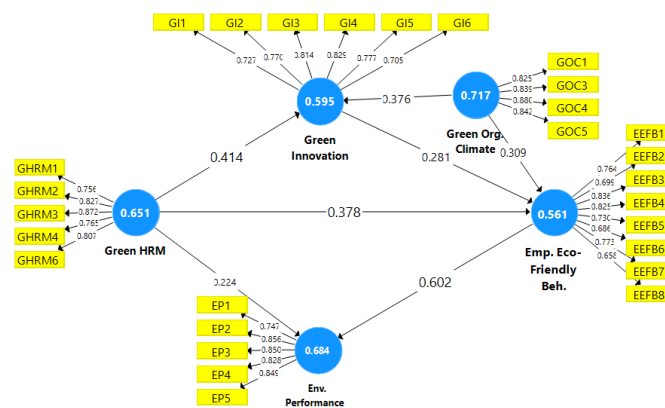


Fig. 2. Measurement Model

The results of the CFA of this study are mentioned, which indicates that all constructs have Cronbach’s Alpha and composite reliability values greater than 0.70, and AVE is more than the cut-off point of 0.50. thus, indicating that all the variables in the study have a good consistency. Thus, all the value’s validity and reliability were within the threshold. Hence, based on the above findings, it is concluded that the instruments of this study are valid in this study context.

**Table 1**  
Measurement model assessment

	Items	Loadings	VIF	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Emp. Eco-Friendly Beh.	EEFB1	0.764	2.116	0.887	0.910	0.561
	EEFB2	0.699	2.012			
	EEFB3	0.836	2.732			
	EEFB4	0.825	3.216			
	EEFB5	0.730	2.224			
	EEFB6	0.686	1.797			
	EEFB7	0.773	2.070			
	EEFB8	0.658	1.607			
Env. Performance	EP1	0.747	1.678	0.884	0.915	0.684
	EP2	0.856	2.387			
	EP3	0.850	2.300			
	EP4	0.828	2.203			
	EP5	0.849	2.336			
Green HRM	GHRM1	0.756	1.645	0.865	0.903	0.651
	GHRM2	0.827	2.764			
	GHRM3	0.872	2.184			
	GHRM4	0.765	1.895			
	GHRM5	0.807	1.984			
	GHRM6	0.807	1.984			
Green Innovation	GI1	0.727	1.719	0.863	0.898	0.595
	GI2	0.770	2.134			
	GI3	0.814	2.460			
	GI4	0.829	2.393			
	GI5	0.777	1.937			
	GI6	0.705	1.819			
Green Org. Climate	GOC1	0.825	1.951	0.869	0.910	0.717
	GOC2	0.839	2.311			
	GOC3	0.839	2.311			
	GOC4	0.880	2.812			
	GOC5	0.842	1.846			

### Discriminant Validity

Discriminant validity measures how much a particular latent variable differs from other latent constructs—by simulating this phenomenon, Henseler, Ringle, and Sarstedt (2015) demonstrated that discriminant validity could be detected using the heterotrait-monotrait (HTMT) ratio. Furthermore, Henseler et al. (2015) suggest that discriminant validity has been established between constructs if the HTMT value is below 0.90, while Kline (2011) defined a more stringent cut-off of 0.85. Thus, Table 2 represents the Heterotrait-Monotrait ratio of correlation (HTMT), which meets the cut-off value defined by Henseler et al. (2015), that HTMT values should be below 0.90.

**Table 2**  
Heterotrait Monotrait Ratios (HTMT)

	EEFB	EP	GHRM	GI	GOC
Emp. Eco-Friendly Beh.					
Env. Performance	0.839				
Green HRM	0.843	0.753			
Green Innovation	0.813	0.784	0.734		
Green Org. Climate	0.794	0.747	0.683	0.709	

### 3.2 Assessment of Structural Model (Direct Relationships)

After assessing the measurement model, the structural model (inner model) is analyzed to study the direct and indirect relationships on the instructions of Hair et al. (2014). According to Hair et al. (2014) rule of thumb, the relationship is significant if the  $t$ -value for one-tailed relations is greater than 1.64. All the direct hypotheses are significant. The results are mentioned in Table 3 and Fig. 3.

