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Impact of green human resources management on green competitive advantage for SMEs; Mediating role of green innovation and moderating role of green knowledge sharing

Impacto de la gestión de recursos humanos verdes en la ventaja competitiva verde para las pymes; rol mediador de la innovación verde y rol moderador del intercambio de conocimientos verdes

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Abstract

This study examines the impact of green HRM on green competitive advantage, the mediating role of green innovation, and the moderating role of green knowledge sharing in SMEs in developing countries. The conceptual model was developed based on two related theories: resource-based view and ability motivation theories. The data was collected through a time-lag longitudinal online survey of small and medium-sized businesses (SMEs). Two hundred twenty-three professionals contributed data based on their perspectives in this study. The findings of this study confirmed a partial mediation effect of green innovation between green HRM practice and green competitive advantages. Furthermore, the present study's analysis also suggested that a moderating role of green knowledge sharing is positive and significant for green HRM and competitive advantage. This study developed a new model with the help of two related theories: the resource-based view and ability motivation theories. Also, a new insight would be helpful to SMEs of top management for developing and implementing key strategies related to studies in the future.

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Resumen

Este estudio examina el impacto de la gestión de recursos humanos verdes en la ventaja competitiva verde, el rol mediador de la innovación verde y el rol moderador del intercambio de conocimientos verdes en las pymes de países en desarrollo. El modelo conceptual fue desarrollado con base en dos teorías relacionadas: la visión basada en recursos y las teorías de la motivación por habilidades. Los datos fueron recolectados a través de una encuesta longitudinal en línea con desfase temporal en pequeñas y medianas empresas (pymes). Doscientos veintitrés profesionales contribuyeron con datos basados en sus perspectivas en este estudio. Los hallazgos de este estudio confirmaron un efecto mediador parcial de la innovación verde entre la práctica de la gestión de recursos humanos verdes y las ventajas competitivas verdes. Además, el análisis del presente estudio también sugirió que el rol moderador del intercambio de conocimientos verdes es positivo y significativo para la gestión de recursos humanos verdes y la ventaja competitiva. Este estudio desarrolló un nuevo modelo con la ayuda de dos teorías relacionadas: la visión basada en recursos y las teorías de la motivación por habilidades. Además, un nuevo enfoque sería útil para las pymes de la alta dirección para desarrollar e implementar estrategias clave relacionadas con estudios en el futuro.

Código JEL: O15, O10, O19
Palabras clave: prácticas de gestión de recursos humanos verdes; intercambio de conocimientos verdes; innovación verde; ventaja competitiva verde; teoría de la habilidad-motivación-habilidad; visión basada en recursos

Introduction

The Sustainable Development Goals are global in scope and all-encompassing, taking into account various nations' actual impact of green issues on businesses is more obvious and noticeable (D. et al. et al., 2016). Naturally, horrifying cases, such as air or water pollution and atomic power mishaps, have reignited concerns about the negative consequences of industrialization. Strategic Human Resource Management (HRM) can assist an organization in meeting its corporate social responsibility goals (Paulet et al., 2021). This function's growth led to related business initiatives and studies known as Green HRM practices. This terminology was developed after management recognized that inefficient resource utilization by human resources was contributing to the organization's environmental impact (S. Hart, 1995).

Green human resource management practices comprise green recruiting, selection, training and development, performance management, employee involvement, and pay and rewards (Tang et al., 2017). Increased management involvement leads to increased corporate profitability and employee needs satisfaction at work (Gollan, 2005). This behavior opens the door to opportunities like the behavior linked with green knowledge sharing (Bhatti et al., 2021; Rubel et al., 2020). The critical question about how GHRM impacted green competitive advantage in SME sectors is unexplored. Therefore, literature

regarding how these Green HRM practices affect green innovation is silent. Significantly knowledgeable labor in the form of green knowledge sharing has already significantly impacted the organization. As a result, this study used a quantitative approach to generate new literature while emphasizing the novelty of green knowledge sharing in this relationship. The significance of green growth in lowering carbon dioxide (CO2) emissions has been theoretically and empirically investigated in previous literature, especially when green knowledge sharing is a critical factor in a sustainable environment (Hao et al., 2021).

