

“Linking green mindful leadership to employee pro-environmental behaviors: The roles of green HRM practices and employee green self-efficacy”

AUTHORS	Vo Hien Chau Nguyen  Thi Thao Hien Bui  
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Vo Hien Chau Nguyen, MBA, Lecturer,
Department of International Business,
School of Business, International
University, VNU-HCM, Ho Chi Minh
City, Vietnam; Vietnam National
University, Ho Chi Minh City,
Vietnam.

Thi Thao Hien Bui, Ph.D., Lecturer,
Department of Business Management,
School of Business, International
University, VNU-HCM, Ho Chi Minh
City, Vietnam; Vietnam National
University, Ho Chi Minh City,
Vietnam. (Corresponding author)



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Vo Hien Chau Nguyen (Vietnam), Thi Thao Hien Bui (Vietnam)

LINKING GREEN MINDFUL LEADERSHIP TO EMPLOYEE PRO-ENVIRONMENTAL BEHAVIORS: THE ROLES OF GREEN HRM PRACTICES AND EMPLOYEE GREEN SELF-EFFICACY

Abstract

Understanding factors associated with employee pro-environmental behavior is crucial in manufacturing. This study examines relationships among green mindful leadership, green human resource management practices, employee green self-efficacy, and employee pro-environmental behavior. Data from 680 full-time employees of Vietnamese manufacturing firms were collected using purposive and snowball sampling and analyzed using PLS-SEM. Green mindful leadership positively relates to green competence-building practices ($\beta = 0.253$; $p < 0.001$), green motivation-enhancing practices ($\beta = 0.279$; $p < 0.001$), and green employee involvement practices ($\beta = 0.187$; $p < 0.001$). These practices positively relate to employee green self-efficacy ($\beta = 0.249, 0.294, \text{ and } 0.170$, respectively; all $p < 0.001$), which relates to employee pro-environmental behavior ($\beta = 0.314$; $p < 0.001$). All three dimensions directly relate to employee pro-environmental behavior: green employee involvement practices ($\beta = 0.353$; $p < 0.001$), green competence-building practices ($\beta = 0.194$; $p < 0.001$), and green motivation-enhancing practices ($\beta = 0.096$; $p = 0.033$). Sequential mediation analyses confirm significant indirect pathways through green competence-building practices and employee green self-efficacy ($\beta = 0.020$; $p = 0.001$), green employee involvement practices and employee green self-efficacy ($\beta = 0.010$; $p = 0.012$), and green motivation-enhancing practices and employee green self-efficacy ($\beta = 0.026$; $p = 0.002$). These findings highlight the role of leadership-driven green human resource management systems and employee green self-efficacy in fostering employee pro-environmental behavior.

Keywords

GHRM, leadership, mindfulness, self-efficacy, pro-environmental

JEL Classification

M12, M14, Q56

INTRODUCTION

Environmental degradation remains a critical global challenge, particularly in developing economies that serve as the primary hubs for global production and industrialization. Within these regions, the manufacturing sector remains a major source of environmental pressure, as industrial production is highly resource-intensive and generates substantial emissions, waste, water use, and material consumption. Recent evidence shows that cleaner and more resource-efficient manufacturing processes are essential because manufacturing activities continue to impose significant environmental burdens at the production-site level (Lema, 2026).

Vietnam's rapid manufacturing-led growth has been accompanied by escalating environmental strain, including urban air pollution, industrial waste, and mounting public health concerns, while

deepening integration into global supply chains and international climate commitments has intensified pressure on factories to demonstrate environmental responsibility in their daily operations (World Bank, 2025). Technical solutions and government rules help, yet employee behavior remains a deciding factor because daily actions on the factory floor directly shape environmental outcomes (Chiarini & Bag, 2024). Encouraging workers to adopt eco-friendly habits is challenging because these actions are voluntary and depend on personal motivation, which formal rules cannot create on their own (Yuan et al., 2024).

Green human resource management (GHRM) and leadership, acting as a strong alignment with management support to drive green workforce changes, are closely associated with employee pro-environmental behavior, but most research examines green HR practices as a single, combined concept. This leaves a gap in understanding how specific actions like skill-building, motivation boosts, and employee involvement spark different behaviors (Amrutha & Geetha, 2020). Additionally, researchers have rarely explored the psychological factors, such as green self-efficacy, that connect leadership and HR practices to real environmental actions. Existing studies focus heavily on the hospitality sector, leaving the manufacturing context largely unexamined (Faraz et al., 2021; Kim et al., 2019; Nisar et al., 2024).

1. LITERATURE REVIEW AND HYPOTHESES

Achieving organizational environmental sustainability ultimately depends on whether green intentions at the managerial level translate into consistent employee action on the factory floor, a translation process that involves organizational practices, leadership behavior, and individual psychological readiness working in concert (Paillé et al., 2014; Renwick et al., 2013). Each of these elements has attracted substantial scholarly attention in isolation, yet how they interact as a system to produce pro-environmental behavior remains incompletely understood, particularly in manufacturing contexts where environmental stakes are highest (Yuan et al., 2024; Graves et al., 2013; Faraz et al., 2021). Most studies still treat GHRM as a unitary construct, leaving a critical gap in exploring how various types of practices lead to employee behavior via different pathways (Amrutha & Geetha, 2020). Additionally, while green self-efficacy is known to connect with pro-environmental behavior, its role in linking specific GHRM practices to actual employee behavior has received little attention (Faraz et al., 2021). Finally, although GHRM practices and leadership can independently affect environmental outcomes, there is inadequate research on how leadership influences employee behavior through the implementation of differentiated GHRM practices and subsequent psychological mechanisms (Dumont et al., 2017;

Graves et al., 2013; Robertson & Barling, 2013). To address these gaps, the Ability–Motivation–Opportunity (AMO) model provides a structured framework to explain the impact of HR practices on employee behavior by specifying three conditions: employees must possess the required abilities, be motivated to act, and have the opportunity to act (Appelbaum et al., 2000). Collectively, these dimensions explain the impact of organizational actions on employees' willingness to act pro-environmentally by aligning specific HR practices.

Employee pro-environmental behavior (EPRO) refers to the actions employees take at work to protect the environment and support organizational sustainability (Boiral et al., 2015). These behaviors are generally divided into two types: tasks required by a formal job description and voluntary actions where employees choose to engage in eco-friendly practices on their own, such as conserving energy, recycling, or proposing green initiatives (Zacher et al., 2023). When employees actively work to reduce waste and save resources, their collective efforts lower operational costs and reduce the overall carbon footprint of the firm. Furthermore, when employees consistently engage in conservation-oriented behaviors, they contribute to organizational sustainability efforts by reducing resource waste and supporting environmentally responsible workplace practices (Fawehinmi et al., 2024). However, since these EPROs are often self-initiated and not strictly mandatory, pro-

moting them regularly among the workforce remains a significant managerial challenge (Yuan et al., 2024; Kim et al., 2017). Consequently, GHRM has emerged as an important strategic tool to encourage employees to voluntarily adopt these eco-friendly practices by aligning daily HR activities with broader environmental objectives (Pham et al., 2019; Renwick et al., 2013).

