

Green human resource management and environmental strategies: the role of corporate environmental ethics

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Abstract

Purpose – This study aims to investigate the unique mediating role of corporate environmental ethics in the positive relationship between green human resource management practices and the implementation of environmental strategies (reactive environmental strategy and proactive environmental strategy) of manufacturing firms in Vietnam.

Design/methodology/approach – A cross-sectional survey of 347 manufacturing firms in Vietnam was conducted, and data were analyzed using partial least squares structural equation modeling (PLS-SEM).

Findings – The findings reveal that firms employing green human resource management tend to prioritize proactive environmental strategy over reactive environmental ones, although green human resource management practices lead to the implementation of both reactive and proactive environmental strategies. Conversely, firms that utilize green human resource management to foster corporate environmental ethics prefer the reactive environmental strategy.

Practical implications – This study provides critical insights for manufacturing firms aiming to integrate environmentally sustainable practices into their operations. By strategically incorporating green human resource management and corporate environmental ethics, firms can effectively implement feasible and beneficial environmental initiatives that advance their sustainability objectives.

Originality/value – Drawing on the resource-based view, ability-motivation-opportunity theory and ethics theory of organizing, this study contributes to the existing literature on green human resource management and environmental strategies by examining the role of corporate environmental ethics. This enhances the understanding of how the intensity of different environmental strategies may differ if green human resource management practices or corporate environmental ethics are cultivated.

Keywords Green human resource management, Corporate environmental ethics, Reactive environmental strategy, Proactive environmental strategy

Paper type Research article

1. Introduction

Environmental stewardship and sustainable development have emerged as critical imperatives for humanity (Al-Swidi *et al.*, 2024). The escalating urgency of these issues has compelled organizations to prioritize environmental considerations, driven by both regulatory mandates and stakeholder expectations (Tatoglu *et al.*, 2020). Vietnam's manufacturing industry has shown substantial development and structural transformation, with its gross domestic product share increasing from 13.0% in 2010 to 16.5% in 2019, highlighting its pivotal national economic role (Dang and Nguyen, 2021; Lin *et al.*, 2024). Manufacturing firms are central to addressing environmental challenges, being both major greenhouse gas emitters and highly vulnerable to climate change impacts (Kartal, 2022). Their operations significantly contribute to carbon emissions, energy use and waste, making them a key focus in sustainability research (Choudhary and Sangwan, 2022).

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Despite potential financial costs (Stefan and Paul, 2008), businesses actively reduce their environmental footprint through technological advances and environmental management, using both reactive and proactive strategies (Baah *et al.*, 2021; Kim, 2018). Proactive environmental strategies (PES) aim to minimize environmental impacts through process redesign and often surpass regulatory requirements, while reactive environmental strategies (RES) primarily focus on environmental regulatory compliance and a control-oriented approach (Baah *et al.*, 2021; Dai *et al.*, 2018).

Research on environmental strategies (ES) and green human resource management (GHRM) is growing; however, empirical evidence on GHRM's specific role in developing and implementing these strategies remains limited (Vázquez-Brust *et al.*, 2022). Integrating ES into GHRM can foster a culture of environmental responsibility, driving sustainable behaviors and enhancing competitive advantage (Hooi *et al.*, 2022). While studies have directly examined the relationship between GHRM and RES or PES, such as the mediating role of GHRM in the relationship between stakeholder greening pressures and environmental protection practices (Vázquez-Brust *et al.*, 2022), or the consistency in ES and human resource (HR) development (Piwowar-Sulej, 2022), the extent to which GHRM is incorporated into ES may vary depending on mediating factors. While GHRM generally tends to promote PES over RES (Vázquez-Brust *et al.*, 2022), firms may favor RES if certain conditions, such as corporate environmental ethics (CEE), are present in the relationship between GHRM and ES (Pan *et al.*, 2020).

CEE is an intangible organizational asset that catalyzes green innovation and competitive advantage (Chen and Chang, 2013). Firms could foster corporate environmental preservation through the synergistic interplay of GHRM and CEE, albeit without establishing a direct correlation between the two (Al-Swidi *et al.*, 2024). Neglecting the mediating role of CEE in the relationship between GHRM and RES and PES could lead to an incomplete understanding of the green organizational culture element that bridges GHRM and these ES. This oversight limits our understanding of the importance of this critical resource and its role in advancing sustainable development policies. Consequently, this study investigates CEE as a potential mediator in the relationship between GHRM and RES or PES. The research questions are formulated to address the existing gaps in academic literature: Firstly, is a firm with a higher level of GHRM practices is more likely to have a higher level of RES or PES adoption? Secondly, how does CEE mediate the relationship between GHRM and RES or PES adoption? Thirdly, is GHRM equally relevant to adopting RES or PES?