The study done so far on Green Innovation has come to mixed conclusions. The authors of some studies say that companies should use green growth methods even if they do not make more money (Rao & Holt, 2005). On the other hand, some researchers are against this kind of integration because they think it could negatively affect performance because of the costs and time it takes (Das et al., 2006). Inconsistencies like these have made experts want to learn more about the link between a company's green creation and how it affects its success (McLean, 2005). The link between GIC and a company's ability to compete is a worldwide issue since green innovation has been found to offer a possible way to gain an edge over competitors (De Marchi, 2012). Customers who care about the environment will like it and increase the company's value as a whole (Lau & Ngo, 2004).

The resource-based view focuses on how organizations use their resources to address external environmental stimuli and gain competitive advantage, which are difficult for their competitors to copy (Barney, 1991; Hart, 1995). By leveraging the resource-based view, HRM officials develop capacities and abilities and motivate their human capital to gain a competitive advantage. According to this study, organizations should produce greenness and advanced features to gain a competitive advantage in environmentally friendly products. There is a gap in the literature regarding how green innovation provides organizations with the capabilities to gain a competitive advantage. This study fills the knowledge gap while shedding light on its role as a mediator in green innovation. Specifically, this study addresses the following research questions:

1. What is the relationship landscape between green human resource management practices, green innovation, green knowledge sharing, and green competitive advantage?
2. Does green innovation mediate between GHRM and green competitive advantage?
3. Does green knowledge sharing moderate the relationship between Green HRM practices and green innovation?

The variables' background and hypotheses statements will be expanded on in the following section. In addition, the methodology section will identify the sampling approaches used to collect data from SMEs. The validity and reliability of the results and analysis will then be determined using various software packages. After all, the discussion section will explain the study's contributions and determine future research directions.

Literature review

Theoretical framework

Resource-based view

The resource-based view offers a conceptual framework to evaluate the strategic suitability of Chinese resources within the framework of the developing world. There is much backing for the resource-based perspective of the firm in the business literature. It was first put out by Birger Wernerfelt (1984) and then modified and expanded by Jay B. Barney (1991) and other researchers. According to resource-based theory, a company's capacity to outperform its competitors is directly related to the resources at its disposal (Wernerfelt, 1984; Conner, 1991; Peteraf, 1993). Barney (1991) enumerated four characteristics of resources—their worth, scarcity, flawed imitability, and lack of substitutability—that might contribute to a company's competitive advantage. RBV states that businesses can gain a competitive advantage by possessing VRIN criteria resources—valuable, uncommon, difficult to replicate, and irreplaceable resources. When a company implements green employment practices, it attracts, hires, and retains employees who are environmentally conscious and knowledgeable about sustainability (Jerónimo et al., 2020). Businesses can assemble a team equipped to address sustainability issues by proactively recruiting environmentally conscious individuals who possess the necessary competencies (Ortiz-Marcos et al., 2020). These employees contribute valuable expertise and concepts to the organization, thereby facilitating the development of novel environmentally friendly products and solutions. This resource can potentially enhance the company's green competitive advantage by differentiating it from its industry peers. Green training and development initiatives have the potential to enhance employees' knowledge and proficiency in domains associated with sustainability (Deshpande & Srivastava, 2023). By providing focused training programs, businesses can educate their employees on environmental issues, assist them in adopting more eco-friendly methods of operation, and equip them with the knowledge and tools necessary to assist the company in achieving its environmental objectives.

Companies can create a culture of sustainability and creativity by teaching their workers more about green practices (Song et al., 2020). It will lead to better green performance and a competitive edge. To use green performance management tools, performance measures and goals need to be in line with environmental goals. By including sustainable goals in the performance review process, companies can encourage workers to use green methods and praise actions that are good for the environment (Moldavska

& Welo, 2019). This way of doing things helps everyone in the company care about sustainability and inspires each worker to add to the company's green competitive edge.

By using these specific green HRM practices, companies can hire people who care about the environment, know how to do things in a way that does not harm it, and are eager to help the company reach its green goals (Suharti & Sugiarto, 2020). Having these kinds of tools is helpful because they set the business apart from rivals that might care less about the environment. Also, these tools are only sometimes easy to find or copy because it takes time and money to find and train workers with specialized green knowledge and skills. Finally, these resources cannot be replaced because they are unique to the company and are hard for rivals to copy or replace. By implementing green HRM practices based on the RBV theory, businesses can improve their environmental sustainability, encourage a culture of responsibility and creativity, and eventually gain a long-term competitive edge in the green market (Khana et al., 2020).