**Table 3**  
Direct Hypothesis Results

	Beta	SD	T stats	P Values	Decision
Emp. Eco-Friendly Beh. → Env. Performance	0.602	0.058	10.353	0.000	Significant
Green HRM → Emp. Eco-Friendly Beh.	0.378	0.040	9.486	0.000	Significant
Green HRM → Env. Performance	0.224	0.058	3.839	0.000	Significant
Green HRM → Green Innovation	0.414	0.064	6.455	0.000	Significant
Green Innovation → Emp. Eco-Friendly Beh.	0.281	0.056	4.981	0.000	Significant
Green Org. Climate → Emp. Eco-Friendly Beh.	0.309	0.056	5.565	0.000	Significant
Green Org. Climate → Green Innovation	0.376	0.075	4.990	0.000	Significant



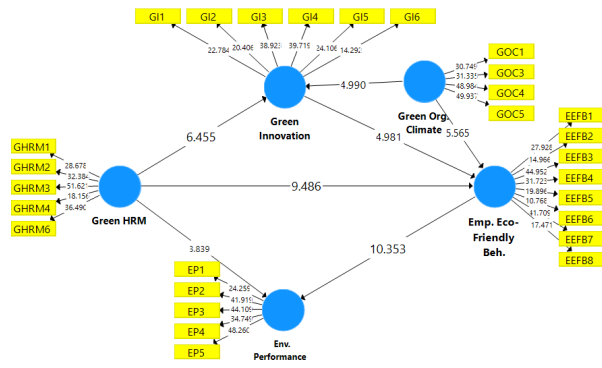


Fig. 3. Structural Model

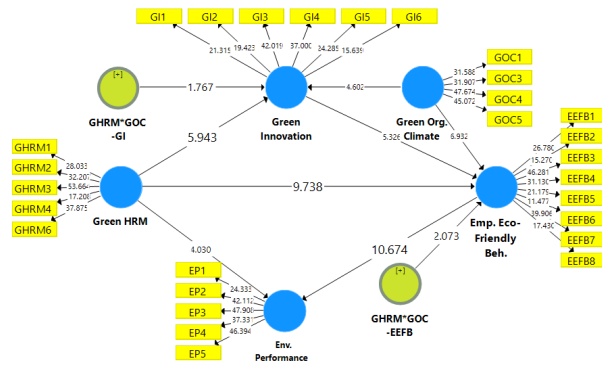


Fig. 4. Moderation Analysis

3.3 Moderation Analysis

The study has used a Product indicator approach through bootstrapping technique of SmartPLS SEM. The data was analyzed using the one-tail technique. The results revealed that all hypotheses are significant, and moderation has significantly strengthened the relationship. The outcomes are mentioned in Figure 4 and Table 4.

Table 4  
Moderation Analysis

	Beta	SD	T Stats	P Values	Decision
GHRM*GOC→ Emp. Eco-Friendly Beh.	0.074	0.036	2.073	0.019	Positive Moderation
GHRM*GOC→ Green Innovation	0.104	0.059	1.767	0.039	Positive Moderation

3.4 Mediation Analysis

In this study, researchers opted for “bootstrapping”. Previous studies elaborated that bootstrapping is a “non-parametric resampling procedure” that has gained popularity among researchers owing to correctness and comprehensiveness in evaluating the mediating mechanism (Hayes, 2009). Moreover, this technique is appropriate for a small sample size (Hair et al., 2014). This study tested the mediating mechanism using Smart PLS 3.3.3, as (Hair et al., 2017) suggested, with 5000 iterations and a one-tail significance level. The results revealed that all the mediation hypotheses are substantially significant, as given in Table 5.

Table 5  
Mediation Hypotheses

	Beta	SD	T Statistics	P Values	5.00%	95.00%	Decision
Green HRM → Green Innovation → Emp. Eco-Friendly Beh.	0.116	0.034	3.430	0.000	0.060	0.171	Mediation
Green Org. Climate → Green Innovation → Emp. Eco-Friendly Beh.	0.106	0.025	4.276	0.000	0.071	0.153	Mediation
Green HRM → Emp. Eco-Friendly Beh. → Env. Performance	0.228	0.026	8.833	0.000	0.186	0.270	Mediation
Green Innovation → Emp. Eco-Friendly Beh. → Env. Performance	0.169	0.040	4.256	0.000	0.102	0.232	Mediation
Green Org. Climate → Emp. Eco-Friendly Beh. → Env. Performance	0.186	0.044	4.207	0.000	0.111	0.257	Mediation