This study contributes to the literature in several ways. First, it examines the relationship between GHRM, RES and PES in manufacturing firms within emerging economies, such as Vietnam, where implementation is complicated by weak regulatory and social controls (Hooi *et al.*, 2022). Research on ecological conservation and ES diversification in such contexts remains limited (Vázquez-Brust *et al.*, 2022), and holistic analyses of corporate environmental impacts are underdeveloped (Baah *et al.*, 2021). Manufacturing industries are increasingly adopting sustainable models by aligning GHRM with ES, integrating environmental responsibilities into job roles and promoting green skills (Piwowar-Sulej, 2022). Compared to other sectors, manufacturing is more proactive in terms of employee skill development and environmental role embedding (Masri and Jaaron, 2017). Second, the study offers practical insights on promoting RES and PES through GHRM and CEE, exploring direct and mediating relationships to advance ES implementation. It explores how CEE functions as a mechanism through which GHRM translates into improved environmental performance. Understanding this mediation is critical for developing targeted strategies that move beyond compliance and toward proactive environmental stewardship in the manufacturing sector. Moreover, by recognizing employees as a crucial stakeholder group that could exert pressure to promote ES adoption, this study calls for further research on the use of GHRM as a driving force for implementing RES or PES (Vázquez-Brust *et al.*, 2022), with the mediating role of CEE. By including CEE as a mediator, the research provides a nuanced understanding of the indirect pathways linking GHRM to environmental outcomes.

The remainder of this study is organized as follows. Section 2 develops a theoretical framework and hypotheses, followed by an explanation of the research methodology in

2. Theoretical framework and hypotheses development

2.1 Theoretical framework

The study's conceptual model integrates the theories of the resource-based view (RBV), ability-motivation-opportunity (AMO), and the ethical theory of organizing. RBV asserts that sustained competitive advantage derives from rare, valuable, inimitable internal resources, with HRs being strategically crucial (Barney, 1991; Al-Swidi *et al.*, 2024). Within this framework, GHRM functions as a key organizational resource, enhancing competitiveness and performance. AMO theory posits that GHRM improves environmental performance by cultivating employee abilities, motivation and opportunities for environmental protection through green HR practices (Dumont *et al.*, 2017). Ability-enhancing practices develop environmental competencies, motivation-enhancing practices align incentives with sustainability and opportunity-enhancing practices foster engagement in environmental initiatives, enabling effective employee contributions to green performance (Vázquez-Brust *et al.*, 2022). Furthermore, CEE, rooted in the ethical theory of organizing, promotes sustainable production and competitive advantage via environmental stewardship, prioritizing environmental responsibility over profit (Baah *et al.*, 2023; Han *et al.*, 2019). Environmentally knowledgeable employees cultivate CEE, establishing a green organizational culture that is vital for adapting to environmental challenges (Al-Swidi *et al.*, 2022).

This study integrates RBV theory, AMO theory, and Ethical Theory of Organizing to model the GHRM – CEE – ES pathway. RBV highlights GHRM's strategic value as an internal capability, while AMO theory explains how GHRM enhances employee capacity, motivation and opportunity for environmental initiatives. The Ethical Theory of Organizing provides a normative lens, underscoring moral imperatives for environmental stewardship. These theories provide a comprehensive foundation for understanding how GHRM fosters CEE and improves ES outcomes.

2.2 Hypotheses development

GHRM refers to a strategic approach that integrates environmental considerations into an organization's HR management practices, procedures, and policies (Khan and Muktar, 2020). From an RBV perspective, GHRM is conceptualized as a valuable, rare, and inimitable internal resource capable of generating competitive advantage by embedding environmental values throughout the workforce (Barney, 1991). As ES are shaped by individual employees (Gabler *et al.*, 2023), GHRM facilitates knowledge sharing, collaboration and innovation to address environmental challenges (Masri and Jaaron, 2017). Aligned with AMO theory, GHRM recognizes employees as key stakeholders, empowering them to influence organizational decision-making and promote environmental sustainability, including RES and PES adoption (Vázquez-Brust *et al.*, 2022). By framing environmental regulations as opportunities for competitive advantage, GHRM motivates employees to exceed regulatory requirements and embrace proactive RES initiatives (Hirunyawipada and Xiong, 2018). Environmental training equips employees with the ability to integrate sustainability into their strategic planning and invest in green R&D beyond legal mandates (Baah *et al.*, 2021). By benchmarking their environmental performance against competitors, employees are driven to adopt innovative PES, such as technological advancements (Potrich *et al.*, 2019).

