



Green human resource management to employee green behavior: The mediating roles of green orchestration innovation and green technology adoption in Indonesian banking institutions

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ABSTRACT

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This research examined how businesses can encourage employees to adopt environmentally friendly behaviors and evaluated how Green HRM (GHRM) can influence workers' ecological behavior in the Indonesian banking industry. The research model used for the analysis is the Ability-Motivation-Opportunity (AMO) model. The study focused on the direct impact of GHRM on employees' ecological behavior, as well as its indirect effects through the adoption of green technologies and the coordination of green innovation. To investigate the suggested links, data were collected from 411 banking industry workers and analyzed using partial least squares structural equation modeling. The findings demonstrated that employee ecological behavior was not directly impacted by GHRM. On the other hand, it had a good impact on the adoption of green technologies and the coordination of green innovation, both of which directly improved the ecological behavior of employees. These results indicate that organizational environmental practices primarily shape employee pro-environmental behavior indirectly by strengthening innovation capabilities and facilitating technology-driven sustainability initiatives. The study provides practical insights for managers in designing more effective GHRM strategies by emphasizing innovation and technology adoption as key organizational mechanisms to foster sustainable employee behavior and support long-term environmental performance in the banking sector.

Contribution/Originality: This study contributes to the existing literature, proving that the environment-based human resource management system improves employee environmental behavior indirectly rather than through direct effects. It presents new knowledge about how innovation orchestration and technology adoption act as mediators to facilitate the sustainable development of the organization.

1. INTRODUCTION

Currently, Indonesia's environmental issues are serious. The rapid industrialization of Indonesia is leading to significant climate change impacts on the environment, and Indonesia is currently dealing with environmental problems stemming from its extractive industries. Deforestation rates in nickel mining areas in Sulawesi almost doubled from 2011–2018, demonstrating that the rapid pace of industrialization has resulted in significant ecological damage (Lo et al., 2024). At the national level, nickel mining has contributed significantly to forest degradation, habitat destruction, and pollution (Nasution et al., 2024). Similarly, degraded peatland ecosystems in Kalimantan have been afflicted with repeated fires, resulting in roughly 236–329 square kilometres of land burned annually from 2001–

2018, because of pressures associated with climate change and changes in land use (Schmidt et al., 2024). The effects on the environment from the 2015 fire season reached crisis proportions, affecting approximately 2.6 million hectares of land, with the area potentially going as high as nearly 5 million hectares during El Niño years. When compared to emissions from fossil fuels in the European Union, the carbon emissions from the fires in 2015 were projected to be 11.3 teragrams of CO₂ per day (Edwards, Naylor, Higgins, & Falcon, 2020). These circumstances show the urgent need for integrated environmental governance, sustainable economic practices, and organizational involvement in environmental stewardship. These situations demonstrate that there is an urgent need for an integrated approach to environmental governance, sustainable economic practices and organizations' participation with respect to the stewardship of our environment.

In addition to institutional and regulatory initiatives at work, environmental sustainability also requires employees to internalise pro-environmental behavior (e.g., employee ecological behavior (EEB)). Employees make a voluntary commitment to the sustainable operation of their own workplace (Farooq et al., 2021). Research has identified several organizational antecedents of EEB, including green transformational leadership; green organizational climate; and green human resource management (GHRM) Correia, Farrukh Shahzad, Moleiro Martins, and Baheer (2024). According to Anwar et al. (2020) GHRM includes a range of practices that incorporate environmental values into the organizational framework while developing employees' green skills, motivation, and opportunities. While the majority of research findings show that there is a positive correlation between GHRM and EEB, empirical research has produced inconsistent findings regarding how and under what conditions GHRM results in employees' actual behavior. Existing research has generally focused on direct relationships and provided little explanation for the psychological, technological, and innovation-based processes through which GHRM impacts ecological behavior (Chiarini & Bag, 2024). Empirical research has predominantly relied on cross-sectional research designs; therefore, research has failed to provide an assessment of deeper behavioral processes and contextual dynamics within the time lens (Jnaneswar, 2023). These shortcomings support an integrative theoretical framework that clearly explains how organizational sustainability practices lead to employee-level environmental behaviors.

One possible mechanism is psychological processes, whereas technological capability has become increasingly important in supporting organizational sustainability efforts. Green technology refers to the application of eco-friendly technologies, such as sustainable operating practices, energy-efficient machinery, and renewable energy sources (Khurshid, Huang, Khan, & Cifuentes-Faura, 2024; Liang, Hussain, & Iqbal, 2025). In addition to helping businesses remain competitive in an increasingly digital and sustainability-focused business environment, green technology is required to address environmental concerns (Hong, Chen, Gong, & Wang, 2024; Khan, Ahmad, Sheikh, & Yu, 2024).

Another important but relatively unfocused mechanism is green orchestration innovation. Green orchestration innovation refers to the strategic arrangement and integration of organizational resources through continuous innovation of employees towards increasing environmental sustainability (Masyhuri, Pradana, Gienardy, & Wibisono, 2026). Many empirical studies suggest that effective resource orchestration can assist organizations in aligning their human, technological, and organizational capabilities with their environmental objectives. However, little empirical research has been conducted to substantiate this claim, especially in service industries such as banking (Masyhuri et al., 2026). This issue is particularly important for banks in the Indonesian banking sector. As sustainability efforts grow, green HR policies, technological transformation, and employee engagement increasingly need to be aligned to support larger environmental objectives. In relation to the relationship between GHRM and EEB within the Indonesian banking sector, the current study investigates the mediating effects of green orchestration innovation and green technology uptake. This study attempts to provide more thorough knowledge of how GHRM affects employee ecological behavior in emerging economies by integrating organizational, psychological, and technological aspects.

Much research has been conducted on GHRM. Overall, little information is available regarding the motivators that lead employees to engage in environmentally friendly actions. More precisely, there is insufficient empirical data

on the connections between GHRM practices and employee ecological behavior through mediating factors (green orchestration innovation and green technology adoption), as well as the reasons why these practices improve employee ecological behavior within an organization. The impact of GHRM on employee behavior has been extensively studied in general, with a few studies examining the mediators between these two constructs within the banking industry as digital transformation occurs. In addition, most published (empirical) GHRM data are from developed nations (manufacturing), so these studies are not representative of developing nations (i.e., Indonesia), where the institutional, technological, and organizational characteristics differ significantly from developed nations.

Based on the aforementioned gaps, the following research questions were investigated.

