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RESEARCH ARTICLE

Impact of green HRM practices on sustainable performance: mediating role of green innovation, green culture, and green employees' behavior

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Abstract

The concept of sustainability in the context of human resource management (HRM), or more precisely, green HRM, has significantly transformed in recent years. Human resources are an important and valuable asset of a firm. In this research, green HRM is concentrated on the areas where HRM is held accountable for the company's sustainability initiatives. The research examines the effects of green HRM on organizational performance in China while considering the mediating roles of green innovation (GI), green employee behavior (GEB), and organizational culture. The data was gathered from 316 HR specialists working in various Chinese manufacturing businesses to meet the study's goals. A self-administered questionnaire utilizing the preexisting scale is used to obtain the data (detail is provided in Table 1). The smart PLS 4 structural equation modeling approach is applied for the data analysis. The study results indicate that green HRM practices influence green innovation (GI), green culture (GC), and green employee behavior (GEB). Furthermore, results also suggest that GI, GC, and GEB influence the organization's sustainable performance (SP). The research has several theoretical, methodological, and practical ramifications for many stakeholders, including the Chinese security exchange commissions, firms' senior management, academics, and HR specialists.

Keywords Green HRM practices · Green innovation · Green culture · Green employee behavior · Sustainable performance

Introduction

Concerns about climate change have been shown to rise in recent years. In the twenty-first century, environmental issues have attracted more attention globally (Herrera and de las Heras-Rosas, 2020; Yong, Yusliza, Ramayah, Chiappetta Jabbour, et al. 2019). International environmentalism's need to halt climate change has also been recognized through specific treaties (Rashid et al. 2021; Shah, 2019). To slow down and stop the depletion of natural resources, various laws and regulations are designed and supported by NGOs and the government. These rules and regulations consider the negative consequences of companies in terms of pollution, poisonous chemicals, and other waste products. Also, these rules and initiatives seek to reduce how destructive environmental issues are to communities, cultures, and living things (Christmann and Taylor, 2002; Srivastava, 2007; Zhu et al. 2008). It has been noted that companies within the existing situation, particularly in the context of China, need to find methods and approaches to cope with the current economic problems and the environment while reducing their ecological footprints. Companies must increasingly focus on social, environmental, and economic concerns and maximize shareholder wealth to gain legitimacy, a social license to operate, long-term success, and survival (Daily et al. 2009; Govindarajulu and Daily, 2004; Jamal et al. 2021). A capable leader must systematically develop and implement corporate sustainability plans (Glavas et al. 2010). Since the idea of "Green" has been integrated into the business strategy, sustainability issues are quickly raising the priority list of corporate executives. Yet, most practitioners are still uneasy

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with the human resource component of the field (Beer and Eisenstat, 1996). Meanwhile, businesses may boost their brand recognition and increase market competitiveness via GPDI (Weng et al. 2015) by using green intellectual capital as environmental awareness among stakeholders increases significantly (Mansoor et al. 2021). Intellectual capital is a group of intangible assets like resources, capabilities, and competences that improve a firm's performance and value. Intellectual capital, an intangible asset, includes people's knowledge, skills, competencies, experience, ability, and customer relationships that help organizations compete (S. U. Rehman et al. 2022).

Over the past 30 years, GHRM has evolved. Job seekers frequently favor environmentally conscientious businesses (S. U. Rehman et al. 2021). The introduction of sustainability in the framework of HRM, or more precisely, green HRM, has lately resulted in significant changes to human resources as a valued and significant asset of a firm. This study's "green HRM" discussion focuses on where HRM is held accountable for the organization's environmental management. To further improve employee morale and satisfaction, Mampra (2013) defines green HRM as the policies and actions that channel resources sustainably and for the cause of environmentalism. Others define green HRM as using HRM policies, processes, practices, and philosophies to enhance corporate resources sustainably and prevent any damage caused by environmental issues inside the enterprise (Zoogah et al. 2011). By attaining green goals and green initiatives across the whole recruiting, selection, training and development, remuneration, and employee relation process, green HRM and productivity of the green HRM support GC and GI in the firm (Dutta 2012; Shah 2019). The HR procedures implement the necessary green HR policies (D. Renwick et al. 2008a). Hence, the significance of human capital for achieving goals connected to sustainable business performance cannot be understated (Sudin, 2011).

The failure of a firm is cited as a result of poor employee participation, selection, remuneration, and recruiting practices (Huselid, 1995). As a consequence, the HR function may bring about organizational transformation. In this period of fast growth, it is necessary to acknowledge that there are new areas, such as the intersection of sustainability and HRM. To effectively execute organizational strategy, it is essential to synchronize HR systems (Jackson et al. 2011a). Cherian and Jacob (2012) observed that emphasizing staff orientation, motivation, recruiting, and incentives might help implement green projects effectively. Findings show that modifications in HRM practices are necessary to hire the best people for green performance (Opatha, 2013). Incorporating GI, employee behavior, and corporate culture, green HRM practices are essential to sustainable company growth (Aykan, 2017a).

In China, relatively little research has been done on the study's practical applications that may aid firms in becoming more sustainable via green HRM practices. The study's contextual factors were given so much attention (Shah, 2019). Consequently, this research explores the effects of SP, GI, and HRM. Also, very little research has been done on the significance of GC, GI, and employee behavior in the Chinese environment. Even though there is a wide range of literature on the subject of green HRM and corporate sustainability, there is still uncertainty regarding the effective and successful implementation of green HRM and corporate sustainability performance of the firms for achieving the ultimate GC in the business context (Patel, 2018; Rashid et al. 2021; Rothenberg et al. 2017). Members are important change agents in this process because green culture can alter current organizational thinking (S. U. Rehman et al. 2023). This study analyzed the extensive and relevant literature that addressed many elements of green HRM to determine how human resource policies may be created in firms to become green. Global challenges, including environmental degradation, social group marginalization, and innovation in both public and private settings, are constantly at the forefront of the sustainability discussion. A criterion for development is necessary to treat social, economic, and environmental issues equally.

Moreover, a connection between feasibility and actions taken within the framework of a company must be created. Private and public groups have historically been at the forefront of bringing about social and environmental changes, notably the most severe and dangerous forms of global warming. Given this, various stakeholders, including the public, the government, regulatory agencies, the academic community, and the media, look to companies to improve society or clean up the mess they cause regarding noise, air, and other forms of pollution. According to the stakeholder perspective, which holds that businesses are responsible for any harm they do to society, the environment, or natural resources, these expectations are also legitimate and reasonable.

On the other hand, an agency approach assumes that businesses were founded to generate money, not to provide social services. The strategy assumes managers should increase company profitability to maximize returns to shareholders. Furthermore, according to earlier research, GC and employee behavior efficiently create and implement structural and cultural changes that will promote sustainability inside businesses (Jamal et al. 2021). So, this research aims to determine if green HRM, as a mechanism of sustainability, enhances sustainable organizational performance. The research also investigates how GC, innovation, and employee behavior influence the relation between G_HRM and SP. The research would bring knowledge for policy and practice in addition to addressing the identified gap in the literature, particularly by examining the novel mediators in the link between green HRM and organizational performance.

The conceptual framework is important because it uses a holistic approach and handles several fresh linkages that have never been studied by the preceding literature or tried, save in fragments.

If a company's human resource policies and plans align with and are compatible with its environmental management policies and strategies, will they be successful (Rashid et al. 2021; Shah, 2019; Yong, Yusliza, Ramayah, and Fawehinmi, 2019)? Employers' environmental plans and policies might align with their workforce via various initiatives, such as GHRM (Gholami et al. 2016). Unfortunately, green HRM is only practiced in a few regions or countries worldwide, such as Europe (L. D. Zibarras and Coan, 2015) and Australia (Shen et al. 2018). Except for Malaysia (Gholami et al. 2016; Yong and Mohd-Yusoff, 2016) in the Asian context, other countries, including India and Pakistan, are yet to produce seminal research in the area (Jamal et al. 2021; Mishra, 2017; Shah, 2019). Moreover, a significant body of past work that concentrated on a few green HRM practices did not yet result in a comprehensive, all-encompassing, or integrated approach to GHRM practices. As a result, this research provides a list of 39 green HRM practices broken down into six main divisions or sections. We determine the following aims and research questions based on the research gap. As mentioned earlier, the research defines the following goals to solve the issue.

Research questions

The research questions of the study are as follows:

1. How do GHRM practices impact GI, GC, and green employee behavior?
2. What is the impact of GI on SP?
3. What is the impact of GC on SP?
4. What is the impact of GEB on SP?

