Leading for Green: The Role of Eco-Centric Leadership in Shaping Organizational Citizenship Behavior for the Environment

Abstract

Purpose: This research examines how eco-centric leadership influences external organizational citizenship behavior for the environment through green human resource management (HRM) and environmental corporate social responsibility.

Design/methodology/approach: Data were gathered from 400 frontline employees across 45 manufacturing firms in Pakistan. Data were analyzed using partial least squares structural equation modeling to test the hypotheses.

Findings: Results indicate that green HRM and environmental corporate social responsibility mediate the positive relationship between eco-centric leadership and external environmental organizational citizenship behavior, encompassing their three dimensions: eco-initiative, eco-civic engagement, and eco-helping behaviors. Managerial discretion moderates the relationship between eco-centric leadership and green HRM, with the relationship being stronger when managerial discretion is higher. Furthermore, managerial discretion influences the indirect link between eco-centric leadership and external environmental organizational citizenship behaviors through green HRM and environmental corporate social responsibility (moderated mediation).

Practical implications: This study offers actionable insights for businesses seeking to develop environmentally responsible strategies through the implementation of green HRM initiatives and environmental corporate social responsibility initiatives.

Originality: This study provides new insights into how eco-centric leadership fosters external organizational citizenship behavior for the environment.

Keywords: Eco-Centric Leadership, Environmental Corporate Social Responsibility, External Organizational Citizenship Behavior for the Environment, Green Human Resource Management, Managerial Discretion

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Introduction

The actions of leaders and employees have received increasing attention in research and practice as organizations seek to embed environmental sustainability into their operational frameworks. *Management Decision* has been at the forefront of these discussions, highlighting leadership's role in sustainability across industries (Kaur *et al*., 2025; Shah and Soomro, 2023). These studies emphasize the importance of organizational environmental culture in promoting sustainability and its broader social benefits (Canbul Yaroğlu, 2025). Given Pakistan's rapidly growing population, environmental challenges are intensifying (Worldometer, 2025).

Unlike traditional leadership models, eco-centric leadership (ECL) promotes intrinsic motivation by emphasizing an organization's mission, social values, and commitment to community development (Biswas *et al*., 2022). Leaders who embody eco-centric values can inspire employees to adopt sustainable behaviors, shaping workplace culture and broader societal norms through ethical standards, environmental awareness, and community engagement (Uddin *et al*., 2021). Although the importance of ECL for internal sustainability actions within organizations is evident, its impact on employees' voluntary environmental behaviors remains underexplored. Existing research on ECL primarily focuses on internal outcomes such as green creativity (Robertson and Barling, 2013), workplace environmental actions (Alhejji *et al*., 2025), and eco-innovation (Khassawneh *et al*., 2024). Recent studies have called for more research into how ECL influences environmental practices beyond organizational boundaries (Yusliza and Muhammad, 2024), revealing a notable gap in both research and practice.

In this context, organizational citizenship behavior for the environment (OCBE) has become an important area of study, reflecting voluntary, environmentally conscious actions taken by employees beyond their formal job requirements. Mi *et al*. (2019) expanded the OCBE framework to include everyday sustainability practices, highlighting frontline employees as key agents in implementing ecological policies. These employees play an essential role in promoting sustainable change through engagement, role modeling, and operational involvement (Spyridonidis and Currie, 2016). By fostering deep environmental awareness and shared ecological beliefs, ECL supports and encourages sustainable actions both inside and outside the workplace (Hamlin *et al*., 2024). However, current research offers limited understanding of how and when ECL can influence OCBE in organizational settings, particularly in the manufacturing sector within non-Western contexts.

Building on the above knowledge gaps, we draw on social cognitive theory (SCT; Bandura, 1986) to investigate the impact of ECL on external OCBE. Specifically, we examine whether the relationship between ECL and OCBE is mediated by green HRM and environmental CSR. This mediating role could help explain the mechanisms through which ECL can influence OCBE and the importance of aligning leadership values with organizational norms to achieve sustainable outcomes (Shah and Soomro, 2023). Additionally, environmental CSR reflects the organization's ongoing commitment to environmental sustainability as a strategic priority. Together, green HRM and environmental CSR help cultivate a sustainability-oriented culture that motivates employees to engage in voluntary pro-environmental behaviors.