Therefore, this study proposes the following hypotheses:

- H1. Firm with a higher level of GHRM practices is more likely to have a higher level of RES adoption.
- H2. Firm with a higher level of GHRM practices is more likely to have a higher level of PES adoption.

Ethics involve the moral principles that guide the behavior of individuals and organizations, serving as a philosophical exploration of what is considered right and wrong (Torelli, 2021). Grounded in the ethical theory of organizing, CEE forms a crucial element of organizational culture, emphasizing environmental management (Baah et al., 2023). This engagement signifies a firm's inherent ethical commitments, normative values and established standards, thereby directing its proactive approach towards environmental protection and achieving ecological objectives (Han et al., 2019). By implementing GHRM, firms could cultivate a strong CEE by equipping employees with the necessary environmental knowledge, skills and values (Al-Swidi et al., 2022). GHRM initiatives could significantly influence employees' perceptions, beliefs, and attitudes toward environmental issues, fostering a shared commitment to environmental protection (Fawehinmi et al., 2024). By shaping employees' ethical standards, GHRM contributes to the development of a robust CEE, which in turn drives environmentally responsible practices (Hooi et al., 2022). This could manifest in various ways, such as increased environmental commitment (Ly, 2023) and the adoption of eco-friendly strategies (Chang, 2011).

Therefore, this study proposes the following hypotheses:

H3. Firm with a higher level of GHRM practices is more likely to have a higher level of CEE.

PES involves intentional efforts to redesign processes and services, minimizing environmental impacts at their source and often exceeding regulatory mandates (Baah et al., 2021). Conversely, RES primarily focuses on compliance with existing regulations, adopting a control-oriented approach to environmental management (Baah et al., 2021; Dai et al., 2018). Firms with a strong CEE are more likely to prioritize environmental conservation and invest in sustainable practices (Hojnik and Ruzzier, 2016). CEE could encourage RES implementation over potentially more impactful but costly practices (PES) (Kim, 2018). However, a robust CEE can facilitate PES implementation by integrating it into the overall business strategy and stimulating innovation (Chan et al., 2022; Nguyen and Adomako, 2021).

Therefore, this study proposes the following hypotheses:

H4. Firm with a higher level of CEE is more likely to have a higher level of RES adoption.

H5. Firm with a higher level of CEE is more likely to have a higher level of PES adoption.

Studies on the positive link between GHRM and ES show mixed results (Al-Swidi et al., 2024). The mediating role of CEE in this relationship remains unclear. Once seen as a moral duty, CEE has become a strategic tool that guides decision-making and promotes sustainable practices (Chang, 2011; Gabler et al., 2023). It empowers employees to lead green innovations and provides ethical standards for evaluating corporate behavior (Chang, 2011). GHRM leverages HR as a key stakeholder to build CEE, bridging reactive strategies focused on compliance and proactive strategies driven by voluntary sustainability commitments (Vázquez-Brust et al., 2022; Baah et al., 2021). Employees engaged through GHRM are more likely to support both environmental approaches (Al-Swidi et al., 2024).

Therefore, this study proposes the following hypotheses:

H6a. CEE mediates the relationship between GHRM practices and RES adoption.

H6b. CEE mediates the relationship between GHRM practices and PES adoption.

Drawing on the above theoretical basis, the conceptual model is developed and presented in Figure 1.

3. Methodology

3.1 Procedure and sample

Vietnam's environmental management has advanced, with Decree 08/2022/ND-CP introducing Extended Producer Responsibility (EPR), which has significantly impacted

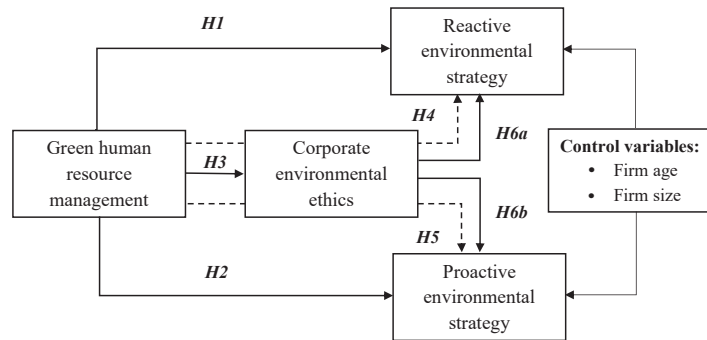


Figure 1. Conceptual model. **Source(s):** Authors' own work

packaging recycling (Vietnam Government, 2022). This study investigated manufacturing firms that are experiencing increasing environmental pressure and heightened stakeholder attention.