The ability-motivation-opportunity theory

The ability-motivation-opportunity (AMO) theory was used in the first section of the theoretical model. It defines high-performance work practices and explains Green HRM practices in the most dominant way (Appelbaum et al., 2000; Boselie et al., 2005). Therefore, there are three significant practices: ability, motivation, and opportunity (Appelbaum et al., 2000). Ability practices describe the knowledge and skills needed to complete tasks. Green knowledge sharing was identified as an ability in this study. Second, motivation practices provide financial and non-financial incentives to employees to increase their efforts to meet the set goals (Anwar et al., 2020). Even though incentives are a component of Green HRM practices, this study has chosen it as the motivation aspect of the theory. Finally, opportunity practices increase employee participation by giving employees more autonomy, such as green innovation and involvement (Marin-Garcia & Tomas, 2016). This study chose green innovation and competitive advantage as an opportunity practice. As a result, in the theoretical model of this study, AMO theory explains variables such as green knowledge sharing as ability practices, Green HRM practices as a motivation factor, innovation, and competitive advantage as an opportunity.

Basic concepts

Green HRM practices

It is a term that refers to the aspects of sustainable HRM that deal with environmental concerns (Wagner, 2013). These initiatives positively protect the environment (Kramar, 2014). Furthermore, green behaviors are considered in performance appraisals, rewards, compensation, and promotion to motivate employees to participate in environmentally friendly activities (Dumont et al., 2016). As a result, according to AMO theory, this study designated Green HRM practices as an independent variable and motivation factor. Furthermore, these practices can be improved by providing employees with green training and development or by setting green goals for them. As a result, Green HRM practices are HRM's green management aspects (Dumont et al., 2016; D. Renwick et al., 2012).

Green knowledge sharing

Green knowledge sharing within a company refers to the process by which employees share environmentally friendly implicit and explicit information to generate new knowledge (Van Den Hooff & Ridder, 2004). Collaboration with colleagues, for example, to share environmental knowledge and skills that benefit employees and the organization (H. Lin, 2007). Because implicit knowledge exists in the human brain, it is difficult to codify. Explicit knowledge, on the other hand, is easily demonstrated because it is recorded in formal, official documents (Rubel et al., 2020; Shah et al., 2007). Additionally, AMO theory, in conjunction with this study, considers green knowledge sharing as a mediating variable and opportunity factor to autonomize employee participation in green goals (Anwar et al., 2020). Furthermore, researchers focus less on the organization (Bhatti et al., 2021; Rubel et al., 2020). As a result, this study aimed to fill a gap in the literature by advancing this concept.

Green innovation

Product stewardship is a subset that aims to modify or adapt product designs to reduce their negative environmental impact (R. et al. et al., 2013). Furthermore, This type of innovation is used as a weapon in the market to gain a green competitive advantage. For example, an organization may select raw materials that produce less pollution and remove hazardous substances from the product (Kivimaa & Kautto, 2010; Xie et al., 2019). Furthermore, it is a part of NRBV's product stewardship capabilities, which gives firms

a competitive advantage by being the first to market (S. Hart, 1995). So, in this study, it served as a mediator and predictor of green competitive advantage. When used in production, it lowers emissions, effluents, or waste or turns it into a helpful resource (S. Hart, 1995; Xie et al., 2019). For instance, lowering resource usage in energy and water, improving resource efficiency, and switching to bioenergy from fossil fuels (Kivimaa & Kautto, 2010). As a result, green process innovation enables businesses to achieve profitability and establish a competitive advantage in the green market (Chan et al., 2016). In addition, NRBV is thought to be able to stop environmental contamination (S. Hart, 1995), and this study views it as a mediator and predictor of competitive advantage for going green.

Green competitive advantage

It is a situation where competitors cannot replicate an organization's position on environmental protection or green innovation (Chen & Chang, 2013). For example, it could take the form of low-cost green innovation, higher quality or profitability of green products or services, research and development capability for environmental protection, managerial capabilities, and first mover advantage (Chen & Chang, 2013). According to NRBV, these strategies provide long-term benefits to organizations by opening new markets and improving their green image (Chen et al., 2006; S. Hart, 1995; Peattie & Charter, 1992; Porter & Linde, 1995). There is very little information available in the literature about this concept. As a result, this study emphasized its significance and used it as a dependent variable in the framework.