Literature review

Theoretical exposition

The resource-based view (RBV) paradigm serves as the theoretical foundation for this investigation. The RBV theory's logic has mostly been applied to or employed in strategic management and related domains, where human resource management is the most significant. The studies in various contexts look at how various available resource types impact the performance of the business in ways that are acceptable to RBV's principles. According to the RBV theory, businesses should have socially sophisticated and competent resources to maintain a competitive edge (Barney and Clark, 2007). It should not surprise that most HR theorists employed RBV to investigate how human resources affect organizational performance since they are socially complicated (Wright and McMahan, 1992; Yong, Yusliza, Ramayah, Chiappetta Jabbour, et al. 2019a). To establish significant enterprises, Pacific Humanoids will invest in human capital to improve awareness of crucial human factors while adopting new organizational techniques (Becker and Huselid, 2006; Wright et al. 1994) to enhance organizational performance (Delaney and Huselid 1996) and to keep businesses at a competitive edge that will be difficult for rivals to replicate.

The organization's sustainability, GI, organizational GC, and employee behaviors are supported by green HRM practices. Similarly, G_HRM practices are required to boost human potential to better meet the organization's goals. Resource-based reasoning is essential for these skills to evolve over time and for businesses to benefit from the competitive effects of those changes (Barney 2001). RBV has therefore been regarded in the literature as a theoretical cornerstone for the development of green HRM (Chiappetta Jabbour et al. 2017). Also, it was suggested (Nonaka and Takeuchi 1995) that the resource-based approach offers a thorough foundation for collaborating with many organizational components to produce something unique and original. To improve the company's competitiveness, HR professionals must redefine their job as internal consultants (Allen and Wright 2008). The future of HRM will include sustainability management, as was previously stated. Thus, the firm-specific resources (GHRM) and the competences of GHRM, which give an edge of competitive edge in the shape of better organization performance, would be the consequence of sustainable organization performance, GI, green organizational culture, and green employee behavior, according to the RBV theory (Yong, Yusliza, Ramayah, Chiappetta Jabbour, et al. 2019a). The research also applies the core of the stakeholder theory, which holds that firms have duties to various stakeholders in addition to their shareholders, including consumers, workers, and the community (Donaldson and Preston 1995). According to Freeman et al. (2021), every group that has the potential to influence the accomplishment of the organization's goal is a stakeholder. The theory goes on to define a stakeholder as someone with an interest of any kind in the issues affecting the firm in question. As a result, everybody directly or indirectly impacted by a firm's issues has a stake in that business and is thus a stakeholder (Werhane and Painter-Morland 2011). Hence, the stakeholder may be closer to the business environment and have a more direct interest in the company, such as employees and shareholders. Alternatively, they may be further away and indirectly interested in the business, such as communities and individuals or entities outside the firm. According to stakeholders' theorists, stakeholder involvement may be

seen as descriptive, normative, and practical (Donaldson and Preston 1995). The *descriptive* method focuses on how a company employs its organizational strategies to meet the stakes of various stakeholders.

On the other hand, the normative approach is founded on moral principles and shows how stakeholders and commercial organizations should work together to carry out their tasks. The instrumental method explores what transpires when a company interacts with its stakeholders in certain ways (Mainardes et al. 2011). The research employs green HRM practices and other commitments as techniques to enhance organizational practices and sustainability practices in the manner described above.

The organizational culture consists of norms, standards, and codes representing an organization's overall quality, functioning, and image (Harris and Crane 2002). "GC" refers to an organization's dedication to achieving its sustainability goals (Ramasamy et al. 2017), establishing and developing a GC support and strengthening the firm's and its workers' commitment to environmentally friendly operations and activities (Ramasamy et al. 2017). Promoting GC inside a company also involves regulating and disciplining all official and informal communication channels (Tang et al. 2018). An organization's purpose must include considerations for organizational sustainability. These procedures must be covered by the departmental budget, green-themed activities, and concern for the well-being of staff (Gupta 2018). G_HRM methods improve GEB toward care and protection for sustainable development. It also promotes numerous environmental education initiatives and employee programs (Chaudhary 2019). It encourages staff members to participate in initiatives that could create a positive, effective, cost-effective, and ecologically friendly workplace. The ideas and approaches of (GHRM) include setting green standards, planning for environmental management-related activities and duties, educating workers as well as fostering a green interpersonal citizenship attitude, informing employees with feedback every day to keep them motivated to achieve green objectives, and including them in several green projects and programs (Renwick et al. 2013). According to Tseng et al. (2013), to raise workers' desire to adopt and enhance pro-environmental attitudes and behaviors, positions should be created to motivate employees to be concerned about the environment and their surroundings and report on environmental management. According to (Jiang et al. 2012), HRM mainly focuses on the attitudes and behaviors of workers as they relate to their jobs. Considering this, HRM's primary duty is to mold workers' attitudes and actions to achieve the company's overall green strategy. Representatives participate in and get recognized for innovative environmental performance and an organization's efforts. Green HRM influences pro-environmental workplace attitudes among representatives inside the company (Chaudhary 2019).

Green HRM practices

Green recruitment and selection

Nowadays, many businesses strive to provide job descriptions that may identify various environmental concerns and activities connected to the obligations and duties of the employment being marketed (D. Renwick et al. 2008a). Employers that implement green, ecologically friendly business methods might draw potential applicants. Hence, developing a reputation as a "green employer" successfully attracts recruits (Arulrajah et al. 2015a). To encourage applicants to apply for open positions, businesses may also advertise their green image, environmental performance, and environmental policy. So, the job description for a specific position should include the environmental responsibilities associated with that position and the abilities and information applicants will need to complete environmental activities (Chaudhary 2018). Green hiring (GH) is a significant component of GHRM practices; it emphasizes the need to develop a staff concerned with environmental problems, which may enhance SP (Zibarras et al. 2015).

Green performance management

A strategy known as "GPM" evaluates an employee's performance based on his or her actions concerning environmental management (Tseng et al. 2013). Regarding green hiring, the focus is on promoting the company's green image to attract professionals who care about the environment (Tang et al. 2018). Previous research suggests that an employee's performance management and appreciation in moral and monetary terms attract upper-edge applicants who are devoted to the environmental management of the business (Guerci et al. 2015), (Ahmed et al. 2019).

Green training and development

Since it helps a company's sustainable growth, green training and development (GTD) is a top priority (Pinzone et al. 2019), also; it is important for carrying out effective environmental management-related operations and cleaner production (Resources et al. 2013). Employee green training and development is crucial for environmental and social responsibility since it will support employee commitment to environmental objectives, which is a significant component in enhancing the performance of EM systems (Chander et al. 2020). These systems provide advantages, including less waste, efficient resource use, and decreased pollution. Employee T&D in green projects will increase chances to improve green

management since it will help organize employees' green goals, incentives, and skills (Florida et al. 2001)

Green compensation and benefits

Enhancing a company's SP (SP) will enhance its economic, social, and environmental performance (Stefan et al. 2008). Implementing a green standard and indicator is thus essential for enhancing (Wang et al. 2018) since doing so will allow all workforces to incorporate environmental goals into action plans (Clair et al. 1996). Attaining SP (Berrone and Gomez-Mejia, 2009) emphasized the significance of inspired environmental behaviors. Likewise, businesses could promote environmental measures by rewarding personnel based on SP criteria. According to Merriman and Mousa et al. (2012), indirect green remuneration gains from sustainable initiatives sufficiently justify staff members to support environmental goals. The idea of sustainability is now a global concern and is becoming more important in HRM. Under pressure from regulators, stakeholders, rivals, and society, organizations have emphasized balancing economic and environmental performance (Rehman et al. 2016).

As a result, there is a significant connection between economic performance, environmental management, and SP. Moreover, there are a variety of HR strategies that may improve SP (Siyambalapitiya et al. 2018). Governments, communities, corporate executives, and consumers embrace sustainability (Rayner and Morgan, 2018). Also, evaluating the performance of the three pillars of SP—economic, environmental, and social factors—can impact an estimate of SP; these three pillars are evaluated equally. Researchers are starting to recognize the connection between human resources (HR) and environmental sustainability (Jabbour 2013); as a result, HR is viewed as having strong practices for integrating workers with new initiatives and for enabling businesses to align their HR practices with their environmental targets, aiding them in achieving environmental sustainability (Haddock-Millar et al. 2016). In addition, social performance refers to the effects of GHRM practices on social issues; it is associated with an organization's and its products' reputation from the views of many stakeholders (Makov et al. 2016). According to Chaudhary (2019), green initiatives help HR foster more employee social responsibility. As a result, it is crucial to create and enhance SP. Dubey et al. (2018) emphasized the relevance of GHRM in enhancing sustainability, which involves understanding environmental concerns and economic and social performance. They also discussed how these programs might raise employee awareness and encourage sustainable behaviors. Economic performance is connected to improving marketing and financial performance due to using green practices, which may improve an organization's position compared to other businesses in the industrial sector (Zhu et al. 2008). In this approach, modern organizations have a social obligation to balance their economic, social, and environmental performance (Longoni et al. 2018). Green activities and behaviors like waste elimination and recycling must be identified and practiced inside an enterprise to improve long-term sustainability. Also, knowledge of the function of GHRM in sustainability concerns is required, including developing a GC, utilizing resources more efficiently, minimizing adverse environmental effects, and motivating workers to eliminate waste (Rayner and Morgan 2018). Most of the literature on green HRM focuses on industrial companies, whereas the contributions of GHRM to the service industries have not received the same attention (Jabbour et al. 2013). Yet, there is a substantial gap in managing environmental effects in developing nations, which has to be addressed in further research (Haider et al. 2015). According to several experts, there is also a need for further investigation across other organizational roles, where only a small number of quantitative research has been conducted in a GHRM setting. Moreover, in advanced research, GHRM should be examined in connection to other disciplines and cross-functions, such as sustainability.