Ho Chi Minh City and Binh Duong Province were selected for their pivotal roles in Vietnam's industrialization, where the concentrations of manufacturers and multinational enterprises support the adoption of international environmental and HRM standards (General Statistics Office, 2022). They also proactively adopt green growth policies and sustainable production (UNDP Vietnam, 2024), making them ideal places to study corporate environmental behavior. Furthermore, their vulnerability to climate change, with increasing temperatures and frequent flooding, poses a threat to industrial operations (Leitold and Revilla, 2019). These locations increased access to key decision-makers through local networks and events, enhancing contextual relevance and data reliability beyond broader or online-only sampling.

Due to Vietnamese entrepreneurs' cultural reluctance to disclose firm strategies, snowball sampling was employed (Parker *et al.*, 2019), leveraging a referral question in questionnaires to enhance reach, especially for SMEs with limited public contact information. Approximately 1,000 outreach attempts were made through online channels (Zalo, email, phone calls) and offline at industry events, with follow-up reminders boosting response rates. Each firm provided one qualified respondent involved in HR and strategy, ensuring data reliability despite using a single informant.

The study received institutional ethical approval and was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki (World Medical Association, 2013) and other relevant national and international guidelines for research involving human participants. All participants provided informed consent after being fully informed about the study's purpose, data use, confidentiality measures and their right to withdraw at any time.

A total of 381 completed responses were collected from September to November of 2024, comprising 208 online and 173 offline responses. After excluding invalid entries, 347 valid questionnaires remained, resulting in an effective response rate of 34.7%. This sample size is deemed sufficient for field research involving a large target population (Memon *et al.*, 2020) and meets the minimum of 200 observations required for PLS-SEM (Hair *et al.*, 2019), which is used in the subsequent data analysis.

Table 1 summarizes firm characteristics. Most of the surveyed firms were small (47.55%) or medium-sized (42.65%), and 9.80% were large-sized. In terms of age, over half were between 3 and under 5 years old (53.03%), followed by younger firms under 3 years (26.80%). Most firms were limited companies (51.01%), followed by joint stock (22.20%) firms, private enterprises (15.56%), individual business households (8.36%) and others (2.88%). The firms spanned various manufacturing sectors, most notably rubber and plastics (25.36%), textiles

Table 1. Descriptive of respondents' general information ($N = 347$)

Variables	Category	Frequency	Percent
Firm size	Small	165	47.55
	Medium	148	42.65
	Large	34	9.80
Firm age (years)	Under 3	93	26.80
	3 - under 5	184	53.03
	5 - under 10	50	14.41
	Above 10	20	5.76
Type of business	Joint stock companies	77	22.20
	Limited companies	177	51.01
	Private enterprises	54	15.56
	Individual business households	29	8.36
	Others	10	2.88
Sector	Food processing	52	14.98
	Textiles and garments	70	20.17
	Electronics	68	19.60
	Furniture	35	10.09
	Rubber and plastics	88	25.36
	Others	34	9.80

Source(s): Authors' own work

and garments (20.17%) and electronics (19.60%). The sample reflects the broader industrial profile of Ho Chi Minh City and Binh Duong, where small and medium-sized enterprises dominate. The diversity in firm types, sizes, and sectors enhances the generalizability and policy relevance of the study findings.

3.2 Measures

The questionnaire was initially developed in English using established scales, and then culturally and linguistically validated for Vietnamese speakers. Eight in-depth interviews with manufacturing, academic and environmental experts ensured content adequacy. Semantic equivalence was confirmed through back-translation (Bhalla and Lin, 1987). A 5-point Likert scale was employed to aid comprehension and reduce fatigue (Sachdev and Verma, 2004).

GHRM was measured using a five-item scale adapted from Carballo-Penela *et al.* (2023) based on Dumont *et al.* (2017), which captures firms' integration of environmental sustainability into recruitment training performance appraisal and incentives, with Cronbach's alpha of 0.838. CEE was measured using a five-item scale developed by Rui and Lu (2020) based on Chen and Chang (2013) to assess organizational awareness, commitment and actions toward environmental protection, with Cronbach's alpha of 0.809. RES was measured using a four-item scale adapted from Chan *et al.* (2022), which focuses on investment in end-of-pipe technologies and remediation, with Cronbach's alpha of 0.724. PES was measured using a four-item scale developed by Chan *et al.* (2022) to assess clean technology development pollution prevention strategic integration and proactive emission reduction, with Cronbach's alpha of 0.840.