Hypothesis framework

Green HRM practices and green competitive advantage

The AMO hypothesis is the most widely used idea in empirical studies to evaluate the effects of green human resource management practices, specifically high-performance work practices, on organizational performance as a green competitive advantage (Appelbaum et al., 2000; Boselie et al., 2005). ways to make sure staff members have the expertise to do a task. Programs for training and development, as well as recruitment and selection, establish the foundation for employees to succeed in their jobs (Brown et al., 2009). Similarly, incentives are based on performance reviews and include monetary and non-monetary gifts to encourage employees to work harder to fulfill performance goals (Marin-Garcia & Tomas, 2016). The well-being of the workforce may be taken into consideration, and this will help firms move strategically. Thus, it is determined through this debate that:

H1: Green HRM practices positively influence the organization's green competitive advantage.

Green HRM practices and green innovation

When the AMO framework is in play, self-perceptions in the form of skill, inspiration, prospect, and knowledge are required to practice green behaviors in the pro-environmental agenda (Rayner & Morgan, 2017). As a result, there is a link between Green HRM practices and green knowledge sharing in the AMO framework. Innovative knowledge and knowledge dissemination are critical for businesses to maintain a long-term competitive advantage (Gope et al., 2018). Green innovation significantly impacts employee environmental commitment to improving environmental performance (Ahmad et al., 2023; Ahmad et al. et al., 2022). Green HRM practices advance toward information transfer and creating individual learning among employees through successful development strategies, relational connections, criticism, support, and information stocks (Matsuo, 2015). As a result, this investigation assumes that employees with a favorable attitude toward Green HRM practices will be bound to create eco-friendly innovation. Therefore:

H2: Green HRM practices positively influence the organization's green innovation.

Green innovation and green competitive advantage

Product stewardship incorporates the environment's voice into the product design or development processes (S. Hart, 1995). Product life-cycle analysis includes reducing nonrenewable materials, eliminating toxic materials, and using renewable materials in proportion to their replenishment (Upham, 2000). As a result, these green products may aid in capturing the green competitive advantage through competitive preemption (Ghemawat, 2003). Furthermore, two methods may aid in achieving this green competitive advantage. These are limited resources, such as raw production capacity, raw materials, or customers, and it is critical to gain preferential access by establishing uniquely tailored standards, rules, and regulations to the organization's capability (Lieberman & Montgomery, 1988). BMW, for example, has a long history of recycling and returning its products. This foresight was called design for environment (DfE) automobiles (S. Hart, 1995), resulting in a green competitive advantage.

Green process innovation improves organizational and operational performance through increased productivity, efficiency, and lower waste disposal costs (Bhatia, 2021; Dai et al., 2017). For example, toxic release inventory (TRI) has limited organizations to managing their emissions to 300 hazardous chemicals or toxins (S. Hart, 1995). As a result, these technological capabilities are critical for

sustaining competitive advantage and enhancing innovation (Bhatia, 2021; Ortega, 2010). As a result, green process innovation necessitates the development of new technologies to achieve the desired performance outcomes (Joo et al., 2018).

Organizations have realized that inefficient use of materials and human resources has increased pollution. As a result, they adopted the concept of continuous improvement in total quality environmental management (S. Hart, 1995). This process necessitated improved material substitution, housekeeping, or recycling, referred to as green innovation (Frosch & Gallopoulos, 1989). Furthermore, organizations may achieve significant savings in the form of a cost advantage over competitors, referred to as a green competitive advantage (S. et al., 1994). Hence:

H3: Green innovation positively influences the organization's green competitive advantage.

Mediation of green innovation

Some studies claim that green innovation development is openly supported by the influence of green innovation during production (Bos-Brouwers, 2010; Rennings & Rammer, 2009; Wu, 2013). Green HRM practices have the opportunity for green innovation for organizations, according to AMO theory. This research will examine how green innovation affects its relationship with Green HRM practices (Anwar et al., 2020). This study will also demonstrate the role of green innovation as a mediator in the relationship between Green HRM practices and green competitive advantage.

The constant collection and integration of new knowledge will result in innovation (Subramaniam & Youndt, 2005). Furthermore, the unseen accumulation of experience and the obvious and visible knowledge contribute to the required creativity for innovation (Seidler-de et al., 2008). As a result, the environment improves the product. As a result, this process will put the organization ahead of its competitors. This foresight results in a green competitive advantage for the organization. Organizations must actively seek out, create, transform, and apply knowledge to develop unique ideas and knowledge with the help of green process innovation (Bhatia, 2021). As a result, these organizational strategic and long-term capabilities improve operational performance (Dai et al., 2017). As a result, this study concludes that improving operational performance may lead to a green competitive advantage. Therefore:

H4: Green innovation positively mediates the link between Green HRM practices and the organization's green competitive advantage.