Green employee relations

Giving workers a chance to engage in various environmental management tasks is one way to promote green participation (Renwick et al. 2013). The term "G_HRM practices" describes using all personnel to support sustainable practices and enhance personnel commitments and attention to sustainability challenges (Rani and Mishra 2014). GER is the GHRM practice that is examined in this study. GER refers to actions taken by businesses to encourage employee involvement, participation, and involvement in creating reasonable solutions to environmental problems (Oyedokun, 2019). By matching workers' skills and goals with environmentally friendly practices, Das and Singh (2019) emphasized how important employee involvement in environmental projects is to ensure ecological sustainability. As a result, current resources are used sustainably.

Moreover, green HRM emphasizes the importance of employee relations and union support when implementing corporate environmental management programs that may improve an organization's SP (Arulrajah et al. 2015b). GER is also a strategy that offers environmentally friendly options. Aykan (2017b) asserts that the key prerequisite for implementing green HRM practices is for the company to internalize environmental concerns. Offering to participate and contribute to environmental initiatives to all employees,

from the bottom to the top level, is one way to achieve this. Executives should coordinate with all staff members to revive a desire to adopt green practices. In other words, employee relations may accomplish the company's competencies in reforming the organization by supporting environmental and green concepts. Aishwarya and Thahriani (2020) mentioned IBM UK as an example of a real-world company that employs GER. This company's action-team initiative provides funding to encourage staff members and their families to participate in environmental projects. As a result, it demonstrates the existence of organizations that support GER. Also, human resource professionals must create a work environment where workers can develop their ideas (Mukherjee et al. 2020). The result is a clear and enthusiastic workplace. Some earlier research has also mentioned GER. According to a survey by Arora and Kaul (2020), 85% of firms allow their workers to participate in green suggestion programs. According to Oyedokun's (2019) findings, GER positively and significantly affects the manufacturing industry's ability to maintain a competitive advantage. As a result, it becomes clear that this factor is a major tool for gaining a competitive edge.

Consequently, the empirical study by Jamal et al. (2021) showed a beneficial impact of green staff participation on business sustainability. The same applies to how GER greatly improved individual and corporate green results (Begum and Arshi 2020). However, according to Raut et al.'s (2020) study, green employee engagement and labor management relied on other factors.

Green innovation

GI focuses on enhancing currently available goods and procedures to make them more environmentally friendly (Rehman et al. 2021). GI has received much attention recently, and the word is often used in literature interchangeably with other concepts like environmental, ecological, and sustainable innovation. According to their concept of applicability, researchers have defined these terms. For example, Oltra and Saint Jean (2009) defined environmental innovation as "innovations that consist of new or modified processes, practices, systems, and products which benefit the environment and contribute to environmental sustainability." According to Graczyk et al. (2018), ecological innovations are "new goods and processes that give consumer and company value but dramatically lower environmental consequences" or "enterprises that provide a trinity of social, economic, and environmental advantages." Sustainable innovation, according to Berkowitz (2018), is defined as "socially desirable results addressing the requirements of the contemporary without compromising the potential of future generations to satisfy their own requirements." Finally, Chen et al. (2006) provide the most thorough definition of GI, defining it as "hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management." Researchers have put a lot of effort into defining GI as well as spotting its aspects. The aspects of GI are typically stated as being "green product innovation" and "green process innovation" (Achi et al. 2022; Huang and Chen 2022). The definition of a "green product innovation" is "innovation that results in the design, manufacture, and distribution of a goods with minimal or little impact on people and the environment across its lifecycle and outperforms the traditional frequently used competing for alternatives" (Wagner 2013). On the other side, "advancements in technology and processes that lead to the manufacture of commodities with no or reduced environmental effect" is what is meant by "green process innovation" (Chen 2008). Researchers have attempted to examine the effect of green product and process innovation on the company's SP, but the findings are ambiguous and need more study to be clarified (Afum et al. 2023; Aisjah and Prabandari 2021). Recent research has introduced the idea of green management innovation, which is seen as a new depth of GI (Burki et al. 2018). Green management innovation refers to managers changing how their organizations are run to comply with environmental regulations (Burki et al. 2018). Instead, green process innovation refers to using a company's resources to minimize environmental damage while manufacturing occurs (Sellitto et al. 2020; Wang et al. 2021). This research focuses on green management and process improvements since the literature is divided on how these aspects affect the organization's performance. As not every company can implement green product innovation because of the inherent qualities of its product, it is not covered (Huang and Chen 2022). For instance, an automobile can develop its technology and produce greener goods, but the glass or leather industries cannot do the same. Since our research is focused on all manufacturing sectors, green product innovation was excluded from our study. According to the literature study, companies must collaborate, exchange information, transfer expertise, and create networking channels with external stakeholders to implement GI (Quist and Tukker, 2013). GI is more frequent in companies with more effective external networks. Also, according to the DCV, GIs are vital competencies for manufacturing companies, offering benefits in the marketplace, cost reductions, and higher financial returns (Afum et al. 2023). As a result, this research emphasizes clarifying any uncertainties in the literature, with the study's subsequent section developing the hypothesis.

Green culture

Management teams establish a similar set of beliefs, attitudes, and values known as an "organizational culture" to help shape organizational actions and mindsets toward accomplishing shared corporate objectives (Al-widi et al. 2021; Wang 2019). "GC" (OGC) refers to an organization's attitude toward environmental conservation. So, the mission statement of the company incorporates an employee core value, making each team member feel accountable for environmental sustainability (Abbas and Dogan 2022). Green culture is a crucial resource for firms that can boost green performance and help them gain a competitive edge (S. U. Rehman et al. 2023). Employees' increased awareness of environmental concerns due to GC has a favorable effect on their ability to do their jobs. Managers must be more concerned about environmental preservation to grow GC. An organization adopting a GC fosters innovation and opposes the status quo (Cherian et al. 2012). Also, a strong GC encourages workers to critically consider environmental challenges. Establishing "eco-environmental values," the basis of a specific framework for GC, may assist a company in implementing green modifications to its processes (Tahir et al. 2020). A company's green organizational culture may transform a pro-environment policy into GI (Cherian et al. 2012).

Nonetheless, businesses that deal with environmental challenges can benefit from green corporate culture (Al-Swidi et al. 2021). The capacity of an organization to absorb green waste increases its capacity to execute GIs (Nureen and Liu 2023). Those that work in green environments care more about their environment (Abbas and Dogan 2022). Previous study shows that an OGC impacts team members' attitudes and actions in a good manner toward environmental protection, which may further drive workers to preserve the environment if a business can handle environmental challenges. Consequently, workers will care about the environment more as a company's culture becomes more environmentally conscious. According to researchers, businesses must adopt green organizational culture ideals to generate eco-friendly products. This research uses GC as a dividing line across GHRM practices and sustainable organizational performance due to the significance of culture and its influence on organizational activities. It asserts that GC, which serves as the boundary condition, improves the connection between GHRM practices and SP.

Green employee behavior

Employees are expected to communicate actively with the business and their peers by mentoring them or making recommendations to assist the organization in managing its environmental impact. Employees can voice their ideas on environmental management when there is regular contact, which promotes GEB (Robertson and Barling, 2017). Workers who exhibit GEB are more likely to initiate actions to enhance the organization's sustainability, encourage coworkers to adopt environmentally friendly behaviors, and participate in the organization's environmental programs or activities, particularly when there is a combination of organizational outcomes (Paille et al. 2020) and leaders' motivated vision. Moreover, according to Amrutha and Geetha (2021), organizational and supervisor support perceptions contribute to increased commitment to GEB. Workers try to maintain the business' pro-environmental reputation and use caution while resolving environmental challenges. Researchers refer to these behaviors as "GEB" since they are behaviors that workers engage in on their own will and are strengthened by G-HRM. G-HRM emphasizes organizational efforts to develop a long-term interaction relationship with workers and generates a good green environment by including recruiting, incentives, performance management, training and development, and employee involvement (Pellegrini et al. 2018).