RQ1: Can GHRM enable employees to use more environmentally friendly actions within Banking Organizations?

RQ2: Can green orchestration innovation mediate the relationship between GHRM and employee ecological behavior?

RQ3: Can green technology adoption mediate the relationship between GHRM and the ecological behavior of employees?

By combining organizational and technical methods, this study will contribute to the body of knowledge already available on GHRM to identify the differences in the mechanisms between employees' behavior and GHRM practices. This research will also contribute to the Resource Orchestrating Theory within sustainability research by adding green orchestration innovation to mediator constructs. Further, the research will provide a Comprehensive Framework for how employees can engage in environmental behaviors using green technology adoption as an additional explanatory mechanism, as well as provide Robinson Banks with an under-represented service sector (banking) in a leisure economy where digital transformation is integrating GHRM and overall green orchestration innovation and technology at a recommended level of efficiency. Following the introduction, a thorough analysis of the literature, the formulation of the research hypothesis, the methodology, the findings and discussion, and the conclusion are included.

2. THEORETICAL FRAMEWORK

The Ability – motivation – opportunity (AMO) model is widely utilized in human resources management; it is a framework that shows how practices implemented within an organization affect employees' behavior and performance. The AMO model defines employee outcomes as determined by three components: (i) ability, which refers to knowledge, skills, and competencies gained from organizational practices such as training and recruitment; and (ii) opportunity, which refers to the degree of assistance that employees receive from the organization to participate, contribute, and engage in activities within the organization. (iii) Motivation: This refers to both internal and external factors that motivate employees to perform and is usually shaped through the use of performance management and incentive systems (Appelbaum, Bailey, Berg, & Kalleberg, 2000; Jiang, Lepak, Hu, & Baer, 2012). Employees will exhibit good behaviors at work when the three elements cooperate according to the AMO model. It is assumed that implementing GHRM practices will enhance employees' ability to practice environmental sustainability and will provide employees with the opportunity to participate in environmentally sustainable behaviors, as everything contributes to an increase in employee engagement with sustainable practices or environmentally encouraged behavior (Pham, Vo Thanh, Tučková, & Thuy, 2020; Renwick, Redman, & Maguire, 2013). The application of AMO theory to sustainability research is growing, with more research studies demonstrating its use in understanding how human resource management practices lead to green behaviors and sustainability (Singh, Del Giudice, Chierici, & Graziano, 2023). The AMO model can therefore be considered a robust theoretical base for understanding how GHRM practices result in environmentally encouraged behavior from an individual perspective.

Resource orchestration theory (ROT) is derived from the resource-based view of the firm (RBV), where competitive advantage is created through a firm's managers organizing, integrating, and deploying a firm's resources to create value (Sirmon, Hitt, Ireland, & Gilbert, 2011). The managerial aspects of organizing and deploying resources

within the firm are critical for ensuring resources are used to create value or innovative output for the firm. Therefore, human resources should be viewed as a strategic resource that must be effectively organized to achieve the objectives of the firm. GHRM is seen in this study as a strategic tool for organizing and cultivating green human capital, so green organizational innovation (GOI) is the result of bundling and leveraging green human capital to create environmentally sustainable innovations. Recent studies indicate that ROT is a valid framework to use to understand how organizations integrate human, technological, and knowledge resources to support innovation and sustainability performance (Chadwick, Super, & Kwon, 2023; Liu, Chen, & Wang, 2024). Additionally, studies have demonstrated that effective resource orchestration enhances both innovation and long-term organizational performance through the alignment of internal capabilities to meet environmental demands (Khan, Yang, & Waheed, 2022). Therefore, using ROT, this research will outline how GHRM practices facilitate the transformation of GHRM into GOI and, in turn, how GOI affects EEB. Therefore, GOI is a critical mediating process that connects the organization's resource management to employee behaviors at the individual level.

2.1. Green Human Resource Management, Green Orchestration Innovation, Green Technology Adoption and Employee Ecological Behavior

GHRM has become vital for organizations in promoting environmental engagement behavior and achieving wider purposes of sustainability (Altassan, 2024). The broad concept of the environment is in line with all HR procedures related to employee involvement and environmentally friendly conduct. GHRM focuses on employee education on environmental issues, with GHRM practices providing organizational mechanisms to create a culture of enhanced EEB and harnessed benefit; organizational values are more likely to generate EEB in response to their environmental capabilities (Motivation) and opportunities to engage in green effort (Opportunity = Organization's Engagement). Through the AMO, HR does more than simply meet private or unit goals; these companies enhance their GHRM systems to create sustainability goals in everyday business practices. Most research to date has shown a positive agreement between EEB and GHRM.

Research indicates that GHRM affects an employee's green attitude toward participation in the environment through employee engagement (Ullah, 2022). For example, in the healthcare sector, GHRM significantly enhances green participation through the mediation of green work commitment (Hani & Praningrum, 2023). Similarly, employees in the hospitality industry report more positive pro-environmental attitudes, creating a desire for contamination remediation (Nisar et al., 2023). In addition to organizational constructs that enhance GHRM effectiveness, a green psychological climate and employee attitudes contribute to the success of GHRM in promoting environmental behavior (Aukhoon, Iqbal, & Parray, 2024; Uslu et al., 2023). However, employees are often seen as the most prevalent barrier to carrying out environmentally focused initiatives within sustainability goals, and are less successful when organizations implement all or most of the GHRM systems. This indicates that the implementation of GHRM would produce a greater level of employee commitment toward achieving successfully planned environmental objectives to achieve positive outcomes for the organization in terms of achieving these goals and therefore make meaningful impacts through employees' interactions and behaviors toward achieving the organization's commissions (Goni & Yusuff, 2023; Ullah, 2022). As articulated by the authors Ahmed, Aliane, Khababa, Abdou, and Agina (2023) and Rehman, Bresciani, Ashfaq, and Alam (2022); organizations will be able to create a competitive advantage through resource orchestration theory the ability to structure, organize and leverage a company's internal resources will form the basis for supporting the organization(s) environmental objectives (Ahmed et al., 2023).