Leadership acts as an important factor in shaping these environmental outcomes, as leaders directly determine the attention, priorities, and behavioral responses of employees toward corporate sustainability efforts (Graves et al., 2013; Robertson & Barling, 2013). Among the various leadership approaches that have been examined in organizational research, increasing attention has recently been directed toward mindful leadership due to its emphasis on awareness, attentiveness, and conscious decision-making in complex work environments (Reb et al., 2015; Doornich & Lynch, 2024). Leaders who remain attentive to environmental concerns, carefully consider the ecological consequences of workplace activities, and encourage employees to reflect on sustainability-related issues are more likely to foster environmentally responsible behaviors among their followers (Reb et al., 2015; Sun & Xi, 2024). Through active listening, thoughtful decision-making, and continuous awareness of environmental challenges, these leaders create a work environment in which employees become more conscious of environmental issues and more willing to participate in sustainability initiatives (Faraz et al., 2021).

Although a growing body of evidence links mindful and environmentally oriented leadership to employee green behavior, existing studies have concentrated predominantly on individual psychological mechanisms, while the organizational mechanisms through which green mindful leadership shapes pro-environmental behavior, particularly the activation of formal HR systems, remain largely unexplored. The impact of green mindful leadership on employee green behavior has similarly been explored through team green mindfulness and green self-efficacy via scenario-based experiments and two-wave survey designs (Wang et al., 2025). Related evidence further confirms this individual-level focus, with self-efficacy and intrinsic motivation as mediators of green

servant leadership on pro-environmental behavior (Mughal et al., 2024), green creative self-efficacy as the mechanism linking environmentally specific empowering leadership to green creativity (Meirun et al., 2024), and moral reflectiveness and environmental passion as mediators of mindful leadership on green creativity (Sun & Xi, 2024). Additionally, most evidence also derives from Chinese service contexts, leaving developing manufacturing economies substantially underrepresented. Given that the effective deployment of formal HR practices depends heavily on a leader's environmental commitment, directly examining the relationship between green mindful leadership and differentiated GHRM practices is essential for understanding how leaders actively shape sustainability-oriented HR systems within organizations.

Mindful leadership as an organizational construct draws from three converging intellectual traditions. The first is the socio-cognitive tradition, which introduced mindfulness into organizational research as a state of active cognitive engagement characterized by openness to novelty, sensitivity to context, and the continuous creation of new distinctions, in contrast to the rigid, automatic processing termed "mindlessness" (Langer, 1989). A mindful leader attends to the present situation as genuinely new rather than assimilating it to past categories, enabling more adaptive and context-sensitive judgment. The second stream originates in high-reliability organization research, which conceptualized mindfulness as a collective organizational capacity, encompassing sustained attentiveness to weak signals, resistance to oversimplification, and readiness for the unexpected, positioning mindful organizing as a leadership-level function that shapes how organizations process ambiguous information before failures escalate (Weick & Sutcliffe, 2001). The third and most empirically developed stream adapts present-moment awareness into supervisor-level research, defining supervisor trait mindfulness as a stable disposition toward non-judgmental attention and demonstrating that leaders high in this trait generate significantly higher employee job satisfaction, need satisfaction, and in-role performance while reducing emotional exhaustion (Reb et al., 2014). Leader mindfulness operates through leader-member exchange quality and interper-

sonal justice, reinforcing its fundamentally relational character as a leadership construct (Reb et al., 2019).

Building on these three foundations, recent scholarship has extended mindful leadership into the environmental domain by integrating sustainability orientation into the construct. Green mindful leadership can be conceptualized as a leadership approach characterized by present-moment awareness, contextual sensitivity, and attentiveness to the environmental implications of organizational decisions, with green mindful leaders distinguished by heightened sensitivity to environmental information, openness to employees' sustainability-related inputs, and the capacity to process complex environmental challenges with composure (Sun & Xi, 2024; Yang et al., 2024). Empirical evidence further confirms that this leadership approach influences environmentally relevant employee outcomes through both direct and indirect psychological pathways. Thus, mindful leadership has been shown to promote employee green behavior through the sequential mediation of green organizational identity and green self-efficacy (Yang et al., 2024), and to enhance green creativity through the serial mediation of moral reflectiveness and environmental passion (Sun & Xi, 2024).

Within the broader HRM literature, leadership has been consistently identified as a key determinant of how HR practices are designed and implemented, with front-line managers' behavior shown to strongly shape the enactment of HR practices in everyday organizational settings (Purcell & Hutchinson, 2007). At the conceptual level, enactment has been identified as the central mechanism through which leadership and HRM interact (Leroy et al., 2018). Despite extensive scholarly attention to this relationship, existing research has concentrated predominantly on transformational, ethical, and servant leadership styles, leaving empirical evidence on how green mindful leadership specifically shapes GHRM practices sparse (Asfahani, 2025; Chen & Yan, 2022; Miah et al., 2024; Singh et al., 2020). Critically, limited research has examined how mindful leadership may differentially influence the three AMO-based dimensions of GHRM as distinct mechanisms through which leadership shapes organizational

environmental initiatives. Leadership and culture have been identified as recurring antecedents of effective GHRM implementation across the literature, and transformational leadership has been empirically shown to enhance GHRM adoption, which in turn positively influences employee green behavior (Asfahani, 2025). Green mindful leadership, combining environmental orientation with present-moment attentiveness, is therefore expected to promote the adoption of green competence-building, motivation-enhancing, and employee involvement practices.

Rooted in early arguments that employees are central to organizational environmental performance (Wehrmeyer, 1996), GHRM was formally conceptualized by Renwick et al. (2013) as the HRM dimensions of environmental management, organized around the AMO framework into three practice categories. These categories aim to develop green abilities, motivate green behavior, and enable employee participation, a classification that has since been widely adopted (Pham et al., 2019; Tang et al., 2018). Tang et al. (2018) subsequently validated a comprehensive GHRM measurement instrument confirming five empirically distinct dimensions, while Ren et al. (2018) proposed an integrated model linking GHRM antecedents, consequences, and contingencies and called for stronger empirical grounding. Recent studies and systematic reviews confirm that GHRM practices consistently and positively influence employee pro-environmental behavior and organizational environmental performance, with leadership behavior identified as a primary antecedent of effective GHRM adoption (Marrucci et al., 2021). However, as Bos-Nehles et al. (2023) emphasized, mainstream HRM research frequently treats these three dimensions as a single combined index or overlooks the specific psychological mechanisms through which they interact. In environmental management contexts, this conceptual aggregation leaves a critical gap in understanding how competence-building, motivation-enhancing, and involvement practices distinctively and collectively drive employee behaviors through underlying psychological pathways.