Sustainable performance

The greatest choice for an organization's survival in today's quickly changing environment is to have green capabilities that can achieve sustainable competitive advantage and exceptional performance (S. U. Rehman et al. 2021). Through sustainable corporate performance and cleaner practices, organizations must avoid and reduce their negative environmental effect. Corporate sustainability performance is reflected in how well environmental protection plans and procedures are implemented. Companies will take active responsibility for their obligations if environmental conservation has advantages. As a result, they will focus more on them. As a result, both environmental preservation and economic gains will coexist. As a result, it is critical to look at the connection between SP and financial performance effect (e.g., adopting sustainability initiatives, environmental protection, ecological legislation, pollution prevention technology, or waste reduction methods) (Latan et al. 2018). To achieve this, there must be a link and harmony among the many sustainable operations, good stakeholder management, and the corporate finance viewpoint. Businesses that include sustainability in their core strategy are more likely to have successful corporate sustainability outcomes. In addition, the capital structure, risk exposure, and profit margins are affected by decreased capital costs combined with increased and improved access to financial and political resources (Wang et al. 2021). Hence, the capital structure, risk exposure, and profit margins are impacted by declining

capital costs and access to more and better social, economic, and environmental resources (Wang et al. 2021). The SP of the environmental firm should eventually increase as a result. As a result, we think that an organization's SP may favor its overall performance.

Hypothesis development

Green HRM practices and green innovation

GHRM is increasingly recognized as essential for implementing green practices, improving SP, and encouraging long-term growth (Dragomir 2020). Literature has examined how and when GHRM influences SP, which may give firms a strategic advantage (Ali et al. 2019). For instance, Guerci et al. (2016) noted how GHRM influences the link between SP and stakeholder demands. Studies (e.g., Harb and Ahmed 2019) investigated the impact of GHRM on perceived SP in the manufacturing industry. GI is the desire and capacity of an industry to accept new ideas, practices, and technology and provide distinctive service offerings (Xiong et al. 2022). Literature has underlined how HRM enhances workers' competencies, knowledge, and skills, which promotes business processes and product innovation (Seeck and Diehl 2017). To create and sustain innovation, manufacturing companies must hire and promote people who actively participate in environmental initiatives (Renwick et al. 2013).

Green training and development (GTD) strategies raise staff members' environmental awareness, attitudes, skills, and knowledge (Gim et al. 2022). They also help employees become more aware of environmental challenges and green values, resolving problems that arise using green working practices (Aboramadan et al. 2022). Competing in the manufacturing sector requires crucial human capital and competencies exclusive to each firm and is difficult for other sectors to replicate (Zahra et al. 2020). Thus, through organizational employees' training and development participation activities—essential for advancing the organizational performance and GI—employees may acquire the knowledge and necessary skills to develop their creativity and invention. Employees understand the links between their behaviors and how they affect the environment. This equips workers with the skills to identify environmental concerns, take appropriate actions to mitigate them, and develop a healthy environment where they learn new things that play a significant role in product and process innovation (Zoogah, 2011).

Rekalde et al. (2017) also show that executive coaching significantly contributes to creating management training methodologies and attractive benefits and compensation for the organization's employees. According to Sanz-Valle and Jimenez-Jimenez (2018), employees who are satisfied with the organizational culture, rewards, and compensation will work effectively to achieve the organization's SP, with HRM systems directly influencing innovation performance. Employee satisfaction is also correlated to product innovation and the employee's innovative work behavior. Its effect seems to rely on the kind of innovation—a process, product, organization, or marketing—as well as its context (Belso-Martinez et al. 2018). Green HRM adoption is anticipated to contribute to environmental sustainability and improve the organization's external reputation as a good corporate citizen. Employees are more likely to adopt actions that help their firm accomplish its goals and function sustainably concerning the environment due to the improved corporate image. Additionally, implementing green HRM practices will probably help employees advance their skills and provide them with chances to add value to green inventiveness and creative thinking (Shen et al. 2018).

Employees can help their organization go green by participating in GER (GER) practice. This engagement fosters a positive workplace atmosphere where employees may express their opinions on pressing environmental concerns and provide solutions (Liebowitz, 2010). Researchers such as Boiral and Paille (2012) highlight that including workers in the execution and creation of an environmental strategy is likely to improve their capacity and knowledge to address environmental issues, ultimately assisting in product and process and managing innovation. Employee interactions also produce eco-intrapreneurs who support the business's environmental innovation (Sathasivam et al. 2021). As a result, staff members would be better equipped to handle environmental issues rationally and provide chances for the business to achieve its sustainable objectives. Employees may be persuaded to engage in task-related and voluntary green performance behaviors linked to green corporate goals through GER activities. GI for the environment and GER (GER) correlate positively (Rubel et al. 2021).

GHRM practices are directly significant to GI (Wang et al. 2021). Hence, eco-friendly performance management and compensation procedures may help employees align their behavior with business objectives (Sepahvand et al. 2022). Performance assessment and compensation are essential HRM practices that support the growth of the industry's human capital as well as innovation in products and processes and managerial innovation (Amrutha and Geetha 2021; Arshad et al. 2022). As a consequence, the following hypotheses are made. Thus, the following proposed hypotheses are:

H1a: GRS positively influences GI.
H2a: GTD positively influences GI.

H3a: GCB positively influences GI.
H4a: GER positively influences GI.
H5a: GPM positively influences GI.

Green HRM practices and GC

Organizational members are strongly concerned for the environment via their values, attitudes, and actions engaged in a GC (Roscoe et al. 2019). As a result, human resource management strategies significantly impact the adoption of contemporary sustainability practices. According to recent research, HRM plays a significant role in achieving the organization's green sustainability goals (Jabbour et al. 2013). In particular, where GHRM practices emphasize the importance of creating an employee concerning environmental issues, which can enhance their organizational culture, green practices are vital steps that support the maintenance and execution of EMs, which will help corporations achieve greater sustainability performance (Arulrajah et al. 2015b). GHRM practices are essential for effectively promoting GC. Organizational culture, GHRM practices, and sustainable development, which depend on teamwork, green compensation and benefits, and analyzing and evaluating environmental goals, can improve the SP of organizations (Jabbour et al. 2008). Adopting green practices will have tangible advantages and improve the ability to attract and retain the best talent, making GHRM practices an essential component of EMs (Patel, 2018). The following hypothesis thus investigates the beneficial connections between GHRM practices and green corporate culture.

Wagner (2013) presented quantitative results regarding the advantages of applying GHRM practices in businesses, emphasizing a favorable correlation between green hiring and selection methods and a company's GC. Moreover, by aligning green hiring and selection practices with sustainability principles, businesses can accomplish their immediate financial and long-term sustainable goals (El-Kassar and Singh 2019). Thus, we hypothesized that the HR division must encourage employees to be environmentally conscious and engage in pro-environmental behaviors through internal training and development programs. HR can lead by institutionalizing "green functions" that motivate staff to support environmental causes. For instance, employees' values, beliefs, and behaviors are shaped by green hiring, rewards, performance management, and training and development. Moreover, these environmentally friendly HR policies encourage staff members to engage in the environmental causes that the firm supports (Pellegrini et al. 2018). When organizational members assist one another in their sustainability programs and advance GC at work, GC will likely change over time.

Eco-conscious practices like GHRM are connected to employee competence and engagement, which may help improve green organizational culture and SP (Turban and Greening, 1997). A competent workforce devoted to environmental concerns will undoubtedly be hired if employers provide competitive pay and benefits and recruit workers interested in environmental development. Similarly, encouraging employee participation and dedication in environmental initiatives and providing green training, moral appreciation, and attractive compensation to enhance their satisfaction level may improve workers' knowledge and abilities and growing organizations' SP (Longoni et al. 2018). This research thus implies that a previous study has shown a positive relationship between green employees' culture and employee relations (Roscoe et al. 2019), demonstrating that companies with greater employee interactions may create better GCs (Pellegrini et al. 2018). Indubitably, it all comes down to how the firm manages its employees and how its executives foster a GC. The HR department is essential in this regard (Roscoe et al. 2019), as it performs a vital function in coordinating company ideology with employee beliefs and actions. Therefore, this study suggests that according to Srinivasan and Kurey (2014), GPM is essential to creating leadership attention, message credibility and performance evaluation, peer participation, employee empowerment and remuneration, and organizational culture transformation. GPM, for instance, encourages leaders to demonstrate excellent environmental management habits that often spread to the employees. Making the environment a priority, leaders establish environmental goals for each department and its employees to foster a GC (Roscoe et al. 2019). GC is more likely to be promoted when environmental messages are relevant, practical, attractive, and delivered by a credible authority who can be trusted (Srinivasan and Kurey, 2014). Peer participation is centered on cooperation, and firms may use workers' pride in one another to motivate staff to work together on environmental projects and promote a GC. GPM, which starts with green recruiting and continues via green rewards, performance management, and training, essentially brings individuals with similar environmental interests together. It would seem obvious that GPM is the foundation for the growth of GC. Accordingly, we hypothesize that:

H1b: GRS positively influences the GC of firms in China.
H2b: GTD positively influences GC of firms in China.
H3b: GCB positively influences GC of firms in China.
H4b: GEB positively influences the GC of firms in China.
H5b: GPM positively influences GC.