From the ROT perspective, GHRM serves as both a regulatory mechanism representing administrative HR functions and provides strategic building capabilities for organizations to structure the alignment of organizational values associated with a human resource/infrastructural system to create green innovation opportunities. Organizations use GHRM through the embedding of recruitment, employee training, performance assessment, and

employee development; in doing so, organizations help to create green employees and validate and further develop green organizational culture (Ahmed et al., 2023). GHRM and GOI organizational constructs are related through the development of human capital. The alignment of GHRM with organizational missions facilitates the recruitment and development of employees who are environmentally aware and can create sustainable competence, leading to the development of unique human capital resources to achieve innovation (Ahmed et al., 2023). GHRM supports the development of employees to develop environmentally related organizational resources (knowledge sharing, coworkers' collaborative problem solving, etc.) through green job training and/or enhancing employee sustainability. The alignment and coordination of green resources facilitate resource orchestration to create green innovation through practice. Based on previous research, the combination of successful GHRM implementation and ethical leadership enhances employee commitment to supporting GHRM practices and improves the effectiveness of the organization's environmental performance (Ren, Tang, & Jackson, 2021). GHRM has the potential to develop employee creativity related to innovation, which is the foundation of developing the innovations that an organization will use to create a sustainable transformation (Ahmed et al., 2023; Farrukh, Rafiq, Raza, & Ansari, 2024).

While most previous research has shown that Green Human Resource Management (GHRM) is beneficial in encouraging green behaviors in employees, the results are still not consistent within certain types of organizations. Several studies have shown that GHRM positively promotes employees' commitment to the environment. They embed environmental sustainability into corporations' HR systems (Chaudhary, 2020; Qi, Pang, Xu, & Liu, 2024). However, some studies have shown that there may not be a positive association across all employee populations. For example, although (Yuan et al., 2024) found that GHRM positively influences employees' green behaviors through environmental commitment, GHRM also leads to emotional fatigue, which negatively impacts employee green behaviors. Additionally, multiple publications related to tourism indicate that there are numerous, but inconsistent, relationships between GHRM and employee green behaviors (Pham, Hoang, & Phan, 2020; Pham et al., 2020; Úbeda-García, Claver-Cortés, Marco-Lajara, & Zaragoza-Sáez, 2020). Therefore, these results indicate that GHRM does not guarantee that all employees will practice ecological behaviors. Instead, the result of positive GHRM on employee ecological behaviors is likely achieved through some other mechanisms within these organizations to translate sustainability-oriented HR practices into ecological actions from employees.

Research demonstrates that GHRM practices create the necessary human capital foundation for the successful implementation of green technological solutions (Graham, Cadden, & Treacy, 2023; Jabbour et al., 2019). GHRM enhances green technology adoption through multiple pathways. First, GHRM practices enable efficient talent acquisition aligned with sustainability goals and incorporate environmental metrics into organizational processes (Shaikh, Sohu, Shaikh, Zahra Kherazi, & Soomro, 2025). Research demonstrates that the implementation of clean technology adoption is significantly aided by employee engagement, which is cultivated through GHRM practices, such as employee involvement and top management support (Graham, Potter, & Towill, 2023). In particular, the adoption of clean technology was found to be positively and significantly correlated with employee involvement and senior management support (Graham et al., 2023). Industry 4.0 technology moderates the positive effects of green HRM practices on sustainable performance and circular economy practices (De et al., 2024). The adoption of artificial intelligence also greatly improves environmental sustainability through its impact on GHRM, especially when it is backed by an environmentally conscious corporate culture (Shaikh et al., 2025). Research indicates that HR strategies, including training, enhance the adoption of advanced environmental management and green supply chain techniques (Jabbour et al., 2019).

H₁: GHRM has a positive and significant influence on EEB.

H₂: GHRM has a positive and significant influence on GOI.

H₃: GHRM has a positive and significant influence on GTA.

2.2. Green Orchestration Innovation and Employee Ecological Behavior

As a main driving factor of employee ecological behavior (also known as pro-environmental behavior), green orchestration innovation arises from the strategic coordination and integration of an organization's resources in pursuit of achieving effective organizational goals towards achieving environmental objectives. Research on ROT suggests that by adopting innovative resource procurement strategies, organizations can encourage employees to engage in sustainable behaviors (Ahmed et al., 2023; Chin, Amy, & Ling, 2026; Keskin, Akgün, & Esen, 2025). Studies find that when organisations commit to green innovation, employees will demonstrate higher levels of PEBs (Tram & Ngoc, 2024), and the green innovation prioritisation provides employees with the motivation to align their actions with organisational sustainability goals (Tram & Ngoc, 2024). There is considerable evidence to suggest that the arrangement of technological, human, and ecological organisational resources impacts and shapes employees' ecological behaviors (Bo, Guang, & Feng, 2020; Chin et al., 2026). Furthermore, organisations positively influence sustainable business behaviors through the use of green dynamic capabilities and knowledge management practices in combination with green innovation as an important mediating variable (Chin et al., 2026). This orchestrated method enables organisations to jointly coordinate their resources towards achieving sustainability goals while simultaneously engaging employees in environmental initiatives (Chin et al., 2026; Keskin et al., 2025).

Resource Orchestration Theory (ROT) explains green orchestration innovation (GOI) as a mediator of organizational sustainability linkages, highlighting the ability for organisations to efficiently organise, bundle, and use resources (Ahmed et al., 2023; Chin et al., 2026). GOI enables organisations to convert HRM practices and competencies towards achieving sustainability, as demonstrated by the conversion of sustainability-oriented organizational HR practices into tangible environmental efforts and results (Ahmed et al., 2023). Earlier research finds a mediating effect for resource orchestration on the relationship between organisational antecedents and green innovation outcomes; moreover, resource orchestration positively impacts companies attempting to develop disruptive green innovation (Murong, Chang, Hui, Yuan, & Dong, 2024).

At an employee level, the mediating role of GOI on behavioral outcomes also applies. Green innovation supports a culture of sustainability, providing employees with the ability to create innovative solutions for addressing environmental concerns and exhibiting PEBs (Tram & Ngoc, 2024). Employees participating in innovative processes develop sustainability-based knowledge and abilities, thereby influencing their ecological behaviors beyond the workplace (Tram & Ngoc, 2024). Additionally, through the orchestration of green intellectual capital, businesses can promote environmentally responsible behaviors by supporting employees to reduce non-renewable resources and participate in environmental training (Van & Nguyen, 2023). Ultimately, these findings suggest GOI is an important mechanism through which the actions of GHRM influence employees' ecological behaviors. Given that there is limited empirical research on the mediating role of GOI within the link between GHRM and employees' ecological behaviors, there is an extensive amount of emphasis on performance outcomes and organisational innovation at the expense of employee behavioral factors. In light of this, more research is necessary to better understand the role of GOI as a mediator of the relationship between GHRM and employees' ecological behaviors.