4. Discussion

According to hypothesis H1, the relationship between Green HRM and Green Innovation is significant. This means that implementing green HRM shall significantly increase green innovation among SMEs. It is evident from existing literature that the firms employing green HRM have more creative and innovative personnel in their teams, which are the ripe fruits of environmentally stable creative work processes and practices (Takalo & Production, 2021). According to some authors, green innovation may be used to modify systems, goods, and practices to improve environmental sustainability and performance. Green innovation covers developing green products and processes (Aftab et al., 2023; Ratnasari, Kahpi, & Wulandari, 2023). Likewise, H2 is supported, indicating that implementing green innovation practices within organizations positively influences employees’ adoption of eco-friendly behaviors. This finding underscores the importance of innovation in promoting environmentally conscious behavior among employees. Previous studies have also found similar outcomes. The environmentally responsible behavior of employees is obtained through green, innovative practices and creativity (Usman et al., 2023). Furthermore, green initiatives promote social and economic advancement in an environmentally responsible manner (Tirno et al., 2023).

The H3 is also supported, demonstrating that adopting Green HRM practices positively impacts employees' eco-friendly behavior. This highlights the crucial role of HRM strategies in fostering sustainable practices within the workforce. This is in line with the findings that promoting activities for safeguarding the environment and fostering eco-friendly practices can influence employee behavior in the workplace. (Farrukh et al., 2022; Usman et al., 2023).

Also, H4 is supported, representing employees' eco-friendly behavior contributes positively to the organization's overall performance. This suggests that sustainability practices at the employee level can have a tangible impact on organizational outcomes. GHRM implementation boosts employee eco-awareness and commitment, positively impacting well-being, society, and the environment (Khan & Liu, 2023; Zhang et al., 2023). The study also supports H5, signifying that Green HRM indirectly influences employees' eco-friendly behavior by introducing green innovations. This suggests that Green HRM practices drive eco-friendly behavior by fostering an environment conducive to green innovation. Similarly, the previous research found that GHRM adoption raises employee eco-awareness and commitment, yielding positive impacts on well-being, society, and the environment (Gill et al., 2021)

In the same vein, H6 is supported, which is suggestive of employees' eco-friendly behavior, which plays a mediator role between Green HRM practices and the organization's environmental performance. It describes that employee behavior is crucial in translating HRM strategies into tangible environmental outcomes. A similar study found in the past concluded that Organizational culture guides green behavior; top-level endorsement is crucial. Employee dedication to green innovation impacts organizational success and broader ecological well-being (Pan et al., 2022; Tuan, 2023).

The moderation hypotheses are also proven to have support like H7, stressing the significance of environmental context. In greener climates, Green HRM practices amplify green innovation, suggesting that environmental conditions can enhance the impact of HRM strategies on innovation. GHRM aims to align HR practices with environmental goals for sustainability. A greener climate enhances GHRM's impact on innovation, underlining the environment's crucial role in driving organizational success (Flagstad, 2022; Shaukat et al., 2023). Similarly, H8 is also supported, emphasizing the role of environmental context. In greener climates, Green HRM has a stronger influence on employees' eco-friendly behavior, indicating that a conducive environmental setting can enhance the effectiveness of HRM practices in promoting sustainability. The past literature has also found that eco-friendly employee behavior is crucial for organizational performance and sustainability initiatives. Cultivating a sustainable culture depends on employee engagement in eco-friendly practices, advancing broader environmental goals (Afsar & Umrani, 2020; García-Salirrosas & Rondon-Eusebio, 2022; Sharma et al., 2023).