Green HRM practices and GEB

G-HRM has been correlated favorably to SP in previous research (Muisyo and Qin, 2021), and businesses with greater G-HRM levels outperformed their competitors (Ren

et al. 2018). Another research by Anwar et al. (2020) and Chaudhary (2019) revealed a strong correlation between G-HRM and proactively adopted green practices. Companies use G-HRM to promote an environmental protection attitude, reaffirm the organization's environmental protection aim, and motivate workers to help achieve that goal by providing the right incentives (Jackson et al. 2011b). Hence, G-HRM opens the door for a long-term investment view on human capital to encourage desired behaviors, highly appreciate workers' contributions, and increase employees' career growth (Robertson and Barling, 2017). Organizations encourage ongoing employee feedback on their product to optimize the (ROI) of their workers (Jabbour et al. 2013). Undoubtedly, businesses use a variety of strategies to promote G-HRM. Green hiring, compensation and benefits, performance management, training and development, and employee relations are all relevant to this study. Encouraging green employee behaviors requires carefully selecting environmentally conscious personnel and pro-environmental incentives, performance management, and training (Pham et al. 2019b). Employees must actively communicate with the organization and their peers by mentoring them or making recommendations to enhance the company's long-term performance. Frequent contact among staff members allows them to express their views on environmental management, fostering GEB (Robertson and Barling, 2017). Particularly in the context of supervisory support and leaders' motivational vision, staff members who exhibit GEB are more likely to make efforts to enhance the organization's SP, encourage coworkers to adopt environmentally friendly behaviors, and participate in programs or activities connected to the environment (Paille et al. 2020).

Moreover, according to Amrutha and Geetha (2021), organizational and supervisor support perceptions contribute to increased commitment to GEB. Employees try to maintain the business' pro-environmental reputation and use caution while resolving environmental challenges. Researchers refer to these behaviors as "GEB" because they occur when employees engage in cooperative behaviors on their initiative due to G-HRM. In essence, G-HRM emphasizes organizational efforts to develop a long-term relationship of exchange with workers and generates a good green environment by including recruiting, incentives, performance management, and training (Pellegrini et al. 2018).

Regarding green hiring, the focus is on promoting the company's green image to attract professionals who care about the environment. Previous research suggests that a company's green image attracts leading applicants devoted to the business's environmental management (e.g., Guerci et al. 2015; Shah 2019). Employing new hires who display good green behaviors using green selection process may eventually convert to GEB (Saeed et al. 2021). Therefore, employers must check job candidates for the desired environmental competencies related to organizational efforts toward SP (Wehrmeyer 2017). By nature, such screening assures that new green hires eventually help the firm achieve its sustainable objectives (Saeed et al. 2021). The recruiter must be trained in candidate environmental assessment to match candidates who are knowledgeable and committed to environmental management practices with green selection criteria to ensure such initiatives' success (Pinzone et al. 2019).

Green training also "gives staff the requisite information about a company's environmental policy, its procedures, and appropriate attitudes". Renwick et al. (2013) prioritize GTD as the most effective G-HRM practice for fostering superior GEB, in line with the AMO theory. GTD seems to improve employees' green aptitudes and behavior and encourages them to look for chances to take part in environmental management initiatives. Their ability to effectively fulfill their environmental obligations to implement green objectives is ultimately made possible by their awareness, knowledge, skills, commitments, attitudes, and partnerships at the individual and organizational levels (Nisaret al. 2021).

Similarly, green benefits and compensation are defined as "the implementation of a system of financial and nonfinancial compensation for employees with a distinct potential to contribute to environmental management," which may help to grow GEB. Organizations have used additional leave, prize money, and promotions to encourage people and teams to perform well in environmental protection and acquire environmental protection skills (Stanwick and Stanwick 2001). Both monetary and non-monetary remuneration are effective methods for inspiring people to perform at their highest level. To advance GEB, compensation and benefits combine organizational goals with employee interests (Jackson et al. 2011b).

Moreover, enhancing commitment and promoting GEB via internal career advancement that aligns with workers' green interests are achieved through GER (Cop et al. 2020). So far, enterprises must use various G-HRM tools for effective GEB. According to the interdependent concept of the AMO theory, G-HRM techniques support one another for the best outcomes (Fawehinmiet al. 2020). For instance, although green hiring and green training improve workers' skills, GER is essential for receiving constructive criticism and determining future green training requirements. In other words, green hiring guarantees that workers are prepared for training, while GER ensures proper green training. Appropriate GER is required to attract green talent and inspire staff to demonstrate GEB by participating in green projects (Ren et al. 2018). Workers that stand to gain from the commitment are psychologically more likely to exhibit GEB. GPM, which is concerned with "the appraisal and registration of employees' environmental performance throughout their careers in

a company and provides them with feedback about their performance to prevent undesirable attitudes or reinforce exemplary behavior," also contributes to GEB. Organizations must include environmental management contributions among the evaluation criteria to evaluate performance management effectively. Employees could be eager to take on more responsibility, becoming more devoted to the company and wanting to remain, which, in turn, encourages GEB as an area of performance management that might boost prospects for advancement.

H1c: GRS positively influences GEB of firms in China.
H2c: GTD positively influences GEB of firms in China.
H3c: GCB positively influences GEB of firms in China.
H4c: Green employees' relations positively influence GEB of firms in China.
H5c: GPM positively influences GEB of firms in China.

Green innovation and sustainable performance

We categorize GI in three parts: GPDI stands for green product innovation, GPOI stands for green process innovation, and GMI stands for green managerial innovation. Compared to similar goods on the market, GPDI strives to lessen its adverse effects on the environment. The application of environmentally friendly technology in manufacturing processes to create products and services with minimum adverse influence on the environment is known as "GI," and the management of the organization develops a mechanism that protects the informant, known as managerial innovation. Changing marketplaces helps organizations reduce costs and become more competitive (Dangelico et al. 2017). Businesses that support GI always prefer recycled materials because they are economical and environmentally beneficial.

By distinguishing goods in a market, we claim that GI relies on green dynamic skills and increases enterprises' chances of entering certain marketplaces where consumers are environmentally sensitive (Dangelico et al. 2017). However, we point out that prior research on the relationships between GI and company success has produced mixed findings. GI companies have not experienced improved financial success compared to non-green businesses (Driessen et al. 2013). Since GI costs more for firms, on the other hand, we contend that developing green products and processes positively correlates with a competitive advantage and strongly predicts SP (El-Kassar and Singh 2019).

Additionally, businesses' environmental actions related to their products and processes positively impact SP. We also highlight that when environmental sustainability concerns and product development are combined, they forecast new markets, higher sales, a higher return on investment, and a competitive edge (Dangelico and Pujari 2010). GI can improve a company's market and sustainability performance. Investments in GI impact a company's sustainability because they may improve customer satisfaction, increase sales, boost productivity, and increase a company's return on investment (Lin et al. 2014). Due to its ability to assist businesses in expanding into new markets, introducing new goods, and launching innovative and profitable green products, GI may also help businesses perform better in the market (Aguilera-Caracuel and Ortiz-de-Mandojana, 2013). Due to its ability to assist businesses in expanding into new markets, introducing new goods, and launching innovative and profitable green products, GI may also help organizations perform better in the market (Aguilera-Caracuel and Ortiz-de-Mandojana 2013). Therefore, we hypothesize that:

H6: GI is positively influencing the SP of firms in China.

Green culture and sustainable performance

Past studies have shown that OGC can transform organizations' current paradigms of thought and that members play a significant role as change agents in this approach (Rao and Holt, 2005). According to Fergusson and Langford (2006), organizations are likelier to implement a GC strategy if their human resources prioritize environmental preservation and demonstrate care. Formal OGC may facilitate the operational integration of various environmentally friendly goods inside a company based on eco-environmental principles (Banerjee et al. 2003). As a result, OGC may be a valuable tool for businesses as they work to implement environmentally conscious initiatives that result in SP (Schlegelmilch et al. 1996). The managerial challenge for manufacturing companies under environmental pressure is balancing two competing goals: choosing the best level of SP even though it might result in lower profits and achieving the lowest level of sustainability possible to maximize profits (Russo and Fouts, 1997). When companies without a GC have limited resources to devote to their green strategy, top management may divert those resources from environmental standards and instead use them for other important organizational needs.

Nonetheless, such resources are required to support environmental action. This encourages a manufacturing company to choose the second goal. On the other hand, OGC may be a major factor in developing SP when enterprises with OGC are under pressure from ecological sustainability to produce and evaluate green performance. The best alternative may be the primary goal for the highest degree of sustained performance. Hence, it is assumed that:

H7: GC is positively influencing the SP of firms in China.