H₁: GOI has a positive and significant influence on EEB.

H₂: GOI mediates the relationship between GHRM and EEB.

2.3. Green Technology Adoption and Employee Ecological Behavior

GTA has become an important organizational factor that influences EEB. When organizations use environmentally friendly technologies, they motivate employees to adopt pro-environmental behaviors (Altassan, 2024; Gill, Ansari, & Tufail, 2021; Khattak, Bhatti, & Raza, 2023). The adoption of green technology contributes directly to increasing employees' environmental consciousness, while also indirectly supporting sustainable workplace practices through organizational mechanisms. Prior studies demonstrate that employees' acceptance of eco-friendly approaches in the workplace is affected by how they perceive and feel about adopting green technology

(Gill et al., 2021). When organizations adopt environmentally friendly technologies, employees are more inclined to accept practices that create eco-friendly workplaces and become more aware of sustainability (Gill et al., 2021). Additionally, by using and adopting green technology, an organization demonstrates a dedication to the environment, creating employee behaviors consistent with the long-term goals of the organization (Altassan, 2024). Green workplaces produced by eco-friendly technologies increase employee engagement and positively impact sustainability initiatives (Gill et al., 2021). Therefore, the implementation of green technology provides a supportive organizational environment for pro-environmental behaviors to become more prevalent and be encouraged in the workplace (Altassan, 2024; Dilawar, Imtiaz, & Cheema, 2023). As a means of connecting sustainability research with understanding how organizational capabilities and practices lead to increased environmental performance and employee ecological behavior, GTA has become a major mediating mechanism. Earlier studies suggest the introduction of green technology alters an organization through changes to organizational inputs (human resource practices, leadership initiatives, and strategic directions), resulting in increased tangible performance outcomes about sustainability (Ahmed et al., 2023; Altassan, 2024; Van & Nguyen, 2023). With environmentally sustainable technologies, organizations can create workplace environments that support employee pro-environmental behaviors.

In addition to serving as a mediator for pro-environmental behaviors at the employee level, the level of employee pro-environmental behaviors at work is affected by breakthroughs in green technology (Mahmood et al., 2025). Companies that implement green technologies are said to have a culture of environmental accountability, resulting in a positive working environment that stimulates employees to engage in pro-environmental behaviors (Altassan, 2024; Liu, Yue, Ijaz, Lutfi, & Mao, 2023). Empirical data consistently demonstrate positive relationships between green-technology breakthroughs and sustainability outcomes (Liu et al., 2023); employees are likely to adopt pro-environmental practices as a result of green technology (Liu et al., 2023). Liu et al. (2023) found that employees exposed to green technologies are more likely to develop positive environmental attitudes, eco-friendly feelings toward the organization, and creativity that supports the organizational system of sustainability. Green technology also provides employees with the tools to participate more fully in sustainability and environmentally responsible behavior at the organization (Liu et al., 2023). These findings suggest GTA is a critical mechanism through which GHRM practices impact employee ecological behavior. Nevertheless, empirical research assessing the mediating role of GTA with respect to GHRM and employee ecological behavior is lacking, particularly in service sectors and emerging markets. Existing studies also focus more heavily on technological and organizational performance outcomes than on employee-level behavioral mechanisms. More research is required to better understand how green technology adoption mediates the relationship between GHRM and employee ecological behavior. The conceptual model is shown in Figure 1.

H₂: GTA has a positive and significant influence on EEB.

H₃: GTA mediates the relationship between GHRM and EEB.

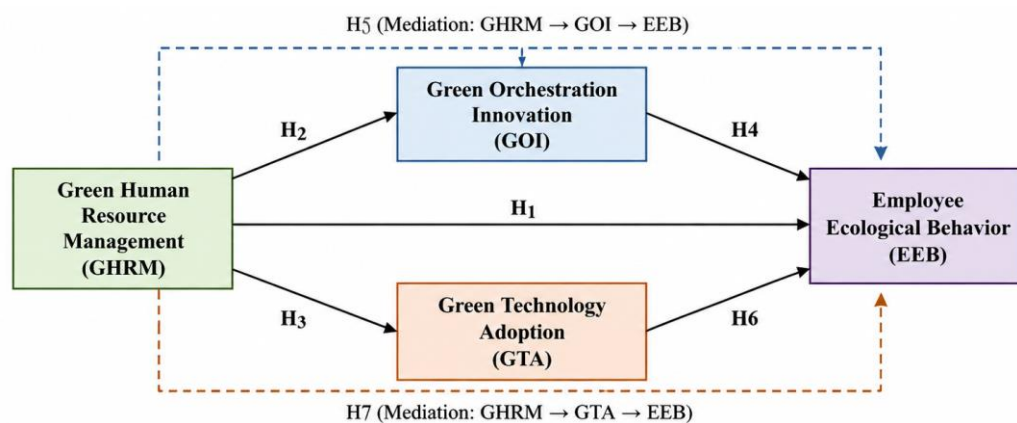


Figure 1. Conceptual Model.

3. RESEARCH METHODOLOGY

3.1. Measurement and Sampling

This study employed a self-administered survey and quantitative analysis. A 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used to gather the results. The scale used in this study has been verified by earlier investigators. Six items from Faezah, Yusliza, Muhammad, and Fawehinmi (2022) were used to measure GHRM. Furthermore, the employee ecological behavior variable uses seven indicators from Faezah et al. (2022). Green orchestration innovation adapts six items from Masyhuri et al. (2026). Green technology adaptation uses four items from Liang et al. (2025). The target population of green banking employees in Indonesia was selected, and data collection was conducted between January and May 2026. Using the criterion of green banking workers who have been employed for at least a year and who work for both state-owned and commercial banks, purposive sampling was employed. The questionnaire was distributed using a Google Form, and anonymity was ensured to maintain the objectivity of the respondents' answers. Of the 450 surveys that were issued, 411 were returned and completed. For further data processing, a 91% response rate is achievable. This study also took into account the G*Power approach for the minimum sample size estimate to guarantee sufficient statistical power and sample adequacy. The computation was carried out with a medium effect size ($f^2 = 0.15$), statistical power of 0.95, and a significance level of 0.05, in accordance with the guidelines for structural equation modelling partial least squares (SEM-PLS) analysis. The final sample used in this study was significantly larger than the minimum required sample size because of the maximum number of predictors directed toward the endogenous construct. As a result, the study had sufficient statistical power and resilience for hypothesis testing and structural model estimation because the sample size of 411 respondents exceeded the suggested cutoff. In this study, GHRM is regarded as an independent variable, EEB is the dependent variable, and GOI and GTA are the mediating variables. Additionally, the SmartPLS 4 program was used for data analysis through SEM-PLS. SEM-PLS was used in this study's quantitative method to examine intricate relationships. Because PLS-SEM works well for testing mediation models, formulating theories, and forecasting models, including several latent constructs, it was selected. The inclusion of two mediation variables, GOI and GTA, offers a more complete picture of the conversion of sustainability-based HR practices into employee ecological behavior, whereas earlier research only examined the direct relationship between GHRM and employee environmental outcomes.