Moreover, because the influence of ECL on OCBE may vary across contexts, we examine whether managerial discretion moderates the relationship between ECL and green HRM. Managerial discretion depends on managers' ability to navigate constraints and leverage networks to support sustainability (López-Cotarelo, 2018). SCT suggests that the interaction between behavior and the environment is shaped not only by the actions of role models but also by the perceived control that individuals believe they have in a given situation. When managerial discretion is high, managers are more likely to have the autonomy and authority to align organizational actions with green HRM practices. In this case, observational learning becomes particularly important, as managers adopt sustainable values from leaders and are more willing to exercise their authority to support green HRM practices. Conversely, even when ECL is supportive, limited managerial autonomy can hinder the implementation of sustainable initiatives, weakening the link between ECL and green HRM.

Accordingly, we address the following research questions: (1) What is the impact of ECL on external OCBE? (2) Do green HRM and environmental CSR mediate the relationship between ECL and external OCBE? (3) Does managerial discretion moderate the relationship between ECL and green HRM? This study contributes to the literature in three ways. First, it extends organizational sustainability research by examining the impact of ECL on OCBE. By focusing on behaviors beyond formal job responsibilities, the study highlights the broader social outcomes of environmentally conscious leadership. Second, it explores the mediating roles of green HRM and environmental CSR, offering new insights into the behavioral process through which leadership values are converted into pro-environmental practices. This enhances understanding of the internal mechanisms by which ECL fosters an environmentally friendly culture. Third, the study

underscores the role of managerial discretion as a moderating variable that clarifies the conditions under which ECL can effectively support green HRM practices.

Theoretical Framework and Hypotheses Development

Social Cognitive Theory (SCT)

SCT evolved from social learning theory, proposing that learning occurs within a socio-institutional context through interactions among personal factors and the environment (Bandura, 1991). It explains that individuals acquire specific behaviors either through direct experience or by observing others (Bandura, 1986). In organizational settings, ECL can act as a role model by demonstrating commitment to pro-environmental practices, which may encourage employees to imitate these behaviors. This process of observational learning promotes voluntary environmental actions that extend beyond formal job responsibilities (Ma *et al*., 2024). Additionally, SCT highlights reciprocal determinism – the interaction between individuals, organizational factors, and the environment – which shapes how ECL is translated into sustainable environmental practices (Hernández and Muñoz, 2022). Thus, SCT provides a useful framework for understanding how ECL values are embedded, translated, and internalized into sustainable organizational practices.

This dynamic interaction is visible in how ECL's demonstration of environmental values influences both formal organizational systems (e.g., green HRM practices) and informal employee behaviors (e.g., external OCBE), while simultaneously being shaped by these same systems and behaviors (Özgül and Demir, 2025). SCT represents a significant shift in management thinking, making it highly relevant for research on green behavior, sustainability, and corporate environmental performance (Biswas *et al*., 2022). Therefore, we argue that SCT offers a compelling perspective for explaining how ECL fosters an organizational culture that encourages environmentally sustainable practices, which in turn motivate employees to engage in pro-environmental behavior.

SCT also proposes that individual behavior results from the complex interplay between personal and environmental factors. Through observational learning, eco-conscious leaders promote eco-conscious behavior by modeling it, making eco-friendly practices attractive and attainable. This process may enhance employees' self-efficacy by equipping them with the skills and confidence needed to contribute to sustainable practices. Moreover, through reinforcement

mechanisms such as rewards and recognition, ECL can encourage employees to adopt eco-friendly practices until they become habitual. Overall, SCT explains the mechanism of reciprocal determinism between ECL behaviors, employees' cognitions, and the organizational environment to promote sustainable practices.