Green competence-building practices expose employees to environmental knowledge, technical skills, and sustainability learning that equip them

to engage meaningfully with ecological challenges; as employees accumulate mastery experiences through this process, their belief in their capacity to act effectively in sustainability contexts grows correspondingly (Pham et al., 2019; Renwick et al., 2013; Yang et al., 2024). Green motivation-enhancing practices reinforce this trajectory by linking performance appraisals, rewards, and recognition mechanisms to environmental outcomes, signaling the organizational value of sustainability contributions and validating employees' environmental efforts in ways that strengthen their confidence in performing green tasks (Mousa & Othman, 2020; Paillé et al., 2023; Pham et al., 2019). Green employee involvement practices complete this picture by providing structured opportunities to participate in environmental decision-making and sustainability programs, converting abstract environmental knowledge into direct experiential evidence that employees can contribute effectively to organizational sustainability goals (Paillé & Francoeur, 2022). Collectively, these three GHRM dimensions converge on green self-efficacy, defined as an employee's belief in their own capacity to perform environmentally responsible tasks (Bandura, 2012), cultivated through the complementary mechanisms of capability development, organizational reinforcement, and active experiential engagement.

Self-efficacy, originally conceptualized as an individual's belief in their capacity to organize and execute actions required to achieve specific outcomes (Bandura, 1997), has been extended into the environmental domain as green self-efficacy, defined as employees' belief in their ability to perform actions conducive to achieving environmental goals (Chen et al., 2015). This construct captures the subjective sense of environmental competence that enables employees to translate awareness into action, carrying stronger predictive power over behavior by reflecting readiness to act on sustainability-related tasks (Chen et al., 2015; Faraz et al., 2021). When GHRM practices build environmental capabilities, reinforce sustainability motivation, and provide participation opportunities, the resulting sense of environmental self-belief subsequently drives employees' willingness to initiate voluntary sustainability actions, overcome workplace challenges, and engage in discretionary behaviors beyond formal

job requirements (Mughal et al., 2024; Zhang & Rafiq, 2025). Within this framework, employees with stronger green self-efficacy are more willing to initiate discretionary sustainability actions, persist through environmental challenges, and extend their efforts beyond what is formally required (Faraz et al., 2021), since their confidence reduces the perceived difficulty of self-initiated environmental engagement (Mughal et al., 2024). Green self-efficacy, therefore, serves as the psychological conduit through which each dimension of GHRM reaches employee behavior, mediating the relationship between green competence-building, motivation-enhancing, and involvement practices and employee pro-environmental behavior. Backed by recent scholarship, a positive relationship between each dimension of GHRM and employee green self-efficacy, a mediating role of green self-efficacy, and a positive relationship between green self-efficacy and employee pro-environmental behavior are expected. Because green mindful leadership shapes the enactment of formal HR systems (Purcell & Hutchinson, 2007; Leroy et al., 2018; Asfahani, 2025) and those systems in turn strengthen employees' environmental self-belief, the leadership effect on pro-environmental behavior is expected to travel through a two-stage chain rather than a single mediator. Comparable sequential structures have been documented for mindful leadership operating through green organizational identity and green self-efficacy (Yang et al., 2024), for green transformational leadership operating through green mindfulness and green self-efficacy (Chen et al., 2014), for GHRM operating through perceived behavioral control and attitude (Fawehinmi et al., 2024), and, in manufacturing specifically, for green leadership operating through a well-being pathway terminating in self-efficacy (Barik et al., 2026).

Despite growing scholarly attention, the literature on GHRM, green self-efficacy, and employee outcomes remains fragmented by inconsistent conceptual models and a predominant focus on non-manufacturing contexts. Green self-efficacy has been framed as a mediator between green leadership and pro-environmental behavior in Pakistan's energy sector (Mughal et al., 2022), yet repositioned as a moderator within the same context (Faraz et al., 2021). A similar divergence exists in the hospitality sector, where green self-efficacy has been treated

as a mediating mechanism linking GHRM to employee green behavior (Nisar et al., 2024) and alternatively as a boundary condition moderating the GHRM–pro-environmental behavior relationship. This inconsistency indicates that the theoretical role of green self-efficacy within GHRM frameworks remains unresolved. Treating green self-efficacy as a mediator more accurately reflects the theoretical logic of social cognitive theory, whereby organizational practices shape employees' self-belief, and it is that self-belief that determines behavioral engagement (Bandura, 1997). The manufacturing sector, where environmental responsibilities are more direct, regulatory pressures are more stringent, and the operational stakes of employee environmental behavior are considerably higher, remains largely unexamined in this regard (Guerci et al., 2016; Jabbour & Santos, 2008).

In summary, while existing literature extensively links environmentally-oriented leadership to green behaviors through individual psychological traits, the specific organizational mechanisms bridging this relationship remain largely overlooked. Addressing this gap requires a comprehensive model explaining how green mindful leadership drives actual pro-environmental actions through the AMO framework, specifically by implementing green competence-building, motivation-enhancing, and employee involvement practices, and the subsequent development of employee green self-efficacy within the manufacturing context. Therefore, the following hypotheses are formulated:

- H1: *Green mindful leadership positively influences green competence-building practices.*
- H2: *Green mindful leadership positively influences green motivation-enhancing practices.*
- H3: *Green mindful leadership positively influences green employee involvement practices.*
- H4: *Green competence-building practices positively influence employee green self-efficacy.*
- H5: *Green motivation-enhancing practices positively influence employee green self-efficacy.*
- H6: *Green employee involvement practices positively influence employee green self-efficacy.*
- H7: *Green competence-building practices positively influence employee pro-environmental behaviors.*
- H8: *Green motivation-enhancing practices positively influence employee pro-environmental behaviors.*
- H9: *Green employee involvement practices positively influence employee pro-environmental behaviors.*
- H10a: *Employee green self-efficacy mediates the relationship between green competence-building practices and employee pro-environmental behaviors.*
- H10b: *Employee green self-efficacy mediates the relationship between green motivation-enhancing practices and employee pro-environmental behaviors.*
- H10c: *Employee green self-efficacy mediates the relationship between green employee involvement practices and employee pro-environmental behaviors.*
- H11: *Employee green self-efficacy positively influences employee pro-environmental behaviors.*
- H12a: *Green motivation-enhancing practices and employee green self-efficacy sequentially mediate the relationship between green mindful leadership and employee pro-environmental behavior.*
- H12b: *Green motivation-enhancing practices and employee green self-efficacy sequentially mediate the relationship between green mindful leadership and employee pro-environmental behavior.*
- H12c: *Green motivation-enhancing practices and employee green self-efficacy sequentially mediate the relationship between green mindful leadership and employee pro-environmental behavior.*

Figure 1 represents the integrated framework.