Moderation of green knowledge sharing

Employees are now regarded as one of the most important intangible assets, and expertise is called 'green knowledge sharing' (Ahmed et al., 2021; Barney, 1991; Shoaib et al., 2021). According to this study, it falls under the ability category of AMO theory. If the organization already has a well-developed and well-equipped workforce, this workforce may be more supportive of newly recruited employees for environmental synergy (Nejati et al., 2017). This will only happen if they properly collaborate and share knowledge. However, in this study, green knowledge sharing served as a moderator in the framework. Therefore:

H5: Green knowledge sharing moderates the relationship between Green HRM practices and green innovation such that this relationship becomes more robust at high levels of green knowledge sharing.

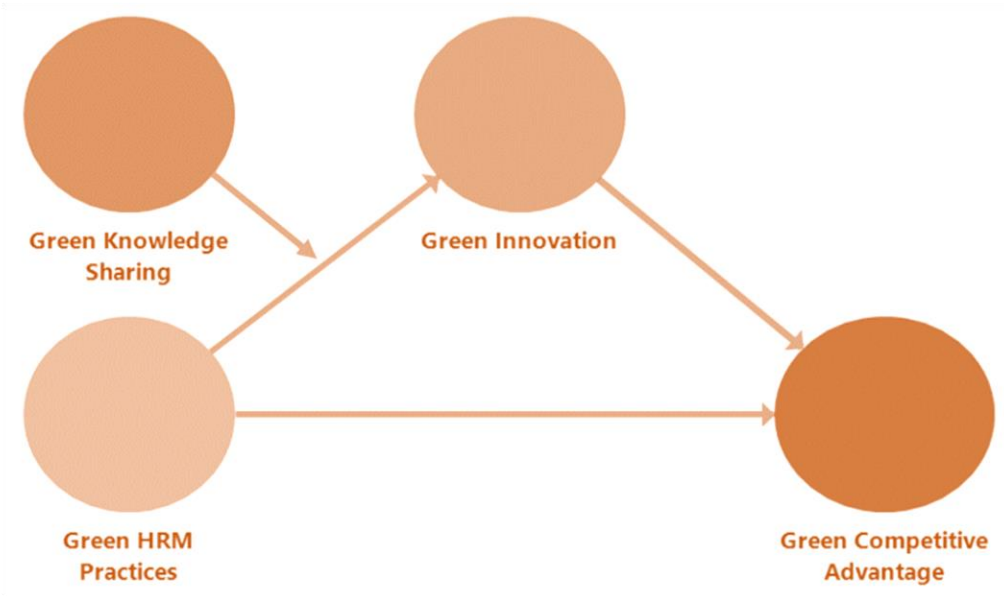

Figure 1. Research Model.

Methodology

Data collection and sample

Small and medium enterprises were chosen as the unit of analysis for the study. As a result, the study's scope is limited to 400 small and medium-sized manufacturing enterprises (SMEs) in Mexico. Researchers have identified cross-sectional data collection as a design flaw and longitudinal or time-lag designs have been proposed as a solution (Bowling & Eschleman, 2010; Parker et al., 2010; Webster et al., 2011). A three-point time-lagged design was used in this study to collect data on various variables at different periods. At time 1 (T1), data on Green HRM practices were collected. Three months later, at time 2 (T2), an online poll was used to collect data on green innovation and knowledge sharing. Information on green competitive advantage was gathered at time 3 (T3) (2 weeks after time 2) (Abbas & Raja, 2019).

A simple random sampling technique was used to collect data for this empirical study. Organizations were chosen based on environmental awareness (Guerci et al., 2016) and are governed by government regulations (Amran et al., 2012). This study used an online questionnaire to collect data using Google Forms and applications (Ahmad et al. et al., 2022; Mustafa et al., 2022; Sekaran & Bougie, 2016).

Based on the number of employees, this method yielded 223 professional responses. Further investigation confirmed their identities, cellphone numbers, email addresses, and job titles (Chen & Chang, 2013).