3.2. Respondent Profile

Overall, the survey sample had a slightly higher percentage of men than women (64 percent male vs. 36 percent female). Nonetheless, the sample is rather well distributed among all respondents' demographic attributes about gender. Males dominate the sample with 64 percent of respondents, while females represent only 36 percent. The entirety of the sample is comprised of individuals aged 31 to 40 years (37.9%) and individuals aged 21 to 30 years (30.6%), with very few respondents being younger than 20 (1.4%). Overall, most respondents' work experience ranged from moderate to long-term. Forty percent of respondents had been with their current employer for 6–10 years, 30.4% had been with their current employer for more than ten years, and 29.6 percent of respondents had been with their current employer for 1–5 years.

3.3. Validity and Reliability Measurement

Evaluating the validity and reliability of the instrument allows researchers to have confidence in their results. Construct validity was established from convergent and discriminant validation. Composite reliability was used to establish internal consistency. Table 1 shows that all constructs developed for this study were both valid and reliable. Indicator reliability was first examined to confirm that each item adequately reflected its corresponding construct. Outer loadings serve as a criterion for evaluating the contribution of individual indicators to their respective latent variables, whereby higher loadings indicate stronger item-construct associations. According to PLS-SEM literature,

all constructs' outer loading values were higher than the suggested cutoff point of 0.70 (Hair, Hult, Ringle, & Sarstedt, 2022). All of the constructs demonstrated a high composite reliability score, with all constructs exceeding the cutoff of 0.70 (Hair et al., 2022), indicating that measurement items had an acceptable level of internal consistency for all constructs. Average variance extracted (AVE) was also utilized to measure the convergent validity of the constructs. Higher correlations among the constructs illustrate better convergent validity (Hair et al., 2022). Furthermore, each of the constructs provided more than half of the variance for the indicators and exceeded the cutoff of 0.50 (Fornell & Larcker, 1981), which establishes sufficient convergent validity. Next, the heterotrait–monotrait (HTMT) ratio was utilized to measure discriminant validity. The HTMT ratio is a measure of how distinct constructs are from one another; values less than the conservative cutoff of 0.85 are considered appropriate (Henseler, 2021). All Heterotrait–Monotrait (HTMT) values are below this cutoff, as Table 2 illustrates, with the highest value being 0.85, which is well within the permissible range. In particular, compared to other constructs, each variable exhibits greater correlations with its own indicators. The measurement model's validity and reliability were validated and considered appropriate for additional structural model analysis based on the presented results.

3.4. Common Method Bias

The authors used Harman's Single Factor in accordance with Kock (2015) and Podsakoff, MacKenzie, Lee, and Podsakoff (2003) guidelines to satisfy the requirement of determining the presence of Common Method Bias (CMB). The first factor (unrotated) explained 34.27% of the total variance and, therefore, was well below the recommended 50%, suggesting that CMB is not serious and did not have a negative impact on the study's validity.

Table 1. Factor loading, internal consistency and convergent validity.

Construct	Outer Loading	AVE	CR
Green Human Resource Management (GHRM)		0.760	0.937
GHRM1: "The company sets eco-friendly goals for all employees."	0.832		
GHRM2: "To promote green principles, the organization offers green training to staff."	0.898		
GHRM3: "The organization offers green training to staff to build the knowledge and skills essential for green management"	0.875		
GHRM4: "Companies consider green behavior in employees' workplaces in performance appraisals."	0.888		
GHRM5: "Companies relate to the green behavior of employees' workplaces with rewards and compensation."	0.862		
GHRM6: "Companies consider green behavior in employees' workplaces in promotions."	0.872		
Green Orchestration Innovation (GOI)		0.658	0.900
GOI1: "My company developed a flexible approach to innovation in protecting the environment."	0.821		
GOI2: "My company gives me autonomy to complete green innovation tasks."	0.804		
GOI3: "My company values the role of each individual in green innovation projects."	0.838		
GOI4: "My company reduces the complexity of formal permits when innovating green."	0.794		
GOI5: "My organization keeps all personnel engaged in green innovation informed regularly."	0.789		
GOI6: "During green innovation, my company actively collaborates with partners."	0.821		
Green Technology Adoption (GTA)		0.668	0.835
GTA1: "A major component of our long-term business plan is green technology."	0.795		
GTA2: "Eco-friendly technology has the potential to increase the credibility of companies."	0.851		
GTA3: "With increased environmental performance, green technology has the potential to deliver larger economic benefit."	0.799		
GTA4: "Any organizational framework can simply incorporate eco-friendly practices."	0.825		

Construct	Outer Loading	AVE	CR
Employee Ecological Behavior (EEB)		0.698	0.929
EEB1: "When the office is not in use, I make sure the air conditioner is off."	0.844		
EEB2: "I try to print documents back and forth to save paper."	0.852		
EEB3: "I use digital communication systems (email, internal systems)."	0.808		
EEB4: "When I drink, I use a stainless steel straw."	0.826		
EEB5: "I'm attempting to use less bottled mineral water"	0.838		
EEB6: "When I go shopping for personal or business purposes, I bring my own bag."	0.842		
EEB7: "When not in use, I turn off lights and electronic equipment."	0.837		

Note: GHRM is Green Human Resource Management; GOI is Green Orchestration Innovation; GTA is Green Technology Adoption.

Table 2. HTMT – Discriminant Validity.