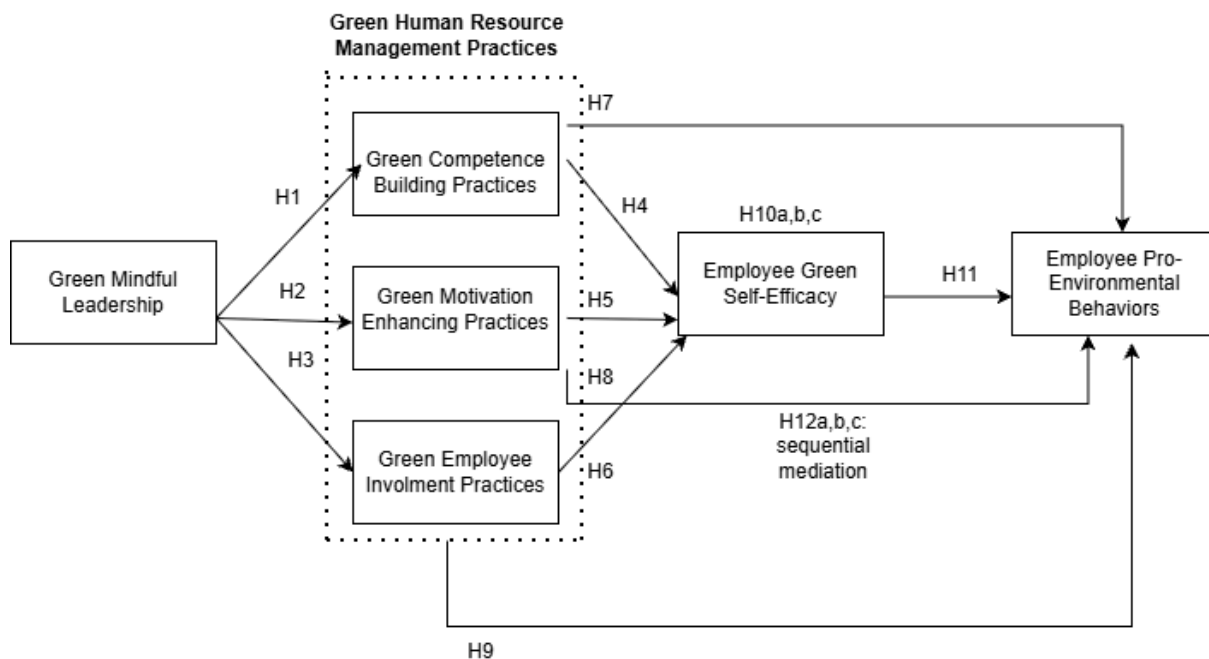


Figure 1. Conceptual framework

2. METHODS

Using a quantitative research design, this study employed partial least squares structural equation modeling (PLS-SEM) to examine the relationships among green mindful leadership, green motivation-enhancing practices, green employee involvement practices, employee green self-efficacy, and employee pro-environmental behavior. A total of 77 out of 155 manufacturing companies listed in the 2025 “Green Enterprise of Ho Chi Minh City” program were considered as the initial sampling frame, based on the official public list of awarded enterprises. Notably, during the data collection period, Ho Chi Minh City, Binh Duong, and Ba Ria–Vung Tau were undergoing administrative integration into an expanded Ho Chi Minh City, further reinforcing the industrial centrality of this southern economic region as an appropriate research context. Respondents were recruited through purposive and snowball sampling between November 2025 and May 2026. Eligible employees were approached directly and invited to complete the questionnaire through both face-to-face distribution and online survey links; initial respondents were subsequently asked to share the survey link with colleagues employed in similar manufacturing firms, thereby extending the sample through referral chains. Respondents were required to meet the following criteria:

- (i) currently employed full-time in a manufacturing company;
- (ii) possessing at least one year of work experience in their current organization;
- (iii) demonstrating sufficient familiarity with the company’s GHRM practices; and
- (iv) voluntarily agreeing to participate in the study.

Of 819 distributed questionnaires, 680 were returned, yielding an 83% response rate. All constructs were measured using a five-point Likert scale (1 = strongly disagree; 5 = strongly agree), with items adapted from previously validated scales and revised to fit the manufacturing context. Green motivation-enhancing and employee involvement practices were adapted from Tang et al. (2018), employee pro-environmental behavior from Graves et al. (2013) and Kim et al. (2016), green self-efficacy from Chen et al. (2015), and green mindful leadership from Walach et al. (2006). Items were reviewed for clarity, contextual relevance, and alignment with the proposed constructs prior to administration, and only those directly related to the study model were retained. A pilot test with 30 employees helped identify potential weaknesses and assess wording clarity before the main survey (Sekaran & Bougie, 2016). The full measurement scales are presented in Table A1.

As shown in Table 1, the sample was relatively gender-balanced (47.0% male, 53.0% female), predominantly aged 31–45 (49.3%), and largely educated to bachelor's degree level. Work experience was concentrated in the 1 to 5 years range (46.1%), reflecting an early- to mid-career workforce. Income was distributed mainly across the VND 10 to 20 million (36.5%) and VND 21 to 30 million (34.4%). Large firms accounted for the largest share of respondents (36.7%), suggesting that medium- and large-sized manufacturing firms constitute the primary context in which GHRM practices are being implemented.

The present study employed a minimal-risk, anonymous survey design and adhered to established ethical principles for human participant research. The project received research funding from Vietnam National University Ho Chi Minh City (VNU-HCM) and was subject to the institution's required appraisal and review procedures for funded research. Before completing the questionnaire, participants were informed of the study objectives, the intended use of the data, the voluntary basis of participation, the anonymous treatment of responses, and their right to withdraw at any point prior to submission.

3. RESULTS

3.1. Common method bias results

To assess potential common method bias, both procedural and statistical remedies were employed. Procedurally, respondent anonymity and confidentiality were ensured, participation was voluntary, and the questionnaire was pre-tested to improve clarity and minimize evaluation apprehension. Statistically, Harman's single-factor test showed that the first unrotated factor accounted for 32.37% of the total variance, below the conventional 50% threshold. According to Kock's (2015), the full collinearity VIF values ranged from 1.102 to 2.708, with EPRO = 2.708, ESE = 1.906, GCBP = 2.032, GEIP = 2.208, GMPE = 2.315, and GML = 1.102. All values were below the conservative threshold of 3.3, providing no indication of pathological collinearity or substantial common method bias.

3.2. Measurement model

According to the current findings, the measurement model demonstrates acceptable indicator reliability, with outer loadings ranging from 0.572 to 0.880 across the study constructs. Specifically, item loadings ranged from 0.606 to 0.713 for GML; 0.677

Table 1. Demographic data

Item	Categories	Response	Percentage
Gender	Male	320	47.0%
	Female	360	53.0%
Age	20–30 years old	320	47.0%
	31–45 years old	335	49.3%
	Above 45 years old	25	3.7%
Work experience	From 1 to 5 years	313	46.1%
	From 5 to 10 years	277	40.7%
	Above 10 years	90	13.1%
Education	College	151	22.2%
	University	293	43.1%
	Master	188	27.6%
	PhD	48	7.0%
Income	Below 10 million VND	198	29.1%
	From 10–20 million VND	248	36.5%
	From 21–30 million VND	234	34.4%
Company size	Below 100 employees	0	0.0%
	From 101–200 employees	234	34.4%
	From 201–300 employees	196	28.9%
	Above 300 employees	250	36.7%

to 0.799 for GCBP; 0.674 to 0.796 for GEIP; 0.750 to 0.804 for GMEP; 0.879 to 0.881 for ESE; and 0.572 to 0.725 for EPRO. These values have shown that the majority of the indicators loaded sufficiently on their corresponding latent constructs. The findings suggest that convergent validity was mostly supported throughout the measurement model. The AVE values for GCBP (0.556), GEIP (0.589), GMEP