The study received 247 responses at T1 from the 400 questionnaires distributed initially via Google Forms. At T2, 236 respondents returned completed questionnaires three months later. Finally, at T3, two weeks after T2, 223 responses were received and included in the final sample, yielding a total response rate of 55.8%. T1 responses were collected in November 2021, T2 responses in February 2022, and T3 responses in March 2022. All responses to the factors above were gathered on a 7-point Likert scale, with one denoting "strongly disagree" and seven denoting "strongly agree." The sugar industry (30.9%), food industry (27.4%), leather industry (21.1%), medicine industry (9%), textile industry (4%), paper industry (3.6%), and others (4% included feed industry, electronics industry, and vegetable oil industry) were among the respondents of SME-sectors.

Table 1
Sample demographics

Characteristics	Respondents (N = 223)	Percentage (%)
Gender		
Male	218	97.8
Female	5	2.2
Marital Status		
Married	127	57.0
Unmarried	96	43.0
Age		
30 Years or Less	125	56.1
31 to 40 Year	61	27.4
41 to 50 Year	34	15.2
Greater than 50 Year	3	1.3
Educational Qualification		
Graduation	140	62.8
Masters	80	35.9
Doctoral	3	1.3
Employee Experience within the Current Organization		
1 to 5 Year	158	70.9
6 to 10 Year	34	15.2
11 to 15 Year	14	6.3
More than 15 Year	17	7.6

Measures

The measurements were obtained from reliable and authentic sources. Variable reliability indicators are listed in Table 2. The Study suggested in this paragraph derives that Green Human Resource Management (GHRM), Green Knowledge Sharing (GKS), and green innovation are essential factors in gaining a competitive advantage (GCA) in the green market. In particular, it points out that GHRM, GKS, and green innovation contribute to GCA and that GKS mediates the relationship between GHRM and green innovation. Moreover, it suggests that GHRM and GCA are linked through green innovation. The hypothesis also supports that management support for green HRM practices can redress environmental concerns and facilitate employee knowledge sharing, ultimately providing small and medium-sized enterprises (SMEs) a competitive advantage in the green market.

Green HRM practices

Green HRM practices (GHRMP) were assessed using a six-item checklist (Dumont et al., 2016). The scale (Composite reliability/CR=0.92, Cronbach's Alpha/α=0.89, Average variance extracted/AVE=0.64) indicated good reliability in this study.

Green innovation

An eight-item measure was selected to evaluate green innovation (GI) (Chen et al., 2006). Measures of green innovation indicated good reliability in this study (CR=0.88, α=0.81, AVE=0.64).

Green competitive advantage

Eleven items were used to assess green competitive advantage (GCA) (Chen & Chang, 2013). The scale (CR=0.94, α=0.93, AVE=0.60) indicated good reliability in this study.

Results

Table 2 shows that all of these are above the benchmarked 0.700. All other values, such as composite reliability (>0.700), average variance extracted (AVE) (>0.500), and Cronbach's Alpha (>0.700), met the bare minimum. All AVE values are less than their respective constructs' composite reliabilities. √AVE's diagonals were more significant than its correlation values. It means that the results exceeded the benchmarked values for the discriminant validity of all variables (Fornell & Larcker, 1981). Furthermore, all R2 values (>0.100) met the quality criteria for constructs, namely GI (Falk & Miller, 1992).

Table 2
Convergent validity

		Factor Loadings					
Construct/Variable	Items	Minimum	Maximum	AVE	CR	α	R2
GHRM	6	0.747	0.848	0.643	0.915	0.889	-
GKS	5	0.729	0.832	0.602	0.883	0.835	-
GI	8	0.727	0.848	0.637	0.875	0.809	0.387
GCA	11	0.719	0.807	0.601	0.943	0.933	-

n=223, α=Cronbach's alpha, AVE=average variance extracted, CR=composite reliability, R2=Coefficient of determination, GHRM=Green HRM practices, GKS=Green knowledge sharing, GI=Green innovation, GCA=Green competitive advantage

Correlational and descriptive analysis

Table 3 included correlation coefficients, mean, and standard deviations for constructs. As expected, GHRM had significant positive associations with GI and GCA. It is highly significant and positively correlated with the mediator GI. The mediator GI was highly significant and correlated positively with the dependent variable GCA. As a result, as previously predicted, all of the constructs had positive and highly significant correlations. Furthermore, these highly significant construct correlations were less than the diagonal values (√AVE) with other constructs and met the criteria very well. In addition, the moderator revealed highly significant correlations with other constructs. It was highly significant and correlated with GHRM, GI, and GCA. These correlations demonstrated that this investigation could project theoretical links without the risk of multicollinearity.