This perspective also clarifies why combining ECL with supportive organizational practices is particularly effective in fostering external OCBE (Han *et al*., 2025). At the organizational level, SCT's construct of collective efficacy (Bandura, 2001) describes how shared beliefs in an organization's ability to achieve environmental goals develop from the interaction of leadership, HRM systems, and CSR initiatives. This collective confidence then encourages employees to engage in ecological behaviors beyond the workplace (Sahar *et al*., 2025).

Eco-Centric Leadership (ECL) and External OCBE Dimensions

SCT emphasizes the importance of observational learning, reciprocal determinism, and self-efficacy in shaping individual behavior (Bandura, 1986; Ma *et al*., 2024). Leaders who demonstrate sustainable values motivate employees to adopt eco-friendly practices by serving as role models (Bisla *et al*., 2024). Through this social learning process, organizations foster a culture of environmental responsibility by integrating eco-friendly practices into daily operations. Employees, in turn, learn and replicate these eco-friendly behaviors both inside and outside the workplace. Empirical research shows that leadership modeling and reinforcement of sustainable behaviors increase employees' likelihood of engaging in external OCBE (Afsar *et al*., 2020). This modeling behavior not only helps employees understand green initiatives but also strengthens their belief in their ability to contribute to environmental change.

ECL promotes reciprocal determinism, where leaders' sustainable behaviors influence and help cultivate a workplace culture that values eco-friendly actions (Abualigah *et al*., 2023). Employees who find these behaviors meaningful are more likely to adopt similar practices, reinforcing an environmentally responsible corporate identity. This process also encourages eco-helping behavior, where employees actively support others in adopting sustainable practices. Using SCT, we suggest that ECL influences employees' pro-environmental actions by shaping attitudes, increasing self-efficacy, and fostering a collective commitment to sustainability.

Recent literature emphasizes the urgent need to integrate ECL with contemporary frameworks such as green HRM and stakeholder value co-creation. For instance, Alhejji *et al*. (2025) suggest that beyond traditional CSR, leadership should be analyzed in relation to social

systems theories, positioning organizations as catalysts for ecological and social impact. Moreover, recent calls highlight the importance of exploring the integration between SCT with emerging leadership trends to develop a comprehensive understanding of pro-environmental behavior and to strengthen systemic approaches to sustainability (Nwosu., 2025). Although current studies recognize the role of leadership in promoting eco-behavior (Zhao and Liang, 2023), few have explained how ECL, green HRM, and environmental CSR initiatives interact to shape a culture that prioritizes external OCBE. Therefore, we hypothesize that:

H1: ECL positively relates to external OCBE and its three dimensions: **H1a** eco-initiative, **H1b** eco-civic engagement, and **H1c** eco-helping behavior.

Green Human Resource Management (HRM)

Green HRM integrates sustainability into HR strategies, policies, and practices to reduce environmental impact and encourage eco-friendly behaviors among employees (Hameed *et al*., 2022). These efforts enhance organizational sustainability by raising environmental awareness and supporting green practices (Choudhary and Datta, 2024). Successful green HRM initiatives rely on motivation and education to drive organizational change and learning (Pham *et al*., 2019). Research further highlights the positive influence of green HRM on environmental performance and employee behavior, motivating eco-friendly actions that extend beyond the workplace (Usman *et al*., 2023). Promoting environmental consciousness and eco-friendly behaviors outside of work requires carefully designed green HRM practices and work methods that encourage responsible resource use.

ECL, as a value-driven approach, encourages employees to engage in environmental protection through altruistic actions (Abualigah *et al*., 2023). By fostering a supportive workplace culture, eco-centric leaders create a sense of purpose, helping employees feel valued and strengthening their contributions to social and environmental progress (Babalola *et al*., 2022). In this context, emerging theories have integrated SCT, sustainable work systems, and sustainable leadership to emphasize HRM's role in promoting ecological values (Bisla *et al*., 2024; Ma *et al*., 2024). Leadership influences pro-environmental behavior through HRM practices that embed ecological values in talent acquisition, career development, and performance management systems (Alhejji *et al*., 2016). Despite their valuable contributions, little is known about how employees engage in external OCBE beyond green HRM initiatives supported by leadership.