Firm age and firm size were included as control variables due to their relevance to ES and innovation (Liao, 2016). Firm size and firm age were measured by the number of employees and years since establishment, respectively. Liao (2016) and Dangelico *et al.* (2017) found that firm age negatively affects environmental innovation, likely due to inertia, resistance to change and lower adaptability in older firms. Prior studies have shown that firm age negatively impacts environmental innovation due to inertia and lower adaptability (Liao, 2016; Dangelico *et al.*, 2017). However, their findings differed in terms of firm size. Liao (2016) found that firm size positively affects environmental innovation due to the availability of more

resources, while [Dangelico et al. \(2017\)](#) reported that firm size can hinder green innovation but boost market performance, suggesting that size does not always improve environmental responsiveness.

3.3 Data analysis

The structural model evaluation was conducted using partial least squares structural equation modeling (PLS-SEM) and a predictive approach. The reliability and construct validity of the measurement model were confirmed during the initial assessment. Subsequently, a structural model analysis explored the hypothesized relationships using a two-step approach that bolstered robustness and reliability ([Hair et al., 2019](#)). Common method bias (CMB) and multicollinearity assessment addressed concerns arising from the extended data collection, targeting manufacturing enterprises in key Vietnamese provinces. Model estimates and hypotheses were tested using a 5,000-resample bootstrapping procedure, yielding R^2 (explained variance), f^2 (effect size), Q^2 (predictive relevance), path coefficients, t -values and p -values for robust predictive power evaluation.

3.4 Common method bias and multicollinearity

CMB analysis was conducted to address potential biases from using the same research instrument to measure both independent and dependent constructs, as CMB can impact construct validity, reliability and covariation among latent variables ([Podsakoff et al., 2003](#)). Harman's single-factor test showed a single factor explained only 39.482% (less than 50%) of the variance, indicating minimal CMB risk. Additionally, multicollinearity was assessed, with all variance inflation factor (VIF) values ranging from 1.385 to 2.764, which is below the critical threshold of 3.33, confirming no multicollinearity issues ([Hair et al., 2019](#)).

4. Results

4.1 Measurement model assessment

The measurement model was evaluated for the reliability and validity of the constructs. To improve the reliability and validity of the constructs, this study tested and confirmed that the loading factor of all items exceeded 0.7. Composite reliability (CR) and Cronbach's alpha were calculated to assess reliability, with values ranging from 0.844 to 0.898 and 0.755 to 0.857, respectively ([Table 2](#)), both of which exceed the recommended threshold of 0.7 ([Hair et al., 2019](#)).

Convergent validity, which evaluates how well a construct correlates with other measures of the same variable, was assessed via average variance extracted (AVE). AVE values for this study's constructs ranged from 0.575 to 0.638, exceeding the critical threshold of 0.5 ([Hair et al., 2019](#)), thereby confirming convergent validity. Discriminant validity, which tests the distinctiveness of constructs, was examined using the Fornell–Larcker criterion. This criterion requires the square root of the AVE for each construct to be higher than its correlations with other constructs ([Fornell and Larcker, 1981](#); [Hair et al., 2019](#)). Additional assessments using heterotrait–monotrait ratio (HTMT) further confirmed these results ([Hair et al., 2019](#)). The results in [Table 2](#) confirmed that the HTMT values of constructs were smaller than the critical value of 0.85 ([Henseler et al., 2015](#)), supporting discriminant validity.

4.2 Structural model assessment

The results of the SEM estimation are summarized in [Table 3](#). In the PLS-SEM model, explanatory power (R^2) serves as the primary criterion for assessing the structural model's goodness-of-fit. In this study, the R^2 values for CEE, RES and PES were 0.398, 0.335, and 0.329, respectively, indicating moderate explanatory power. The effect size (f^2) was relatively small for most predictor constructs, indicating a similar influence across these constructs. However, GHRM had a significant impact on CEE, with an f^2 value of 0.666 (greater than

Table 2. Measurement model assessment result and discriminant validity assessment

Constructs	Cronbach's alpha	CR	AVE	Inner VIF	HTMT ratios				Fornell–Larcker criterion				
					1	2	3	4	1	2	3	4	
1. GHRM	0.857	0.898	0.638	1.668					0.798				
2. CEE	0.814	0.871	0.575	1.693	0.754				0.632	0.758			
3. RES	0.755	0.844	0.575	1.000	0.582	0.697			0.476	0.554	0.758		
4. PES	0.852	0.894	0.630	1.000	0.643	0.534	0.663		0.551	0.447	0.529	0.794	