Green employee behavior and sustainable performance

Our results demonstrate that personal green values positively affect individuals' green behavior and SP because employees' green conduct is naturally prosocial (Chou, 2014). Employee commitment to attaining corporate objectives will increase if green practices are consistent with organizational values. From a practical standpoint, if a person exhibits green behavior at work, this behavior probably includes in- and out-of-role activity (Cheema et al. 2020). According to Ramus and Killmer (2007), an organization's results may benefit from its employees' additional effort and behavior. Employees passionate about the environment work harder to protect it and eventually improve the organization's sustainability, which benefits individual and organizational performance. When employees rate their green beliefs highly, this link will become much stronger. As a result, we suggest the following:

H8: GEB positively influences the SP of firms in China.

Figure 1 shows the proposed research model of this study.

Research methodology

Data and sampling

The manufacturing firms carrying out their operations in China are considered the population of the proposed study. As estimating the total population is not an easy task, previous literature has been relied upon and used G Power software and recommended for calculation of sample size that works on predictors and other outcome variables without having any knowledge about the population of study under consideration. The software determined a sample of 316 respondents; however, for methodological precision, robust results, and overcoming the non-response rate and outliers in the data, the study distributed the questionnaire to 10% additional (31) total of 347 respondents. So, 400 survey questioners were distributed, and we received 352 responses and 316 responses considered for data analysis according to software determine the sample size, late and inaccurate or incomplete responses not considered. After calculating the sample size, the questionnaire is developed based on the previous literature (see Table 1 for detail) for the data collection.

Research approach and instrument development

The proposed quantitative study involves collecting primary data through a self-administered questionnaire from manufacturing firms in China (Table 2). To collect relevant data, a 5-point Likert scale will be used to record the responses of individuals ranging from 1 = strongly disagree to 5 = strongly agree. Table 1 shows the dimensions and items of the questionnaire.

Reliability and convergent validity

Smart PLS (Ali Memon et al. 2021) has gained popularity for its advanced estimations, leading recent research to utilize PLS-SEM for data analysis (Rasoolimanesh et al. 2018). The study endeavored to forecast and explain the constructs; thus, PLS is deemed more suitable for examination,

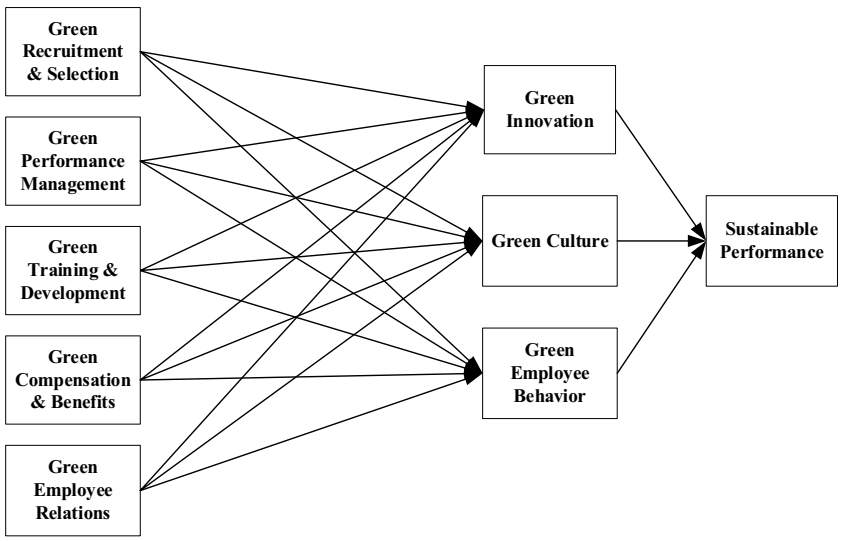

Fig. 1 Conceptual framework of the study

Table 1 Questionnaire items of the study

S. no.	Construct	Dimensions	Items	Sources
1.	Green HRM practices	Green recruitment and selection	05	(Shah, 2019; Tang et al. 2018; Yong, Yusliza, Ramayah, Chiappetta Jabbour, et al. 2019)
		Green training and development	05	
		Green compensation and benefits	05	
		Green performance management	05	
		Green employee relations	05	
2.	Green innovation	Managerial, product and process	07	(El-kassar and Kumar, 2018)
3.	Green culture		06	(Pham et al. 2019; Roscoe et al. 2019)
4.	Green employees behavior		06	(Mcconnaughy, 2014)
5.	Sustainable performance	Social, environmental, and economic	07	(Tom, 2015; Yong, Yusliza, Ramayah, Chiappetta Jabbour, et al. 2019)

Table 2 Demographic profile

Respondents' profile	Categories	Percentages
Gender	Male	68.05%
	Female	31.95%
Age	25–30	6.05%
	30–35	16.05%
	35–40	26.05%
	40–45	24.05%
	Above 50	28.0%
Experience	Below 3 years	6.05%
	5–10 years	11.05%
	10–15 years	14.05%
	15–20 years	19.05%
	Above 20 years	49.75%
Qualification	Bachelor	30.05%
	Master	64.05%
	PhD	5.90%
Position	Top level	48.5%
	Middle level	24.5%
	Line manager	18.5%
	Entry level	9.85%

as validated by (J. F. Hair et al. 2020). The (PLS-SEM) is a valuable instrument for analyzing and implementing the structural model to clarify and evaluate the constructs. Furthermore, the adaptable instrument is employed for constructing models in cases where the investigation encompasses numerous theories. As mentioned above, the tool is utilized to obtain specific results while mitigating the concerns surrounding sample size and data normality. The research employed a two-stage technique to analyze the outcomes, as suggested by the PLS-SEM literature (Anderson et al. 1988; Henseler et al. 2009; Siyal et al. 2019; Yap et al. 2012). In the initial stage of the PLS-SEM methodology, the measurement aspect was scrutinized to assess inter-item reliability, convergent validity, and internal consistency reliability. Subsequently, the structural model was analyzed in the subsequent stage to verify the hypotheses (Henseler et al. 2009).

Measurement model

Primary data is collected from 316 respondents from the manufacturing sector, one respondent from each firm, using an online questionnaire from the study participants and analyzed using PLS-SEM; however, the measurement model is assessed before PLS-SEM. Factor loadings determine whether the items used to measure the constructs exactly measure the same construct or not. Factor loadings usually range from 0.50 to 0.9; however, the value of factor loadings of items greater than 0.70 ensure the validity of the construct. Figure 2 and Table 3 showed factor loadings of items for each construct of the model. The results showed that the value of factors ranges from 0.57 to 0.81. The results showed that the factor loading for each item is greater than 0.50, and those items which factor loading less than 0.5 are related to an increase in the model's validity. Thus, the results demonstrated that the items used to measure the construct are measuring the same construct, which ensures the validity of the construct. In addition, Table 4 reported the Cronbach alpha, composite reliability, and average variance extraction (AVE) results. The results of Cronbach alpha and composite reliability ensured the reliability of the data as the values for all model constructs are in the acceptable range (> 0.70). In the same way, the AVE for each construct of the model is greater than the cutoff value of 0.50.

The Fornell-Lacker criterion is used to check the discriminant validity of the measurement model. According to this criterion, the square root of AVE reported in each column's first cell should be greater than the correlation between variables. It can be observed from Table 4 that the square root of AVE of GC is 0.759, which is greater than the other values in the same column. In the same way, the first value for each construct of the model is greater than the other values in the