Table 3
Correlation and discriminant validity

	Mean	SD	1	2	3	4
1. GHRM	4.31	0.560	0.802			
2. GKS	4.17	0.568	0.482**	0.776		
3. GI	4.03	0.761	0.547**	0.617**	0.798	
4. GCA	4.09	0.625	0.593**	0.666**	0.711**	0.775

n=223, **p<.01

The heterotrait-monotrait ratio (HTMT) in Table 3 also indicated that almost all of the required indicator correlations were within the threshold mark (<0.900). As a result, the results demonstrated that discriminant validity was not an issue in the study.

Table 4
Heterotrait-Monotrait Ratio (HTMT)

	GHRM	GKS	GI	GCA
GHRM				
GKS	0.562			
GI	0.646	0.751		
GCA	0.652	0.757	0.818	

n=223

Hypothesis testing

In Tables 5 and 6, hypotheses were evaluated using direct, specific indirect, and total effects using the partial least square (PLS) method. The researchers examined the cumulative and direct effects of GHRM, GCA, and GI. Second, the direct and cumulative effects of GCA on GI were evaluated. The effects of GI

on GCA were also investigated. The four-step technique was used to examine the mediation effect of GI on the relationship between GHRM and GCA (Baron & Kenny, 1986).

The study also looked at how (GHRM×GKS) influenced GI in a moderating way. The hypotheses' path coefficients indicated that the relationships were highly significant and positive. As a result, these findings backed up all of the study's hypotheses. The t-statistics (>1.96) of direct and indirect effects were also highly significant, with values exceeding the benchmark. When the p-values of the relationships were examined, the results revealed that almost all of them were highly significant and positive. Because these values were within the benchmark limit ($p<0.01$), the positive and high significance was indicated in all the relationships' direct and indirect effects. Because these values were within the benchmark limit ($p<0.01$), the positive and high significance was indicated in all the relationships' direct and indirect effects.

The moderating relationship revealed a highly significant effect ($p<0.01$) of (GHRM×GKS GI). The moderating effect (GHRM×GKS GI) was also positive and highly significant. The estimated PLS path model and the moderated mediation model were found. It demonstrates that GHRM and GKS, as well as their interaction term (GHRM×GKS), explain 38.7% of the variance in GI. Hypothesis 1 states that GHRM has a significant positive relationship with GCA.

The direct effect of GHRM on GCA with mediation is positive and highly significant, as are the overall effects without mediation, thereby supporting Hypothesis 1. Furthermore, Hypothesis 2 states a strong positive relationship between GHRM and GI. The direct and total effects of GHRM on GI are both positive and highly significant. According to Hypothesis 3, GI has a significant positive correlation with GCA.

The findings revealed that all the direct relationships examined in the study were positive and highly correlated. This resulted in the confirmation of all of the study's direct hypotheses. As a result, the results were consistent with the desired outcomes, and the results validated all hypotheses.

Table 5
Path coefficients (direct and specific indirect effects)

	β	SD	t- Statistics	p-Values
GHRM → GCA	0.206**	0.063	3.262	0.001
GHRM → GI	0.400***	0.099	4.021	0.000
GI → GCA	0.623***	0.045	13.764	0.000
GHRM → GI → GCA	0.255***	0.067	3.829	0.000
Moderation (GHRM×GKS) → GI	0.152**	0.053	2.873	0.004

n=223, SD=standard deviation, **p<.01, ***p<.001

Table 6
Path analysis and hypotheses testing

Path	Overall Impact (t- Statistics)	p-Values	Hypothesis	Outcome
GHRM → GCA	0.380*** (4.968)	0.000	H1	Supported
GHRM → GI	0.400*** (4.021)	0.000	H2	Supported
GI → GCA	0.294** (3.452)	0.001	H3	Supported
GHRM → GI → GCA	0.255*** (3.829)	0.000	H4	Supported
(GHRM × GKS) → GI	0.152** (2.873)	0.004	H5	Supported

n=223, **p<.01, ***p<.001

Discussion

In addition to the mediating impact of green innovation and moderating impact in the domain of green HRM and green competitive advantage, which received little attention in previous research, the current study reveals the direct impact of green human resource management on firms' green competitive advantage. The results of the current study confirmed the mediating effect of green innovation between GHRM and GCA, which supported the work of Ahmad et al. 2023; Ahmad, Mustafa, Khawaja, et al., 2022; and the moderating effect of green knowledge sharing between GHRM and green innovation, which confirmed the significant impact of green HRM on green competitive advantage (Ahmed et al., 2021; Barney, 1991; Shoaib et al., 2021). The findings showed that green HRM and employee information exchange are crucial pillars for achieving SMEs' competitive advantage in the green market. This argument is made because employees play a crucial role in implementing SME plans and offering client services (Haldorai et al., 2022; Kuo et al., 2022; Zameer et al., 2020). The views of staff members in SMEs regarding GHRM procedures may successfully persuade their staff to support and contribute to GCA. Therefore, employees who work on SNEs can help fuel the impetus for GCA by acting sustainably.