## 5. Conclusion

The results of this study validate the importance of Green Human Resource Management (HRM) and Green Innovation in promoting sustainability among Small and Medium Enterprises (SMEs) in Saudi Arabia. The empirical evidence demonstrates that adopting Green HRM practices leads to a significant enhancement in green innovation. This finding is consistent with prior scholarly research that emphasizes the favorable influence of these practices on organizational creativity and innovation. Moreover, the research reveals a definitive correlation between Green Innovation and the adoption of eco-friendly behaviors by employees, underscoring the pivotal significance of innovation in fostering environmentally conscious conduct among personnel. Furthermore, implementing Green Human Resource Management (HRM) practices favorably impacts employees' engagement in environmentally friendly actions. This highlights the significance of HRM strategies in promoting sustainable behaviors within the workforce. Moreover, the study elucidates that adopting environmentally conscious actions plays a crucial role in augmenting the effectiveness of organizations, hence showcasing the measurable influence of sustainable practices implemented by employees on overall achievements. The research also emphasizes the mediating function of employee behavior in the relationship between Green HRM practices and environmental performance, underscoring the significance of employee conduct in effectively implementing HRM strategies to achieve measurable environmental outcomes. Moreover, the results suggest that the environmental context substantially magnifies the influence of Green HRM on green innovation. This underscores the need to create a favorable environmental framework to foster organizational achievements inside small and medium-sized enterprises (SMEs) in Saudi Arabia. In general, this study offers significant contributions to understanding the interrelationships between Green HRM, Green Innovation, employee behavior, and the environmental setting in promoting sustainability inside small and medium-sized enterprises (SMEs) in the specific context of Saudi Arabia.

## 6. Implications

### 6.1 Theoretical Implication

This study analyzed through the AMO (Ability, Motivation, Opportunity) model, has significant theoretical implications. Firstly, it highlights how implementing Green HRM practices and Green Innovation initiatives enhances organizational ability. By providing employees with the knowledge and skills for eco-friendly practices, Green HRM boosts their capacity to contribute to environmental sustainability. Similarly, Green Innovation strengthens an organization's ability to develop and implement environmentally friendly products and processes, aligning with the AMO model's focus on building capabilities for better performance. Secondly, the study emphasizes an increase in motivation, particularly through the impact of employee eco-friendly behavior on organizational performance. This underscores employees' intrinsic motivation to engage in

environmentally conscious practices, reflecting their desire to contribute to environmental well-being. Green HRM practices and Green Innovation act as powerful motivational tools by fostering a culture of sustainability and innovation within the organization. Lastly, the study underscores the pivotal role of the environmental context, especially in terms of a Green Climate, as a moderator that amplifies the effects of Green HRM and Green Innovation on organizational success. This aligns with the AMO model's concept of Opportunity, where a favorable environmental backdrop creates ideal conditions for organizations to leverage their abilities and motivations for improved performance. A greener climate provides fertile ground for organizations to excel in green innovation and sustainability efforts. This thorough examination aligns the study's findings with the core principles of the AMO model, offering valuable theoretical insights into how Green HRM, Green Innovation, employee behavior, and environmental context interact to drive sustainability within SMEs.

### 6.2 Practical Implications

This study offers essential guidance for SMEs in Saudi Arabia looking to boost sustainability efforts. It emphasizes integrating Green HRM practices, which incorporate eco-friendly policies and initiatives into HR strategies. This helps cultivate an environmentally-conscious workforce through targeted training, awareness campaigns, and incentives for eco-friendly behavior. Additionally, fostering a culture of innovation and creativity is crucial, as it positively influences employees' adoption of green practices. Recognizing employees' pivotal role in driving environmental performance is essential, achieved through implementing eco-friendly workplace policies, providing resources for sustainable practices, and acknowledging and rewarding environmentally responsible actions. Moreover, considering the local environmental context amplifies Green HRM and Innovation's positive effects. By taking these practical steps, SMEs in Saudi Arabia can proactively contribute to environmental sustainability while reaping the benefits of improved organizational performance.

### 6.3 Limitations and Future Directions

The study was conducted to measure the influence of Green HRM, green innovation, green climate, and eco-friendly employee practices on SMEs' organizational environmental performance in Saudi Arabia. It has been recognized through the abovementioned results that green HRM is supportive to inculcate green behavior of employees in a firm to achieve sustainability and environmental preservation goals. However, certain other factors hinder or limit the aspirations of sustainable development and organizational performance. For example, cultural, demographic, and governmental factors need consideration to strengthen the research model further. Therefore, future research studies should also include these external factors in their model for a more realistic version. Conclusively, these significant implications of the study would fill the gap in available literature on Green HRM practices and the environmental performance of SMEs in the Gulf region.

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