(0.601), and ESE (0.774) exceeded the recommended threshold of 0.50, confirming adequate convergent validity for all constructs. In comparison, EPRO (0.432) and GML (0.438) did not satisfy this requirement. However, the two constructs displayed acceptable internal consistency, with composite reliabilities of over 0.80 and acceptable Cronbach's alpha and rhoA. Based on Chin's (1998) recom-

Table 2. Measurement model: Convergent validity and reliability

Indicator	Loading	Cronbach’s alpha	Composite reliability	Average variance extracted (AVE)
Employee pro-environmental behaviors				
EPRO1	0.597	0.836	0.872	0.432
EPRO2	0.627			
EPRO3	0.708			
EPRO4	0.720			
EPRO5	0.641			
EPRO6	0.572			
EPRO7	0.628			
EPRO8	0.725			
EPRO9	0.681			
Employee self-efficacy				
ESE1	0.879	0.708	0.873	0.774
ESE2	0.881			
Green competence building practices				
GCBP1	0.799	0.840	0.882	0.556
GCBP2	0.760			
GCBP3	0.787			
GCBP4	0.732			
GCBP5	0.713			
GCBP6	0.677			
Green employee involvement practices				
GEIP1	0.796	0.825	0.877	0.589
GEIP2	0.792			
GEIP3	0.787			
GEIP4	0.783			
GEIP5	0.674			
Green motivation enhancing practices				
GMEP1	0.770	0.834	0.883	0.601
GMEP2	0.750			
GMEP3	0.759			
GMEP4	0.793			
GMEP5	0.804			
Green mindful leadership				
GML1	0.618	0.767	0.823	0.438
GML2	0.606			
GML3	0.627			
GML4	0.713			
GML5	0.685			
GML6	0.711			

mendation, items ESE3 and GML7–GML9 were removed because their outer loadings were below the 0.50 threshold. Table 2 indicated the results of the measurement model.

Two criteria were used to assess discriminant validity. Heterotrait-monotrait ratio (HTMT) values are less than the conservative estimate of 0.85, with the highest being 0.823 between EPRO and ESE (Henseler et al., 2015). Even though this result is close to the cut-off, it is inside the permitted range, indicating discriminant validity. The Fornell–Larcker criterion was also met, since the square root of the average variance extracted (AVE) for each construct, shown diagonally, exceeded all significant inter-construct correlations. These findings support acceptable construct distinctiveness across measurement modes. Tables 3 and 4 represent the HTMT results and Fornell–Larcker results.

Table 3. HTMT results

Variable	EPRO	ESE	GCBP	GEIP	GMEP	GML
EPRO						
ESE	0.823					
GCBP	0.730	0.689				
GEIP	0.793	0.639	0.665			
GMEP	0.727	0.729	0.773	0.757		
GML	0.285	0.364	0.278	0.216	0.282	

Note: EPRO = employee pro-environmental behavior; ESE = employee green self-efficacy; GCBP = green competence-building practices; GEIP = green employee involvement practices; GMEP = green motivation-enhancing practices; GML = green mindful leadership.

Table 4. Fornell–Larcker results

Variable	EPRO	ESE	GCBP	GEIP	GMEP	GML
EPRO	0.685					
ESE	0.650	0.880				
GCBP	0.609	0.536	0.746			
GEIP	0.691	0.494	0.556	0.768		
GMEP	0.623	0.563	0.651	0.630	0.775	
GML	0.225	0.236	0.253	0.188	0.279	0.662

Note: EPRO = employee pro-environmental behavior; ESE = employee green self-efficacy; GCBP = green competence-building practices; GEIP = green employee involvement practices; GMEP = green motivation-enhancing practices; GML = green mindful leadership.

3.3. Structural model

The estimates of the effect sizes (f^2) have shown that most of the relationships that were hypothesized to exist had a smaller effect size (0.011–

0.085), with the relationship between ESE and EPRO having a relatively high effect ($f^2 = 0.161$). GCBP showed a small effect on EPRO ($f^2 = 0.051$), GMEP had a negligible effect ($f^2 = 0.011$), whereas GEIP demonstrated a moderate effect ($f^2 = 0.181$), suggesting that green employee involvement practices make the strongest substantive contribution to employee pro-environmental behavior among the three GHRM dimensions. In terms of explanatory power, the model accounted for 6.4% of the variance in GCBP, 3.5% in GEIP, 7.8% in GMEP, 38.3% in ESE, and 62.1% in EPRO, with adjusted R^2 values of 0.063, 0.034, 0.077, 0.381, and 0.619, respectively. These results suggest that the model possesses low explanatory power on the three dimensions of GHRM practices, moderate explanatory power on ESE, and strong explanatory power on EPRO. The results are shown in Table 5.

Table 5. Results of inner VIF, f^2 , R^2 , R^2 adjusted, and Q^2

Paths	Inner VIF	f^2	R^2	R^2 adjusted	Q^2
GML → GCBP	1.000	0.069			
GML → GMEP	1.000	0.085			
GML → GEIP	1.000	0.036			
GCBP → ESE	1.852	0.054			
GMEP → ESE	2.116	0.066			
GEIP → ESE	1.766	0.027			
GCBP → EPRO	1.953	0.051			
GMEP → EPRO	2.256	0.011			
GEIP → EPRO	1.813	0.181			
ESE → EPRO	1.622	0.161			
GCBP			0.064	0.063	0.058
GEIP			0.035	0.034	0.030
GMEP			0.078	0.077	0.071
EPRO			0.621	0.619	0.050
ESE			0.383	0.381	0.042

Note: EPRO = employee pro-environmental behavior; ESE = employee green self-efficacy; GCBP = green competence-building practices; GEIP = green employee involvement practices; GMEP = green motivation-enhancing practices; GML = green mindful leadership.

The predictive relevance test also indicates the sufficiency of the model. The results of all the endogenous constructs produced positive values of Q^2 , with the values being 0.058, 0.030, 0.071, 0.050, and 0.042, respectively, which implies that the model has predictive relevance to all the endogenous variables.