Construct	EEB	GHRM	GOI	GTA
EEB				
GHRM	0.272			
GOI	0.609	0.228		
GTA	0.521	0.705	0.396	

4. RESULTS

SEM-PLS, a variance-based method especially appropriate for complicated models, non-normal data distributions, and predictive research, was used to assess the structural model (Hair et al., 2022). SEM-PLS is a widely utilized analytical method in the fields of management and sustainability because of its adaptability and stability. SEM-PLS helps researchers maximize the amount of explained variance (R^2) of an endogenous construct (Sarstedt, Ringle, & Hair, 2022). The graphic below shows the results of the evaluation criteria. The model fits well. First, the NFI was higher than the 0.90 threshold, indicating that the model performed well, and the SRMR was less than the 0.08 cut-off, indicating a decent match. Second, d_ULS and d_G both supported the adequacy of the models by meeting acceptable levels. In general, the model is appropriate for further testing (Table 3) (Leclercq-Machado et al., 2022).

4.1. Coefficient of Determination (R^2)

The evaluation of the structural model indicated varying degrees of explained variance and predictive relevance for endogenous constructs using R^2 . According to Hair, there is strong explanatory power for EEB, moderate explanatory power for GTA, and limited explanatory power for GOI. R^2 values of 0.75, 0.50, and 0.25 indicate strong, moderate, and weak explained variance, respectively. With over half of the variability in employee ecological behavior explained by the variables, the model showed a high degree of explanatory power for EEB ($R^2 = 0.541$). GOI ($R^2 = 0.545$) and GTA showed substantial levels ($R^2 = 0.692$).

Table 3. Model Fit.

Model Fit	Saturated Model	Estimated Model
SRMR	0.050	0.064
d_ULS	0.935	0.931
d_G	0.915	0.923
Chi-square	2026.062	2189.859
NFI	0.904	0.905

4.2. Q^2 Criterion

The Q^2 results support the conclusion that this procedural model provides reasonable prediction capabilities for all endogenous constructs, with all Q^2 values greater than zero (Hair et al., 2022). EEB has a substantial degree of predictive relevance ($Q^2 = 0.364$), indicating a strong ability to make accurate predictions outside of the validation

samples. GTA had moderate predictive relevance ($Q^2 = 0.258$), while the GOI construct had low predictive relevance ($Q^2 = 0.028$). Therefore, some constructs have less explanatory power (i.e., GOI), and the model provided acceptable predictive accuracy.

4.3. Hypotheses Test

In addition, seven hypotheses were tested, with the use of the coefficient (positive or negative), t-statistic greater than 1.96, and p-value greater than 0.05. All tests of the seven hypotheses are summarized in Tables 4 and 5 and Figure 2.

Table 4. Direct Effect.

Hypotheses	Construct	β	t-values	p-values	Result
H1	GHRM $\rightarrow$ EEB	-0.062	1.605	0.109	Rejected
H2	GHRM $\rightarrow$ GOI	0.212	4.419	0.000	Accepted
H3	GHRM $\rightarrow$ GTA	0.626	14.450	0.000	Accepted
H4	GOI $\rightarrow$ EEB	0.279	4.437	0.000	Accepted
H6	GTA $\rightarrow$ EEB	0.194	3.700	0.000	Accepted

Table 5. Indirect Effect.

Hypotheses	Construct	β	t-values	p-values	Result
H5	GHRM $\rightarrow$ GOI $\rightarrow$ EEB	0.059	3.004	0.003	Accepted
H7	GHRM $\rightarrow$ GTA $\rightarrow$ EEB	0.121	3.669	0.000	Accepted

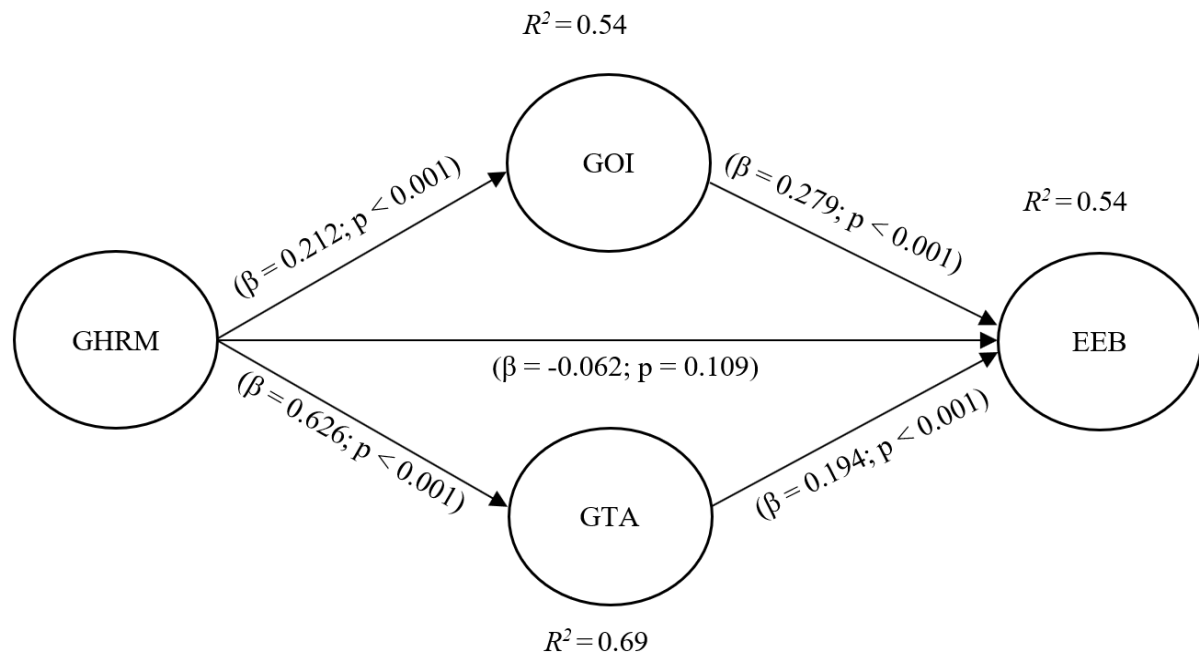


Figure 2. SEM Result.

5. DISCUSSION

There was no significant connection between GHRM and EEB, according to the first hypothesis evaluated in this study ($\beta = -0.062$; $p = 0.109$). In line with these conclusions, Ahmad and Hayee (2024) discovered that employee environmental behavior is not directly impacted by GHRM, indicating that without psychological or contextual mechanisms as a support system, organizational practices will not lead to behavioral change. In addition, Benevene and Buonomo (2020) concluded that formal HRM practices by themselves are not sufficient to encourage ecologically oriented behavior unless they have been internalized through motivational and cognitive processes. Therefore,

considering the results of this study, it is consistent with past evidence suggesting that GHRM does not have a direct effect on EEB; rather, they operate indirectly and requires the existence of psychological and organizational mechanisms for it to have a positive effect on employee behavior. In addition, formal green HR practices alone may be insufficient to generate pro-environmental behavior unless supported by appropriate psychological, technological, and innovation-related mechanisms.