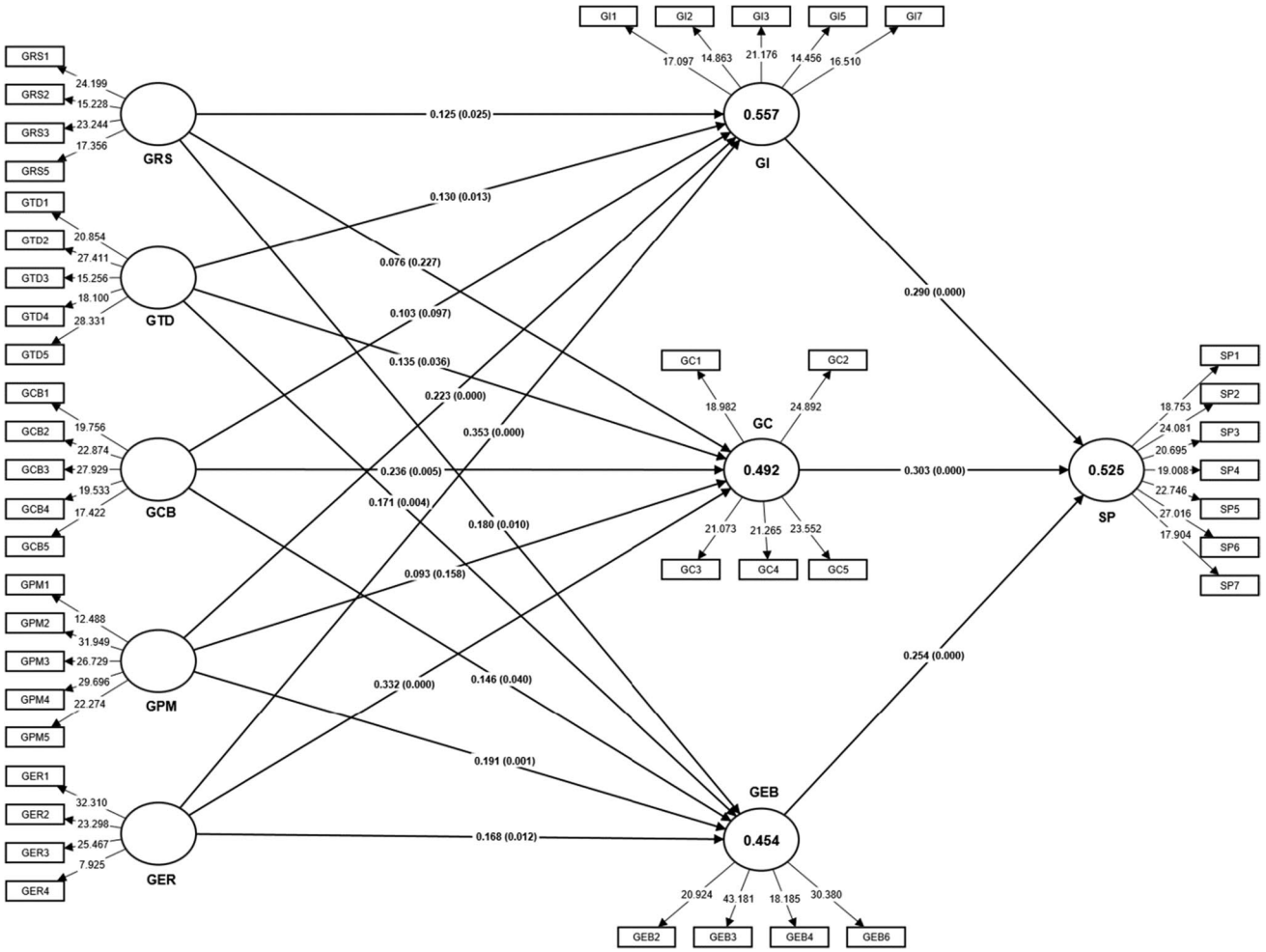

Fig. 2 Hypothesized model

same column. The results of Table 4 confirmed the discriminant validity of the measurement model of this study. In addition, the heterotrait-monotrait ratio also confirmed the discriminant validity (Table 5).

Results of bootstrapping model

In this study, PLS-SEM is employed to achieve the study's objectives. Table 6 presented the results of path coefficients, and Fig. 2 presented the values of *T*-statistics of path coefficients, demonstrating the strength and significance of the relationship between study variables. The results showed that G-HRM practices (GRS, GPM, GTD, GCB, and GER) are positively affected by GI, GC, and green employee behavior, while GI, GC, and GEB are also positively and significantly affected by SP.

We have also computed the specific indirect effects. The results reported in Table 7 represent that all the green HRM practices indirectly affect SP through GI, GC, and green employee behavior, except for GPM -> GC -> SP, GCB -> GEB -> SP, GRS -> GC -> SP, and GCB -> GI -> SP.

The value of *R*-square showed that 49.2% of variations in GC, 45.4% in green employee behavior, and 55.7% in GI are explained by GRS, GPM, GTD, GCB, and green employee behavior. Moreover, 52.5% of the employees' SP variations are explained by GRS, GPM, GTD, GCB, and green employee behavior (Table 8).

Discussion on results

G-HRM has emerged as a key strategy for organizations that aim to integrate environmental sustainability into their operations. G-HRM practices refer to a set of HRM practices that focus on the environmental impact of an organization's activities and aim to minimize the negative impact while enhancing sustainability. Consulting the previous, we included G-HRM practices such as GRS, GPM, green

Table 3 Factor loadings

	Item	Factor loading	Cronbach's alpha	Composite reliability	AVE
Green recruitment and selection	GRS1	0.757	0.720	0.725	0.542
	GRS2	0.692			
	GRS3	0.756			
	GRS5	0.736			
Green training and development	GTD1	0.737	0.802	0.807	0.556
	GTD2	0.781			
	GTD3	0.727			
	GTD4	0.710			
	GTD5	0.773			
Green compensation and benefits	GCB2	0.765	0.825	0.829	0.588
	GCB3	0.796			
	GCB4	0.748			
	GCB5	0.769			
Green performance management	GPM1	0.690	0.823	0.825	0.587
	GPM2	0.794			
	GPM3	0.782			
	GPM4	0.808			
	GPM5	0.751			
Green employees relations	GER1	0.818	0.823	0.769	0.573
	GER2	0.813			
	GER3	0.793			
	GER4	0.579			
Green innovation	GI1	0.704	0.751	0.755	0.500
	GI2	0.684			
	GI3	0.739			
	GI5	0.692			
	GI7	0.717			
Green culture	GC1	0.722	0.815	0.816	0.576
	GC2	0.808			
	GC3	0.754			
	GC4	0.765			
	GC5	0.742			
Green employee behavior	GEB2	0.762	0.812	0.827	0.640
	GEB3	0.863			
	GEB4	0.770			
	GFB6	0.801			
Sustainable performance	SP1	0.747	0.875	0.876	0.572
	SP2	0.745			
	SP3	0.749			
	SP4	0.751			
	SP5	0.783			
	SP6	0.813			
	SP7	0.703			

training and development, green compensation and benefits, and GER in our study. The results reported a positive relationship between green HRM practices and GI. We argue that organizations adopting G-HRM practices are more likely to engage in GI activities. The results align with the Zeng and Zhao (2021) study, which found that green HRM practices positively influence GI by enhancing employee environmental awareness, knowledge, and skills.

Similarly, Saeed et al. (2021) found that green HRM practices positively influence GI by fostering a culture of

Table 4 Discriminant validity—Fornell-Lacker criteria

	GC	GCB	GEB	GER	GI	GPM	GRS	GTD	SP
GC	0.759								
GCB	0.588	0.767							
GEB	0.528	0.546	0.800						
GER	0.604	0.539	0.504	0.757					
GI	0.610	0.574	0.646	0.643	0.707				
GPM	0.544	0.661	0.564	0.553	0.620	0.766			
GRS	0.437	0.485	0.504	0.385	0.494	0.506	0.736		
GTD	0.518	0.561	0.534	0.483	0.547	0.543	0.536	0.746	
SP	0.615	0.593	0.602	0.553	0.640	0.588	0.369	0.481	0.756

Table 5 Discriminant validity (HTMT)

	GC	GCB	GEB	GER	GI	GPM	GRS	GTD	SP
GC									
GCB	0.709								
GEB	0.638	0.655							
GER	0.770	0.683	0.635						
GI	0.777	0.720	0.829	0.846					
GPM	0.659	0.801	0.680	0.705	0.781				
GRS	0.550	0.617	0.652	0.508	0.662	0.640			
GTD	0.628	0.671	0.641	0.611	0.685	0.654	0.688		
SP	0.722	0.695	0.701	0.679	0.779	0.692	0.459	0.563	

Table 6 Path analysis

Path	Coefficient	STDEV	*T*-statistics	*P* values
GCB -> GC	0.236	0.084	2.794	0.005
GCB -> GEB	0.146	0.071	2.057	0.040
GCB -> GI	0.103	0.062	1.662	0.097
GER -> GC	0.332	0.059	5.624	0.000
GER -> GEB	0.168	0.067	2.499	0.012
GER -> GI	0.353	0.056	6.334	0.000
GPM -> GC	0.093	0.066	1.413	0.158
GPM -> GEB	0.191	0.058	3.267	0.001
GPM -> GI	0.223	0.062	3.617	0.000
GRS -> GC	0.076	0.063	1.207	0.227
GRS -> GEB	0.180	0.070	2.581	0.010
GRS -> GI	0.125	0.056	2.245	0.025
GTD -> GC	0.135	0.064	2.099	0.036
GTD -> GEB	0.171	0.059	2.907	0.004
GTD -> GI	0.130	0.052	2.485	0.013
GC -> SP	0.303	0.065	4.665	0.000
GEB -> SP	0.254	0.057	4.432	0.000
GI -> SP	0.290	0.074	3.916	0.000