The results of the hypothesis testing in Table 6 show that all direct relationships in the model are positive and significant. First, GML shows sig-

nificant positive effects on all three dimensions of green human resource management practices, including GCBP ($\beta = 0.253, p < 0.001$), GEIP ($\beta = 0.187, p < 0.001$), and GMEP ($\beta = 0.279, p < 0.001$), so *H1*, *H2*, and *H3* are supported. Secondly, these three GHRM dimensions, in turn, significantly and positively influence ESE, with effects observed for GCBP ($\beta = 0.249, p < 0.001$), GMEP ($\beta = 0.294, p < 0.001$), and GEIP ($\beta = 0.170, p = 0.002$), so *H4*, *H5*, and *H6* are supported. All three GHRM dimensions proved significant positive effects on EPRO, with effects observed for GCBP ($\beta = 0.194, p < 0.001$), GMEP ($\beta = 0.096, p = 0.033$), and GEIP ($\beta = 0.353, p < 0.001$). Thus, *H7*, *H8*, and *H9* are supported, with GEIP showing the strongest direct association with employee pro-environmental behavior. ESE has a significant positive effect on EPRO ($\beta = 0.314, p < 0.001$), indicating that *H11* is accepted. Overall, the results confirm that green mindful leadership positively affects GHRM practices, which in turn is positively associated with employee green self-efficacy, while employee green

self-efficacy significantly promotes employee pro-environmental behavior. The results are presented in Figure 2.

The indirect effects analysis in Table 7 proved that ESE plays a significant role in mediating the relationships between GCBP, GEIP, GMEP, and EPRO. The indirect effect of GCBP $\rightarrow$ ESE $\rightarrow$ EPRO was significant ($\beta = 0.078, p < 0.001$), as was the indirect effect of GEIP $\rightarrow$ ESE $\rightarrow$ EPRO ($\beta = 0.054, p = 0.002$) and GMEP $\rightarrow$ ESE $\rightarrow$ EPRO ($\beta = 0.092, p < 0.001$). As the respective direct effects on the EPRO were also still significant, the results suggest partial mediation. Hence, *H10a*, *H10b*, and *H10c* are supported. This suggests that, in manufacturing firms, GHRM practices are more effective when they do more than establish formal green policies and systems; they also need to help employees feel capable of contributing meaningfully to environmental objectives in their routine tasks. The sequential mediation effects were statistically significant across all three pathways. Specifically,

Table 6. Direct effects results

Relationship	Confidence Intervals		Original Sample	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Support
	[2.5%]	[97.5%]					
H1: GML $\rightarrow$ GCBP	0.178	0.334	0.253	0.040	6.368	0.000	Yes
H2: GML $\rightarrow$ GMEP	0.210	0.360	0.279	0.039	7.213	0.000	Yes
H3: GML $\rightarrow$ GEIP	0.114	0.267	0.187	0.039	4.858	0.000	Yes
H4: GCBP $\rightarrow$ ESE	0.152	0.352	0.249	0.050	4.997	0.000	Yes
H5: GMEP $\rightarrow$ ESE	0.177	0.411	0.294	0.059	4.990	0.000	Yes
H6: GEIP $\rightarrow$ ESE	0.064	0.275	0.170	0.054	3.149	0.002	Yes
H7: GCBP $\rightarrow$ EPRO	0.111	0.278	0.194	0.043	4.545	0.000	Yes
H8: GMEP $\rightarrow$ EPRO	0.003	0.185	0.096	0.047	2.030	0.033	Yes
H9: GEIP $\rightarrow$ EPRO	0.270	0.440	0.353	0.043	8.147	0.000	Yes
H11: ESE $\rightarrow$ EPRO	0.237	0.394	0.314	0.041	7.755	0.000	Yes

Note: EPRO = employee pro-environmental behavior; ESE = employee green self-efficacy; GCBP = green competence-building practices; GEIP = green employee involvement practices; GMEP = green motivation-enhancing practices; GML = green mindful leadership.

Table 7. Indirect effects results

Relationship	Confidence Intervals		Original Sample	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Results
	[2.5%]	[97.5%]					
H10a: GCBP $\rightarrow$ ESE $\rightarrow$ EPRO	0.044	0.119	0.078	0.019	4.164	0.000	Yes
H10b: GMEP $\rightarrow$ ESE $\rightarrow$ EPRO	0.050	0.146	0.092	0.025	3.779	0.000	Yes
H10c: GEIP $\rightarrow$ ESE $\rightarrow$ EPRO	0.020	0.089	0.054	0.018	3.102	0.002	Yes
H12a: GML $\rightarrow$ GCBP $\rightarrow$ ESE $\rightarrow$ EPRO	0.010	0.033	0.020	0.006	3.416	0.001	Yes
H12b: GML $\rightarrow$ GMEP $\rightarrow$ ESE $\rightarrow$ EPRO	0.013	0.045	0.026	0.008	3.097	0.002	Yes
H12c: GML $\rightarrow$ GEIP $\rightarrow$ ESE $\rightarrow$ EPRO	0.004	0.019	0.010	0.004	2.500	0.012	Yes

Note: EPRO = employee pro-environmental behavior; ESE = employee green self-efficacy; GCBP = green competence-building practices; GEIP = green employee involvement practices; GMEP = green motivation-enhancing practices; GML = green mindful leadership.