Source(s): Authors' own work

Table 3. Results of structural equation model estimation

Hypotheses	Path	Coeff.	STDV	t-value	p-value	f ²	Decision
	Firm age→RES	0.051	0.047	1.094	0.274	0.003	Not supported
	Firm age→PES	-0.057	0.048	1.191	0.234	0.004	Not supported
	Firm size→RES	0.070	0.047	1.475	0.140	0.006	Not supported
	Firm size→PES	0.144	0.047	3.098	0.002	0.026	Supported
H1	GHRM→RES	0.207	0.064	3.252	0.001	0.039	Supported
H2	GHRM→PES	0.441	0.057	7.680	0.000	0.176	Supported
H3	GHRM→CEE	0.632	0.041	15.465	0.000	0.666	Supported
H4	CEE→RES	0.412	0.058	7.130	0.000	0.153	Supported
H5	CEE→PES	0.143	0.060	2.368	0.018	0.018	Supported
H6a	GHRM→CEE→RES	0.261	0.041	6.288	0.000		Supported
H6b	GHRM→CEE→PES	0.090	0.038	2.368	0.018		Supported

Source(s): Authors' own work

0.35). The Q² values, obtained through resampling, confirmed predictive relevance, as all exhibited Q² values greater than zero.

Table 3 summarizes the SEM results, confirming significant relationships among the constructs. The effect of GHRM on RES was significant, thus supporting H1. The impact of GHRM on PES was positive and significant, thus supporting H2. Additionally, GHRM's effect on CEE was substantial, thus supporting H3. The relationships between CEE and both RES (H4) and PES (H5) were likewise significant, thus supporting H4 and H5. H6a and H6b examined CEE's mediating role between GHRM and the ES. GHRM's effect on RES through CEE was significant, thus supporting H6a. Similarly, the indirect relationship between GHRM and PES via CEE was significant, thus supporting H6b. These findings underline the mediating role of CEE in the relationship between GHRM and both RES and PES. For control variables, firm age showed no significant relationship with RES or PES. Firm size also had no effect on RES; however, it had a significant effect on PES. Figure 2 illustrates the results of proposed model testing.

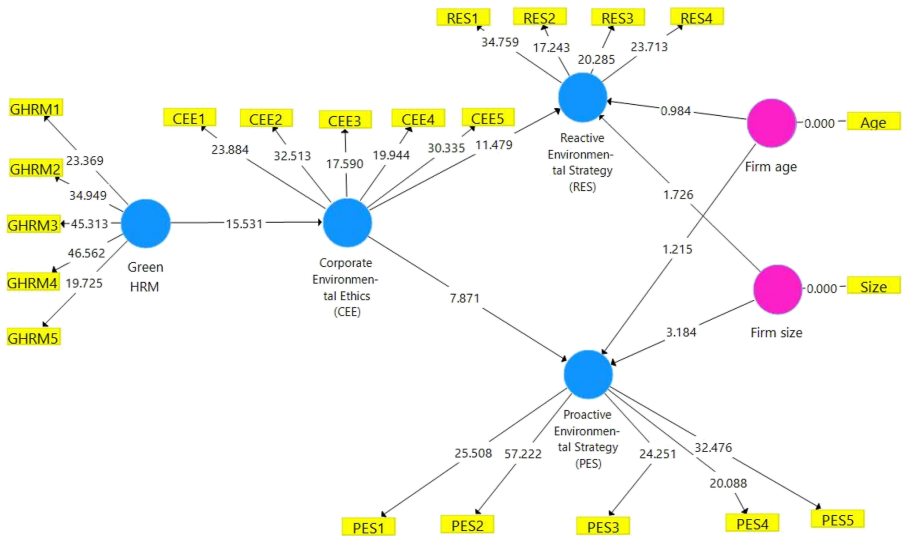


Figure 2. The results of proposed model testing. Source(s): Authors' own work

5. Discussion and implications

5.1 Discussion

The relationship between GHRM and both RES and PES, mediated by CEE, highlights how firms translate environmental goals into practice, with CEE shaping the ethical orientation that enables effective ES.

First, GHRM directly influences RES and PES. Firms that invest in green HR practices, including environmentally focused training, sustainability-linked performance assessments, and green incentives, are likely to implement both RES and PES. Firms frequently deploy both strategies to mitigate environmental impact (Baah *et al.*, 2021; Kim, 2018), which become intertwined once adopted. GHRM develops the necessary skills, fosters motivation and shapes employee behaviors that align with sustainability goals. Findings confirm GHRM's crucial role aligning employee behaviors with ES (Vázquez-Brust *et al.*, 2022) and its significant influence on environmental outcomes (Carballo-Penela *et al.*, 2023). Differentiating from prior studies examining overall environmental performance, our research distinguishes between RES and PES, revealing a significant impact of GHRM on the latter. This suggests GHRM supports compliance and risk mitigation through RES, yet proves particularly instrumental in fostering innovation and long-term sustainability via PES. The pronounced association between GHRM and PES reflects a strategic preference for proactive approaches, despite inherent complexities, due to the potential for enhanced business value through technological advancement (Bromley and Powell, 2012). Effectively addressing the HR challenges inherent in PES, firms, especially environmentally conscious SMEs, are better positioned to intensify the adoption of proactive sustainability strategies (Vázquez Brust *et al.*, 2022), anticipating regulatory changes and accruing long-term financial and reputational benefits (Nguyen and Adomako, 2021; Tyler *et al.*, 2024).