The results also showed that green innovation mediates between GHRM and GCA. The AMO theory backed up the idea that green HRM practices can lead to green innovation. Results from earlier studies by Ahmad (2015), Chaudhary (2019), Song et al. (2021), and Muisyo et al. are inconsistent with the current findings (2022). The organizations get their competitive advantage through this process, so green HRM activities are crucial in encouraging green innovation. Green HRM approaches encourage environmental values among employees. They can assist staff in applying their abilities to develop novel solutions, which are crucial for fostering and enhancing staff innovation (Chowhan, 2016). The employees' ability to exchange information through the green HRM practice boosts the organization's green initiatives.

Theoretical contribution

The current study adds to the body of SME literature in various ways. This study bases its explanation of the importance of green HRM on two theories: RBV and AMO. It employs green innovation as a process and green knowledge sharing as a prerequisite for achieving SCA. This study explored how green HRM displayed SMEs' GCA and suggested a connection between RBV and AMO theories. According to RBV theory (Haldorai et al., 2022), green HRM practices helped turn employees into valuable assets. They also helped improve employees' abilities and motivation, which aligns with AMO theory (Ari et al., 2020; Pham et al., 2020). Employees participate in green activities in a way that encourages knowledge sharing, and both these actions—engaging in green activities and encouraging knowledge sharing—help to foster green innovation and realize a company's GCA. Through this study, we analyzed the relationship between GHRM, green knowledge sharing, green innovation, and GCA, which was not previously known. GHRM is significant since it is a critical component of the RBV and AMO theories (Haldorai et al., 2022). We believe that our study is the first to investigate the relationship between GHRM, green knowledge exchange, green innovation, and GCA.

Conclusions

According to the Resource-Based View (RBV) (Lubis, 2022), a firm's sustainable economic advantage is derived from its distinctive and valuable resources and capabilities. It emphasizes that organizations that effectively utilize critical instruments will outperform their rivals. By providing a conceptual framework, RBV enables us to discern the interrelationships among the factors contributing to sustained success—certain GSCM practices (Khana et al., 2020). GKM practices manifest in diverse ways, encompassing the generation and application of green knowledge within an organization (Sahoo et al., 2023). Acquiring such information may provide one with a competitive edge.

A current study has confirmed that GHRM, GKS, and green innovation are crucial for establishing a competitive edge in the green market. When GHRM, GKS, and green innovation are used to explain how these components contribute to GCA, hypothesis testing largely accounted for this. While GKS mediates the relationship between GHRM and green innovation, GHRM and GCA are related through green innovation. Management must support green HRM practices to address environmental concerns and foster employee knowledge sharing that will give the SME sector a green competitive advantage. This study can be a good source and guidance for practical implications. First, the SME sector must adopt GHRM practice as a strategic tool to achieve GCA. This will help them achieve and help their employees set a new knowledge-sharing and dissemination culture. These behaviors will help them be

more innovative in achieving their SCA. The management at SMEs may encourage their employees to engage in green behavior and share green information and knowledge frequently to boost and improve green innovation and achieve SCA. From the findings of this research, it is evident that green innovation results from GHRM and GKS boost GCA. The SMEs that understand the concern for a sustainable environment and implement green initiatives may inspire employees to follow and provide environmentally friendly services.

Limitations and future research

The findings of this study may be considered under certain limitations. First, this study GHRM to achieve GCA using green innovation as a process and GKS as a condition. Future researchers can work on other aspects and dimensions of GHRM, such as green employee empowerment and involvement (Pham et al., 2020). Secondly, the researcher can get help from our research model and employ its different multifaceted dimensions to study its implication for green behavior and GCA. There is little or no complete consensus on the dimensions of GHRM (Ari et al., 2020). The GHRM and GCA are in their infancy in the SME sector and may be studied in other settings.

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