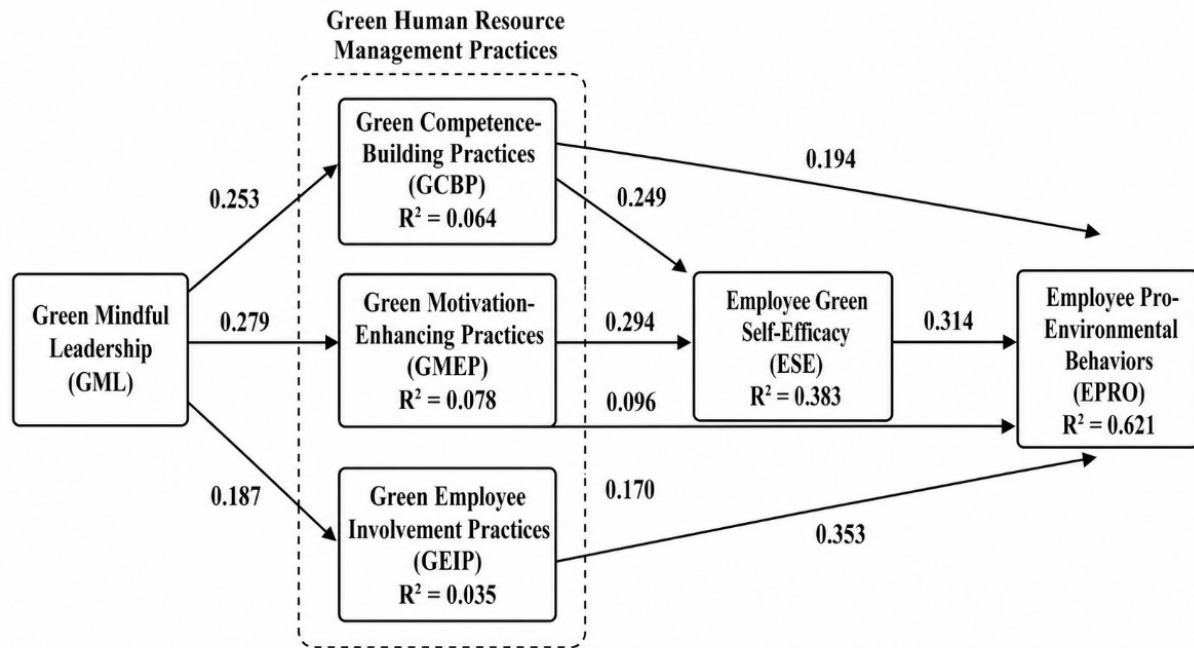


Figure 2. Structural model with standardized path coefficients

the indirect effects of GML through GCBP and ESE ($\beta = 0.020$, $p = 0.001$), GEIP and ESE ($\beta = 0.010$, $p = 0.013$), and GMEP and ESE ($\beta = 0.026$, $p = 0.002$) on EPRO were significant. These findings support *H12a to H12c* and indicate that green mindful leadership is associated with employee pro-environmental behavior through a sequential process involving GHRM practices and employee green self-efficacy. Importantly, the results suggest that leadership-related environmental signals are translated into employee behavior not through a single mechanism, but through a staged process in which green HRM practices first create supportive organizational conditions and subsequently strengthen employees' perceived capability to act environmentally responsibly. Among the three pathways, the GMEP-based sequence shows the strongest indirect effect, indicating that motivation-enhancing practices may play a particularly important role in converting green mindful leadership into pro-environmental behavioral outcomes through self-efficacy.

4. DISCUSSION

This study examines how green mindful leadership shapes employee pro-environmental behavior through the roles of differentiated GHRM

practices and employee green self-efficacy in the manufacturing context. Drawing on the premise that the operational success of green policies hinges on employees' routine environmental behaviors, this study responds to calls for more integrative models linking leadership and human resource management mechanisms in sustainability research (Yuan et al., 2024). This study theorizes that green mindful leadership activates a bundle of green HRM practices, which collectively cultivate employees' self-efficacy in performing environmentally responsible actions, thereby driving pro-environmental behavior. This theoretical pathway is expected to be particularly consequential in manufacturing industries, where environmental commitments must be embedded within daily production routines.

The findings show that employee pro-environmental behavior is shaped by both direct and indirect effects associated with green mindful leadership, green human resource management practices, and employee green self-efficacy. Among these factors, green employee involvement practices appear to be the most important organizational driver of environmental performance outcomes, while employee green self-efficacy also plays a significant role in strengthening such outcomes. This result suggests that employee green behav-

ior is influenced not only by the formal presence of green organizational practices, but also by how employees interpret and internalize those practices in their daily work. In this respect, the results support the view that green mindful leadership is an important antecedent of employee green behavior. Consistent with Yang et al. (2024) and Wang et al. (2025), the findings indicate that green mindful leadership helps employees make sense of environmental priorities and translate them into workplace action, especially when such leadership is reflected in green-oriented development and involvement practices.

The results also confirmed that all of the green HRM practice dimensions had significant positive effects on employee pro-environmental behaviors. This paper suggests that the dimensions of green human resource management practices do not contribute equally to employee pro-environmental behavior. Although green motivation-enhancing practices remain significant, their effect is weaker than that of green employee involvement and green self-efficacy, suggesting that the effectiveness of green human resource management extends beyond formal incentives or organizational signaling. Employees appear to respond more strongly when green practices foster participation, capability development, and perceived behavioral capacity. This pattern is consistent with prior evidence that reward-based mechanisms typically exert less influence on employee green behavior than capability-building practices such as green training, selection, and job design (Rubel et al., 2021).

The mediating role of employee green self-efficacy offers additional insight into the mechanism through which green human resource management practices influence employee pro-environmental behavior. The results show that green competence-building practices, green employee involvement practices, and green motivation-enhancing practices all have positive effects on employee green self-efficacy, thereby supporting *H10a*, *H10b*, and *H10c*. In turn, employee green self-efficacy has a significant positive effect on employee pro-environmental behavior, providing support for *H11*. These findings suggest that green human resource management practices contribute to environmental outcomes not only by es-

tablishing green-oriented organizational systems, but also by strengthening employees' confidence in their ability to perform environmentally responsible actions. In this respect, employee green self-efficacy functions as a meaningful transmission mechanism linking organizational practices to individual behavior. This interpretation is consistent with Farooq et al. (2022), who likewise emphasized the importance of self-efficacy-related processes in explaining how green organizational practices are translated into employee behavior. Because the direct effects remained significant alongside the indirect effects through employee green self-efficacy, the results indicate partial mediation. This pattern is broadly in line with prior research showing that green human resource management influences employee green outcomes both directly and indirectly through self-efficacy-related mechanisms (Farooq et al., 2022; Yuan et al., 2024). Overall, the findings indicate that green human resource management practices affect employee pro-environmental behavior both directly, through organizational systems and routines, and indirectly, through employees' perceived environmental capability.

Green mindful leadership reached employee pro-environmental behavior through each of the three GHRM dimensions and, subsequently, through employee green self-efficacy, supporting *H12a*, *H12b*, and *H12c*. Leadership operates here as a distal antecedent whose influence accumulates across two intervening stages. The binding constraint sits at the first stage, where leadership shapes the adoption of HR practice, rather than at the psychological stage. In Vietnamese manufacturing firms, this means that a plant manager's environmental attentiveness changes daily conduct on the production floor once it is converted into training curricula, appraisal criteria and participation structures that employees encounter as routine features of their work, and once those structures leave employees confident enough to act on environmental expectations under production pressure. Yang et al. (2024) reported the same sequential architecture with green organizational identity as the first-stage mechanism, and Barik et al. (2026) documented a comparable chain terminating in self-efficacy among Indian manufacturing employees. The present findings differ from both by disaggregating the first stage into the AMO dimensions,

which shows that ability, motivation, and opportunity-enhancing practices transmit leadership influence at unequal strengths. Prior work positioning green self-efficacy as a direct mediator of leadership effects (Mughal et al., 2022; Wang et al., 2025) captures the psychological stage while leaving the organizational conversion that precedes it unspecified. Mindfulness-oriented leadership development produces behavioral returns when it is paired with authority over training design, appraisal criteria, and participation structures. A plant manager who attends closely to environmental consequences yet lacks influence over how employees are trained, evaluated, and consulted leaves the first stage of this pathway unbuilt, and the environmental attentiveness stops at the supervisory level. Firms should therefore locate green HR decision rights with the operational leaders who set environmental priorities, rather than treating leadership development and HR system design as separate programs. In

Vietnamese manufacturing contexts, this pattern reflects the importance of value orientations and psychological readiness alongside formal organizational systems. Environmentally oriented values are more likely to stimulate voluntary green behavior when employees feel personally capable of acting on them (Tran & Nguyen, 2026), and improved environmental awareness alone does not guarantee environmentally responsible behavior without a corresponding sense of competence (Vu et al., 2025). This helps clarify why green self-efficacy occupies a central mediating position in the present model. Employees may endorse environmental expectations yet refrain from acting unless they believe they can execute such behaviors effectively within the constraints of daily production routines. Green HRM practices are therefore most effective when they not only communicate environmental priorities but actively build the confidence that enables employees to act on them.