Second, CEE serves as a cultural amplifier of GHRM initiatives. The findings emphasize CEE's role as a cultural amplifier within the organization (Al-Swidi *et al.*, 2024; Singh *et al.*, 2019). When GHRM is embedded within an ethical framework, the firm practices sustainable HR policies and fosters an environment where ethical and environmental considerations are central to decision-making. This evidence aligns with that of Al-Swidi *et al.* (2024). This alignment between GHRM and CEE results in a holistic approach where employees at all levels are encouraged to integrate environmental ethics into their daily work, enhancing the organization's overall sustainability.

Third, the mediating role of CEE. CEE serves as a substantial mediating role in the relationship between GHRM and both RES and PES. This indicates that while GHRM establishes the structural and functional framework for environmental action, the internalization of environmental ethics within the organization is crucial for translating these practices into tangible ES. CEE creates a shared understanding of environmental responsibility across all levels of the organization, fostering a unified commitment to environmental goals (Singh *et al.*, 2019). This ethical alignment enhances the effectiveness of GHRM initiatives by integrating environmental considerations into the organizational culture (Fawehinmi *et al.*, 2024), thereby helping sustain proactive and reactive strategies over time (Chan *et al.*, 2022).

Fourth, differentiated impact on RES and PES. The stronger mediating relationship of CEE between GHRM and RES compared to PES suggests that ethical frameworks might be particularly impactful in guiding reactive strategies. Reactive strategies, addressing existing environmental damage, demand an immediate ethical commitment to responsible impact management. Immediacy and external pressure, including regulatory mandates and public scrutiny, define the boundary conditions that determine the impact of CEE on RES. Proactive strategies, however, involving longer-term planning and innovation, depend more on GHRM-driven skills and motivation than ethical imperatives alone. For proactive approaches, CEE's role, while significant, has a slightly less impact; these strategies inherently rely more on GHRM practices' structural support and a workforce skilled in sustainable innovation. Within GHRM, employees comprehend ES (Correia *et al.*, 2024). This knowledge empowers

employees to recognize that PES may not always yield desired strategic or environmental outcomes (Tyler *et al.*, 2024), potentially compromising corporate profitability (Kim, 2018). Employees, subject to external pressures from government and environmental regulations or internal pressures from GHRM initiatives (Vázquez-Brust *et al.*, 2022), prioritize environmental ethics, minimizing unethical environmental activities and strictly adhering to environmental regulations (Pan *et al.*, 2020), leading to increased RES adoption (Chan *et al.*, 2022).

Lastly, firm age has no significant influence on both reactive and PES. This finding aligns with Badulescu *et al.* (2018), who observed no direct link between firm age and CSR activities, and with Liao (2016) and Dangelico *et al.* (2017), whose research suggests older firms may be less inclined toward environmental innovation. Such evidence challenges the assumptions by Russo (2009) and Withisuphakorn and Jiraporn (2016), indicating that experience alone does not decisively shape sustainability behavior. Firm size, conversely, appears more crucial for PES; larger companies, possessing greater financial and HRs, tend to invest in environmental systems, such as pollution prevention and reverse logistics (Vijayvargy *et al.*, 2017; Balasubramanian *et al.*, 2021), supporting long-term strategic orientation toward sustainability. Reactive strategies, however, are often shaped by regulatory compliance or immediate environmental risks, applying equally across varying firm sizes (Amores-Salvadó *et al.*, 2021).

5.2 Theoretical implications

Theoretically, this study aims to make several contributions to literature. First, this research contributes to existing literature by explaining and empirically validating how GHRM practices develop and promote ES, particularly PES. The findings underscore the critical role of top management involvement in driving these efforts (Genç and Benedetto, 2019). Additionally, the study emphasizes the importance of aligning control mechanisms with incentive-driven organizational structures to motivate employees and facilitate effective PES implementation (Amores-Salvadó *et al.*, 2021). Moreover, GHRM also supports RES by enhancing employee capability to ensure compliance and reduce environmental risks. By clarifying these differentiated pathways, our study contributes to advancing theoretical understanding of how GHRM shapes both compliance-driven and innovation-oriented ES.