The hypothesis's finding ($\beta = 0.212$; $p < 0.001$) confirmed that GHRM has a significant impact on GOI. This is in line with the findings of research conducted by Shah and Soomro (2023) and Singh, Del Giudice, Chierici, and Graziano (2020). This indicates that green orchestration advances are significantly affected by GHRM. The results of Singh et al. (2020) and Shah and Soomro (2023) support the notion that, to effectively support environmental sustainability and green innovation, enterprises need to create a proactive GHRM architecture. In this regard, the HR division is not only in charge of standard administrative tasks, but also strategically contributes to environmental conservation and the development of sustainable corporate culture. Therefore, by incorporating environmental values into HRM systems and organizational practices, policymakers and top management are expected to protect the socioeconomic and ecological well-being of employees. Organizations can attract, develop, and retain environmentally conscious employees who can contribute to green innovation initiatives by implementing green recruitment and selection, green performance appraisal, green compensation and rewards, and green training and development.

According to the third hypothesis, GHRM has a significant impact on GTA ($\beta = 0.626$; $p < 0.001$). According to Gupta (2021) and Shaikh et al. (2025), GHRM has a major impact on the adoption of green technologies. Emphasized how HR procedures play a strategic role in supporting corporate environmental change. A workforce that is both environmentally conscious and technologically adaptive to eco-innovations is produced by GHRM practices such as green hiring, environmental training, and sustainability-focused performance reviews. Through these mechanisms, employees are more likely to develop the necessary competencies, motivation, and commitment to support the implementation and utilization of green technologies within organizational processes. GHRM is making employees environmentally conscious towards new technology and promoting a green applied environment within the work environment based on the ability to introduce AI technologies in the workplace, which is used to support data-driven, HR leadership methods to improve management decisions and allow for the selection of appropriate green technology.

The fourth hypothesis showed that GOI and EEB had a strong connection ($\beta = 0.279$; $p < 0.001$). For example, Masyhuri et al. (2026) found that organizations made their resource usage more effective by promoting innovation across all departments while allowing employees the authority to make decisions, clearly defining the employees' responsibilities, reducing the number of policies and procedures to follow, and promoting teamwork within the organization. Unlike conventional green innovation, the GOI establishes a comprehensive environment for integrating all environmental initiatives within the organization's principles and aligns the organization's motivation for sustainability into actions, which is comparable to the findings reported by Tikas (2024) and Ahmed et al. (2023), demonstrating the extent to which employees can meet the sustainability vision for the organization. This level of organization encourages employees to demonstrate behaviors consistent with the company's environmental goals. Furthermore, the degree of employee involvement in GOI promotes environmentally based behaviors through the development of skills and knowledge, and increases employees' internal motivation related to pro-environmental behaviors (Tram & Ngoc, 2024). Furthermore, GOI cultivates a sustainability-oriented culture that encourages creativity and continuous environmental improvement.

According to the fifth hypothesis, EEB is significantly affected by GHRM, with the GOI acting as a mediating variable ($\beta = 0.059$; $p = 0.003$). GHRM practices play a crucial role in fostering an organizational climate that supports innovation oriented toward environmental sustainability. In this context, the GOI emerges as a strategic mechanism that translates GHRM-driven environmental values into innovative processes, systems, and practices. As highlighted by Tram and Ngoc (2024), green innovation fosters a sustainability-oriented culture that encourages employees to think creatively about minimizing environmental impacts and engaging in pro-environmental behavior.

Thus, GHRM not only shapes employees' environmental awareness but also stimulates organizational innovation that makes such awareness actionable. Furthermore, the mediating role of the GOI extends to employee-level behavioral outcomes by enhancing employees' capabilities and opportunities to engage in ecological behavior. Employees involved in green innovation processes acquire sustainability-related knowledge and skills, which strengthen their ecological behavior both within and beyond the workplace (Tram & Ngoc, 2024). In addition, the orchestration of green intellectual capital encourages environmentally responsible practices, including cutting back on non-renewable resource use and actively taking part in environmental education initiatives (Van & Nguyen, 2023). This indicates that the GOI acts as a critical pathway through which GHRM influences EEB by converting environmental competencies into concrete behavioral outcomes. In line with the AMO framework, while GHRM enhances employees' abilities and motivation, GOI provides an opportunity structure that enables consistent enactment of actions that support the environment. The sixth hypothesis, which emphasizes the substantial positive impact of green technology adoption on employee ecological behavior, is supported by the study's findings ($\beta = 0.194$; $p < 0.001$). In this respect, Gill et al. (2021) indicated that employees' beliefs and perceptions regarding green technology adoption increase their desire to act sustainably at the company, suggesting that the integration of environmentally friendly technologies can shape employees' values, perceptions, and daily practices toward sustainability. The adoption of green technologies increases employees' perceptions of their utility and usability, which in turn increases their readiness to participate in pro-environmental actions, according to the technology acceptance paradigm. When organizations invest in cost-efficient and eco-sustainable technologies, they not only improve operational performance but also reinforce environmental values among employees. Additionally, pressure from outside sources (such as laws and regulations and corporate social responsibility) contributes to the accelerating adoption of green technologies and helps create a more comprehensive institutional framework for promoting environmentally sustainable behavior. A green work environment adds to employees' attachment to and participation in sustainability efforts and reduces their resistance to change.

According to the findings of Hypothesis 7, employee environmental behavior (EEB) is significantly impacted by green human resource management (GHRM), which also serves as a mediator between GHRM and green technology adoption (GTA) ($\beta = 0.121$; $p < 0.001$). Employees who engage in GHRM practices, such as green training, hiring, and performance management, become more environmentally conscious and competent, increasing their likelihood of adopting and successfully using green technologies. By institutionalizing sustainability throughout the company, GHRM was able to not only instill environmental ideals but also put them into practice. According to earlier studies Altassan (2024); Liu et al. (2023) and Mahmood et al. (2025), the adoption of green technologies fosters an organizational culture that embodies environmental responsibility, which encourages employees to act pro-environmentally at work. Additionally, the GTA establishes a mechanism that transforms environmental awareness into observable pro-environmental behavior. According to Liu et al. (2023) the implementation of green technologies fosters employee involvement in sustainability initiatives, the development of an eco-friendly mindset, and the generation and dissemination of eco-friendly ideas. Therefore, the substantial mediating effect of GTA indicates that the relationship between GHRM and EEB is stronger when organizations adopt green technologies. This study makes various valuable contributions to the GHRM and EEB literature. This study first identifies that formal green HRM practices are insufficient to generate pro-environmental behavior unless attention is also given to the psychological, technological, and innovation-related mechanisms necessary to facilitate pro-environmental behavior.