CONCLUSION

This study examines the influence of green mindful leadership on employee pro-environmental behavior, with green human resource management practices and employee green self-efficacy serving as key explanatory mechanisms in the context of manufacturing firms in Ho Chi Minh City, Vietnam. The findings show that green mindful leadership positively increases green competence-building practices, green motivation-enhancing practices, and green employee involvement practices. GHRM practices affect environmental performance not just through their direct impacts on employees' results, but also due to their reinforcement of employees' beliefs that they can deliver environmentally friendly work. In this regard, GHRM gives the organization the framework to practice green behavior and environmental self-efficacy, which translates these practices into long-term environmental performance. The findings indicate that green management efforts are supposed to be established as a system of organizational-psychological integration. It is important not only to put in place green compensation, participation, and motivation-boosting practices, but also to provide an environment that will make employees feel confident in their ability to execute their environmental duties well.

From a managerial perspective, manufacturing firms should invest not only in formal green human resource management practices, but also in the leadership and psychological conditions that enable such practices to become behaviorally effective. In particular, managers should strengthen green competence-building through environmental training and knowledge-sharing, expand green employee involvement in problem-solving and environmental initiatives, and support motivation-enhancing practices that reinforce environmental priorities in the workplace. At the same time, leaders should cultivate a mindful approach to environmental issues by communicating green priorities clearly, responding thoughtfully to environmental challenges, and encouraging employees to participate in sustainability-related improvements. These efforts are likely to be more effective when they are accompanied by initiatives that strengthen employee green self-efficacy, as employees are more likely to engage in pro-environmental behavior when they feel capable of doing so. Future research may extend this study by testing additional contextual factors, such as organizational climate, leadership conditions, or firm-level

characteristics; by using longitudinal or multi-source designs to reduce common method bias; by adding objective performance measures of the environment; and by analyzing possible limitation factors like firm size, industry segment, or organizational sustainability maturity. The study is designed at the individual employee level. Hence, future research should incorporate multilevel or cluster-adjusted analytical techniques to account for the nested structure of employees within firms. Finally, the convergent validity for EPRO and GML rests on the composite reliability criterion of Fornell and Larcker rather than on the AVE threshold. Future work would benefit from refining both instruments, for instance by modeling EPRO as a higher-order construct comprising distinct in-role and extra-role dimensions, and by validating a purpose-built green mindful leadership scale in the manufacturing setting.

AUTHOR CONTRIBUTIONS

Conceptualization: Vo Hien Chau Nguyen, Thi Thao Hien Bui.

Data curation: Thi Thao Hien Bui.

Formal analysis: Thi Thao Hien Bui.

Funding acquisition: Thi Thao Hien Bui.

Investigation: Thi Thao Hien Bui.

Methodology: Thi Thao Hien Bui.

Project administration: Vo Hien Chau Nguyen.

Resources: Vo Hien Chau Nguyen, Thi Thao Hien Bui.

Software: Thi Thao Hien Bui.

Supervision: Vo Hien Chau Nguyen, Thi Thao Hien Bui.

Validation: Thi Thao Hien Bui.

Visualization: Thi Thao Hien Bui.

Writing – original draft: Vo Hien Chau Nguyen, Thi Thao Hien Bui.

Writing – review & editing: Vo Hien Chau Nguyen, Thi Thao Hien Bui.

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APPENDIX A

Table A1. Measurement scales

Symbol	Measurement scales	Sources
Green motivation-enhancing practices		
GMEP1	I have green performance indicators in my performance management system and appraisals	Tang et al. (2018)
GMEP2	My company assigns environmental responsibilities to me (e.g., reducing material waste, minimizing energy use, complying with environmental operating standards)	
GMEP3	In my company, non-compliance with environmental rules or failure to meet environmental management goals may result in negative consequences for me (e.g., warnings, penalties, or lower performance evaluations)	
GMEP4	In my company, I am provided with green work-related benefits that support environmentally responsible practices (e.g., energy-efficient equipment, carpooling support, or digital systems that reduce paper use)	
GMEP5	In my company, there are financial incentives for me to promote environmentally responsible behavior	
Green employee involvement practices		
GEIP1	My company has a clear developmental vision to guide my actions in environmental management	Tang et al. (2018)
GEIP2	In my company, I am involved in a mutual learning climate among employees for green behavior and environmental awareness (e.g., waste reduction campaigns, energy-saving initiatives, environmental improvement programs)	
GEIP3	In my company, I have observed a number of formal or informal communication channels used to spread green culture (e.g., emails, posters, meetings, bulletin boards)	
GEIP4	In my company, I am encouraged to get involved in quality improvement and problem solving related to environmental issues	
GEIP5	In my company, I have opportunities to participate in environmental management through suggestion schemes, green improvement teams, environmental awareness programs, or sustainability initiatives	
Green competence building practices		
GCBP1	I am attracted to my company's environmental sustainability initiatives	Tang et al. (2018)
GCBP2	My company prefers to hire employees who have environmental awareness	
GCBP3	I prefer to work at this company because of its environmental performance	
GCBP4	My company provides environmental awareness programs or workshops to improve my environmental knowledge	
GCBP5	In my company, integrated training is provided to foster employees' emotional involvement in environmental management (e.g., recycling, waste management, and sustainability-related programs or workshops)	
GCBP6	My company provides green knowledge-sharing activities to guide my environmental behaviors (e.g., internal environmental sharing sessions, and posters promoting energy saving and water conservation)	
Employee pro-environmental behaviors		
EPRO1	At work, I try to learn more about environmental issues	Graves et al. (2013) and Kim et al. (2016)
EPRO2	At work, I look for ways of working that are better for the environment	
EPRO3	At work, I try not to waste water	
EPRO4	At work, I carry out environmental actions that are not formally required by my manufacturing company	
EPRO5	At work, I participate in environmental activities that are not required as part of my job	
EPRO6	At work, I encourage others to think about the environment	
EPRO7	At work, when environmentally unfriendly behavior occurs, I try to prevent it in a timely manner	
EPRO8	At work, I question practices that are likely to harm the environment	
EPRO9	At work, I try to save resources used by my manufacturing company	
Employee self-efficacy		
ESE1	I have the ability to engage in pro-environmental behavior at work	Chen et al. (2015)
ESE2	I am able to modify my work task objectives to be more in line with environmental goals	
ESE3	I am able to choose work methods that allow me to minimize my environmental impact	
Green mindful leadership		
GML1	My supervisor gives me full attention when I speak about environmental issues at work	Walach et al. (2006)
GML2	In conversations about environmental issues at work, my supervisor is patient	
GML3	My supervisor listens carefully when I talk about environmental issues at work	
GML4	In conversations about environmental issues at work, my supervisor first listens to what I have to say before forming his/her own opinion	
GML5	My supervisor remains open-minded until I have finished sharing my views on environmental issues at work	
GML6	My supervisor approaches environmental issues at work without being constrained by preconceived opinions	
GML7	My supervisor stays calm even in tense environment-related situations at work	
GML8	My supervisor remains emotionally composed when discussing environmental issues at work	
GML9	When my supervisor disagrees with certain environmental matters at work, he/she still responds in a calm and controlled manner	