Second, this research further contributes to academic discourse by providing empirical evidence that CEE predominantly drives RES rather than PES, often due to pressures to comply with industry standards. Government and GHRM-related pressures can motivate employees to prioritize CEE, leading to reduced unethical environmental activities, stricter adherence to environmental regulations and increased RES adoption (Chan *et al.*, 2022; Pan *et al.*, 2020).

Lastly, this study advances theory by demonstrating that firm age does not impact ES, indicating that experience alone is not a strategic resource for sustainability. Conversely, firm size influences proactive strategies, emphasizing the importance of internal capabilities as described by the RBV and AMO theory. Additionally, the findings reinforce the ethical theory of organizing by highlighting the critical role of GHRM and environmental culture in driving ES beyond structural characteristics.

5.3 Practical implications

GHRM has a critical impact on RES and PES implementation, with CEE mediating this relationship. To maximize this, firms must embed GHRM policies that foster eco-conscious workforce practices. This involves prioritizing the recruitment of candidates with sustainability values, incorporating environmental criteria into performance evaluations, and developing comprehensive training programs on environmental practices. Additionally, an “Environmental Ethics Committee” can cultivate an ethical organizational culture, encouraging the reporting of unethical environmental conduct. Providing leadership development programs focused on sustainability helps prepare future leaders to actively

support and promote green initiatives. Empowering employees through “Green Teams” fosters ownership and enhances engagement. Finally, forging strategic partnerships with local communities and environmental organizations amplifies sustainability efforts, while regular GHRM policy review, incorporating employee feedback and current environmental research, proves crucial for sustained relevance and effectiveness.

To strengthen GHRM, firms should implement specific actions that support employee engagement in sustainability. First, they can adopt green recruitment practices by hiring candidates who demonstrate strong environmental values and knowledge (Nisar *et al.*, 2021). Second, green training programs should be used to encourage behaviors such as recycling, waste reduction, and remote working (Xie and Zhu, 2020). Third, applying green performance evaluations and reward systems can help motivate employees to adopt and maintain environmentally friendly practices at work (Ahmed *et al.*, 2019).

Ensuring sustained ES implementation necessitates balancing environmental responsibility with financial viability (Gabler *et al.*, 2023), which requires rigorous cost-benefit analyses of ecological initiatives (Khanifah *et al.*, 2020). Firms frequently employ PES and RES simultaneously (Baah *et al.*, 2021; Kim, 2018), varying in intensity based on organizational resources and strategic objectives. PES pursuit can erode corporate profitability (Genç and Benedetto, 2019; Kim, 2018), jeopardizing funding for both PES and RES (Khanifah *et al.*, 2020). While PES offers superior long-term benefits, firms often complement this approach with RES. Facing financial constraints, firms may prioritize RES implementation, involving less disruptive operational changes, balancing green practices and legal compliance (Kim, 2018). By adopting a reactive strategic stance, focusing on “end-of-pipe” controls, firms achieve efficiency gains, meet minimum regulatory requirements and embody the “low-hanging fruit principle” (Amores-Salvadó *et al.*, 2021). Importantly, this study also highlights that younger firms, when equipped with the right strategic focus, should be confident in their ability to perform as well as older firms’ environmental sustainability efforts despite having less experience.

6. Conclusion

This study addressed three key questions concerning the influence of GHRM on firms’ ES. The results indicate that GHRM contributes to both reactive and proactive environmental approaches, with a more substantial impact observed in driving forward-looking, innovation-based practices. This highlights its critical role in shaping long-term sustainability agendas. Furthermore, the CEE emerged as a mediator, reinforcing the link between green HR practices and environmental outcomes through shared ethical values. The results suggest that GHRM enhances ES not only through structural practices but also by fostering an ethical mindset across the organization. This research underscores the importance of aligning HRM practices with ethical values to promote environmental sustainability. These insights offer value for managers, scholars, and policymakers seeking to build resilient and responsible organizations.

This study has several limitations. First, its geographic scope was confined to two industrial regions in southern Vietnam, potentially limiting generalizability to other Vietnamese contexts, such as urban-rural disparities or northern provinces, and neglecting variations in export orientation or market scope. Future research should diversify locations and company profiles to enhance external validity. Second, snowball sampling, while effective for accessing senior managers, may introduce bias by favoring respondents with similar characteristics or perspectives (Etikan *et al.*, 2016), highlighting the importance of adopting more representative sampling methods in future research. Third, cross-sectional design limits the ability to analyze temporal changes in GHRM, CEE and environmental sustainability. This limitation indicates the necessity for future longitudinal studies. Finally, while focusing on Vietnamese manufacturing firms provides valuable insights, future work could expand to other industries or nations for comparative analysis and integrate new variables, such as green learning or green innovation to enrich theoretical models.

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