Table 7 Specific indirect effects

Path	Coefficient	STDEV	*T*-statistics	*P* values
GPM -> GC -> SP	0.028	0.022	1.276	0.202
GER -> GEB -> SP	0.043	0.020	2.136	0.033
GTD -> GEB -> SP	0.043	0.017	2.514	0.012
GCB -> GC -> SP	0.072	0.035	2.037	0.042
GER -> GC -> SP	0.101	0.026	3.811	0.000
GTD -> GI -> SP	0.038	0.018	2.079	0.038
GRS -> GI -> SP	0.036	0.017	2.130	0.033
GCB -> GEB -> SP	0.037	0.022	1.666	0.096
GRS -> GEB -> SP	0.046	0.020	2.289	0.022
GER -> GI -> SP	0.103	0.030	3.375	0.001
GRS -> GC -> SP	0.023	0.018	1.248	0.212
GTD -> GC -> SP	0.041	0.020	2.023	0.043
GCB -> GI -> SP	0.030	0.022	1.345	0.179
GPM -> GEB -> SP	0.048	0.019	2.501	0.012
GPM -> GI -> SP	0.065	0.025	2.539	0.011

Table 8 *R*-square

Constructs	*R*-square	*R*-square adjusted
GC	0.492	0.484
GEB	0.454	0.445
GI	0.557	0.550
SP	0.525	0.520

sustainability and encouraging employees to participate in GI initiatives. Therefore, we argue that G-HRM practices enhance an organization's environmental performance by reducing its impact. For example, GRS can help

organizations identify and hire environmentally conscious employees with the skills and knowledge needed to contribute to GI. Green training and development practices can help employees develop the skills and knowledge to identify and implement environmentally sustainable practices and technologies. In addition, green compensation and benefit practices can motivate employees to engage in GI activities by rewarding environmentally sustainable behaviors and practices. GER practices, as providing a safe and healthy work environment and encouraging employee participation in sustainability initiatives, can also enhance the motivation and engagement of employees in GI activities.

On the other hand, GC is a set of beliefs, values, and practices that promote environmental sustainability within an organization. The results of our study suggest that there is a positive relationship between G-HRM practices and GC. G-HRM practices can also enhance an organization's environmental performance by reducing its impact. GRS can help organizations identify and hire environmentally conscious employees with the skills and knowledge needed to contribute to a GC. Green training and development practices can help employees develop the skills and knowledge to identify and implement environmentally sustainable practices and technologies. In addition, green compensation and benefit practices can motivate employees to engage in environmentally sustainable behaviors by rewarding environmentally sustainable behaviors and practices. GER practices, such as providing a safe and healthy work environment and encouraging employee participation in sustainability initiatives, can also enhance the motivation and engagement of employees in environmental sustainability. Our results confirm the findings of previous studies that have found that organizations that adopt green HRM practices are more likely to foster a GC within their organization, such as a study by Saeed et al. (2021) found that green HRM practices positively influence GC by creating a sense of environmental responsibility and promoting environmental awareness among employees. Aziz et al. (2020) argued that green HRM practices positively influence GC by promoting employee participation in environmental sustainability initiatives and providing opportunities for employees to learn about environmental sustainability.

Furthermore, results pointed out that G-HRM practices have a positive relationship with green employee behavior, meaning that organizations that adopt green HRM practices are likelier to have employees who engage in environmentally sustainable behaviors. The results align with a study by Jiang et al. (2019) in which green HRM practices positively influence employee environmental behavior by increasing their environmental awareness and promoting their sense of responsibility toward the environment. G-HRM practices positively influence employee pro-environmental behavior by providing opportunities for employees to participate in environmental sustainability initiatives and creating a supportive work environment that encourages environmentally sustainable behaviors (Saeed et al. 2021). G-HRM practices positively influence GC by promoting employee participation in environmental sustainability initiatives and providing opportunities for employees to learn about environmental sustainability (Aziz et al. 2020). For example, green compensation and benefit practices can reward employees for engaging in environmentally sustainable behaviors, motivating them to continue these behaviors. Green training and development practices can give employees the knowledge and skills to engage in environmentally sustainable behaviors, enhancing their motivation.

Similarly, we found a positive relationship between GI and SP, meaning that organizations that engage in GI are more likely to achieve SP. GI positively influences SP by reducing the environmental impact of an organization's products and services, improving the organization's reputation for environmental sustainability, and enhancing the organization's competitiveness in the market (Zhu et al. 2020). We also argue that GI positively influences SP by reducing resource consumption and waste generation, increasing energy efficiency, and reducing environmental pollution. GI can also contribute to SP by reducing costs and improving resource efficiency, for example, green technologies can reduce energy and resource consumption, saving costs, and improving efficiency. Green products and services can also improve resource efficiency and reduce waste, contributing to SP (Aziz et al. 2020).

The results also revealed a positive relationship between GC and SP, meaning that organizations that promote a culture of environmental sustainability are more likely to achieve SP. Several studies have examined the relationship between GC and SP. Organizational culture significantly impacts adopting environmentally sustainable practices, positively influencing SP (Berrone et al. 2013). Our results support the claim of Rahman et al. (2019), who argued that GC positively influences SP by promoting environmentally sustainable practices and creating a supportive work environment that encourages environmentally sustainable behaviors. GC can also contribute to SP by improving employee engagement and motivation toward environmental sustainability. Employees who feel that their organization values environmental sustainability and promotes environmentally sustainable practices are likelier to engage in such practices. This can improve environmental performance and contribute to the organization's overall success.

Finally, we have identified a positive relationship between GEB and SP, meaning that organizations with employees who engage in environmentally sustainable behaviors are more likely to achieve SP. Several studies have examined the relationship between GEB and SP. Our results support the claims of Ren et al. (2019) and Wu et al. (2020), who argued

that GEB positively influences SP by reducing resource consumption and waste generation, improving environmental performance, and enhancing the organization's reputation for environmental sustainability. GEB can also contribute to SP by improving resource efficiency and reducing waste. Employees engaging in environmentally sustainable practices, such as reducing energy and resource consumption, can save costs and improve efficiency. This can contribute to SP by reducing the organization's environmental impact while improving its financial performance.

Conclusion

Our investigation concluded after examining the connections between G-HRM practices, GI, GC, GEB, and sustainable performance (SP). According to the study's findings, implementing G-HRM practices can significantly impact encouraging green innovation, green culture, green employee behavior, and ultimately sustainable performance. The findings highlight how important it is for firms to cultivate a culture of environmental responsibility and include environmental sustainability in their HRM processes. Moreover, investing in environmentally friendly innovation and encouraging environmentally responsible conduct in the workplace can further boost sustainable performance. As a result, the research will verify the accuracy of the recently created green HRM scales by Shah (2019) in Pakistan and Tang et al. (2018) in Chinese. An integrated model is being created to demonstrate the relationship between green HRM and SP in Chinese enterprises. This research aims to significantly contribute in two ways: first, it will identify green practices within the human resource management division. Second, exploratory research will be conducted in Chinese companies to show the connections between green HRM practices and several elements essential to manufacturing organizations' long-term success in China. HRM significantly influences sustainable companies' economic, social, and environmental performance. This study will serve as a foundation for future research to assist managers and practitioners in comprehending and implementing green HRM and green initiatives for fostering sustainability.

Theoretical and managerial implications

Our research advances theoretical knowledge of the connections between G-HRM, GI, GC, GEB, and SP. It shows the significance of incorporating environmental sustainability into HRM procedures and a green culture's contribution to fostering environmentally friendly behavior. Our findings also have managerial ramifications for businesses. To enhance sustainable performance, managers should incorporate environmental sustainability into HRM procedures, foster a culture of environmental governance, and promote green innovation. These procedures can achieve long-term success, improving worker motivation, engagement, and overall environmental performance.

The void in the body of knowledge about the association between G-HRM, GI, and SP, particularly in emerging and developing nations, is filled by this study. It proposes an integrated model that illustrates the relationship between G-HRM and SP in Chinese firms and validates the most recent green HRM scales. The study's results provide information for future research and practical applications while also advancing our understanding of green practices in the HRM sector. These insights can help managers and practitioners understand and execute green HRM strategies and initiatives, promoting sustainability in their firms.

Limitation and future research agenda

This research has several limitations. Operational employees, who would have useful information to share with the researcher, were not considered in this study, primarily concerned with middle and top management data. Future research must consider these to acquire a deeper understanding of the subject. Due to managers being required to operationalize the research tool, information was obtained based on what they believed their companies were doing, which might have resulted in bias. Biases cannot be completely removed, despite the author's best efforts. Future researchers should thus include information from many sources, such as yearly financial reports. Moreover, extending the study's geographic reach to additional countries might confirm the analyzed model. Also, it is advised to include other factors into the test of the key constructions, GHRM and SP, such as alignment of interest, capacity building, carbon neutrality, employee work engagement, personal ethical code, and sustainable development.

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Data availability The raw used for analysis purpose will be provided on demand by contacting the corresponding author.

Declarations

Ethical approval Not applicable.

Consent to participate I am free to contact any research people to seek further clarification and information.

Consent for publication We do not have any concern and obligation if our paper is accepted for publication after the peer review process.

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