The results of this study indicate that GHRM and EEB are not directly related. It is also critical to show that not only do employees' abilities and opportunities to behave ecologically need to be met, but that emotional commitment and organizational enablers, in addition to abilities and opportunities, must also be present to achieve EEB. The Ability-Motivation-Opportunity (AMO) framework is extended in this study by demonstrating how emotional and organizational enablers are key components in facilitating employee EEB. Second, this research contributes to Resource Orchestration Theory (ROT) by establishing that GHRM functions as a strategic capability

in promoting green orchestration innovation and green technology adoption. The findings indicate that HRM practices designed to enhance sustainability support the orchestration of human, technological, and organizational resources in achieving an organization's sustainability objectives and are therefore applicable to EEB. Finally, a more comprehensive understanding of how GHRM affects EEB within sustainability-oriented enterprises in emerging economies is provided by offering an integrated framework through which organizational, psychological, and technological views interact.

5.1. Theoretical Implication

5.1.1. Managerial Implication

Through this research, some theoretical implications are drawn by clarifying how sustainability-focused HR practices impact the ecological behaviors of employees. Initially, it substantiates that GHRM is not a direct-original link between the GHRM practices of a workplace and the ecological behaviors of employees, calling into question the idea that eco-friendly HR practices will directly result in eco-friendly behaviors from their employees, that is, individual behavioral outcomes do not occur automatically or immediately from the establishment of HR policies or practices made by businesses; rather, employee eco-friendly behaviors occur due to several different mechanisms of organizational/HR transformation. Thus, by creating this event, we can conclude that although the implementation of an HR system that promotes sustainability on its own generates employees' intentions to act in an environmentally friendly manner, additional transformation mechanisms are still required for those intentions to translate into employees' overt behaviors. From this study's findings, it revises how the AMO framework's explanatory logic occurs in terms of developing environmentally inspired behaviors through an employee's ability, motivation, and opportunities. The research shows how the AMO framework does not give adequate attention to the role of the organizational transformation mechanisms that convert an employee's ability into observable behavior. Stated another way, the employee having an environmental awareness and the employer providing organizational support will not lead to a behavioral change if the employer does not have a system in place to enable an employee to utilize their eco-friendly resources. From this point, this research describes the application of Resource Orchestrating Theory at the employee level versus the organizational level, as well as providing data to suggest that just having resources will not produce environmentally sound behaviors unless those resources are organized, integrated, and/or strategically applied. Organizational advancements in green technology utilization and green orchestration are two examples of organizational transformation mechanisms that convert HR capacities in sustainability to observable employee behaviors. Thus, Resource Orchestrating Theory recognizes that the creation of value from resources occurs at both the organizational and employee levels through environmentally inspired behaviors produced by employees. Finally, this research provides a more process-oriented explanation for employee environmental behaviors by integrating human capacity, organizational innovative capacity, and technological capacity into one framework. Rather than perceiving environmentally inspired behaviors as a direct result of an organization's green policy, the findings propose that an employee's environmentally inspired behaviors emerge from an organizational transformational process in which the various organizational systems, innovation capacity, and technological infrastructure result in employees' environmentally favored actions. Therefore, by demonstrating that environmentally friendly employee behaviors represent an emergent organizational competence rather than just individual employee behaviors, this study contributes to the body of knowledge on sustainable management.

6. CONCLUSION

Insights into how GHRM affects EEB can be obtained from this research. GHRM was not found to directly affect EEB, but instead through GOI and GTA. This research indicates that implementing organizational sustainability practices will not produce behavioral change unless the organization implements innovation mechanisms, emotional support, and technological infrastructure. This research contributes to GHRM/EEB literature because it identifies

the mediation effect of both GOI and GTA on EEB and demonstrates that EEB is the result of multiple organizational interventions versus just the impact of GHRM. Additionally, the research offers a more comprehensive perspective on sustainability research than has typically been applied (technological and innovation-based) combined with a psychological perspective, specifically as it relates to emerging economies and service-based industries. Lastly, there is empirical support for integrating the AMO and ROT frameworks to understand behavior related to sustainability. In conclusion, organizations should not focus solely on formal GHRM policies, but instead focus on investing in green innovation initiatives, employees' intrapersonal motivation to be environmentally friendly, and adoption of technology that promotes ecological behavior through the creation of a workplace that reinforces engagement and commitment to ecological behavior. Specifically, managers in the banking sector should focus on aligning their HR practices with technology transformation and innovation strategies to effectively promote sustainability at the employee level. Legislators should create laws, rules, and incentives to encourage companies to use green innovation and GHRM. These policies include tax breaks for training initiatives, funding for green innovation projects, and establishing sustainability standards that can accelerate the transformation to sustainable development within organizational practices at the firm and government levels.

6.1. Limitations and Scope for Future Research

There are some limitations to this research. Since the data were gathered from a cross-sectional sample, generalization from this study is not feasible. Additional restrictions include the following: 1. A small sample size; 2. The organizations in this study were not all at the same stage of the innovation process. 3. Non-random purposive sampling; 4. No long-term studies have been conducted; 5. Single-location research; 6. Retrospective data collection techniques, 7. The use of cross-sectional research methods, and 8. Absence of multiple informants. Although the findings provide empirical support for the proposed model, the cross-sectional nature of the study does not allow definitive causal interpretation; therefore, the reported relationships should be interpreted as theoretically supported associations rather than strict causal effects. There are opportunities for future research to help understand GHRM and EEB in organizations outside the Indonesian banking sector, as well as across industries within different geographic areas. More research can also be conducted regarding green innovation, technological innovation, and organizational development in general. Future studies should also include a longitudinal study to give greater emphasis to cause and effect. Finally, more data can be obtained to enhance the understanding of GHRM in an organizational context.

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Informed Consent Statement: Informed verbal consent was obtained from all participants, and all data were anonymized to protect participant confidentiality.

Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

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