From an SCT perspective, behavior results from the dynamic interaction of individual traits, environmental factors, and outcomes (Farooq *et al*., 2022). This interaction is central to understanding green HRM. SCT explains how personal attributes, behaviors, and the external environment interact, shaping the replication of observed behavior (Bandura, 1986; Mehmood *et al*., 2025). Rather than being driven solely by internal motivation or external control, employees act based on their contributions within a network of influences. Therefore, we propose the following:

H2: ECL positively relates to green HRM.

H3: Green HRM positively relates to external OCBE.

Environmental Corporate Social Responsibility (CSR)

SCT suggests that learning and engagement in specific behaviors are shaped by the interaction among individuals, their environment, and the behavior itself (Bandura, 1991; Schunk and DiBenedetto, 2020). Somerville *et al.* (2010) emphasize that cognitive and emotional traits, social contexts, and behavioral patterns explain why people choose to engage in or avoid certain behaviors. Confidence in participating arises from the belief that such behaviors will produce desirable and achievable outcomes (Ziv and Arbel, 2020). Employees who voluntarily engage in green activities make meaningful contributions to their organization's environmental goals (Chuang and Huang, 2018). External OCBE captures employees' voluntary efforts beyond formal job requirements to benefit the environment both inside and outside the organization (Febriani and Irawati, 2024). Leadership qualities, supervisory support, and organizational policies (such as environmental policies) are key drivers of external OCBE. Responsible leadership further reinforces these behaviors.

Environmental CSR demonstrates a company's commitment to minimizing its environmental and social impact through sustainable production and management practices (Jiang *et al*., 2018). According to SCT, organizations that adopt environmental CSR create a context that shapes employees' attitudes and behaviors toward sustainability, extending beyond the workplace (Kim *et al*., 2019). Leaders who demonstrate commitment to environmental responsibility encourage employees to adopt similar values and behaviors (Zientara *et al*., 2018). Through reinforcement and social influence, leaders also increase employees' confidence in engaging in pro-environmental behaviors (Norton *et al*., 2015).

Although environmental CSR is recognized as a strategic extension of ECL, much existing research focuses on: (1) its significance for environmental and social outcomes (Bissing-Olson *et al*., 2013); and (2) its role in supporting behaviors beyond formal job requirements (Boiral *et al*., 2015). However, CSR is often treated as a standalone initiative. We argue that it should be explicitly linked to ECL to foster ecological and social change. Empirical studies rarely examine how ECL and CSR jointly promote external OCBE beyond organizational boundaries. Therefore, we propose the following:

H4: ECL positively relates to environmental CSR.

H5: Environmental CSR positively relates to External OCBE.

Serial Mediating Role of Green HRM and Environmental *CSR*

As mentioned earlier, SCT suggests that learning and behavior are shaped by interactions among individuals, their environment, and observed actions (Bandura, 1991; Schunk and DiBenedetto, 2020). Employees' pro-environmental behaviors outside of work are therefore influenced by social pressures from peers and supervisors, particularly when sustainable actions align with workplace norms (Sampene *et al*., 2024). Building on SCT, previous research has shown that organizational factors such as environmental CSR, green HRM, and leadership influence individual task performance and green behaviors both inside and outside the workplace (He *et al*., 2021; Usman *et al*., 2023). Environmental CSR reflects a company's commitment to reducing environmental impact through ethical practices, sustainability initiatives, resource conservation, and environmental protection (Afsar *et al*., 2020). Green HRM refers to formal HR practices that encourage environmental responsibility (Malik *et al*., 2021). Supervisors also play a role by modeling eco-friendly behaviors such as recycling, resource conservation, and waste reduction, thereby encouraging employees to act in similar ways (Kim *et al*., 2019).

Organizations that prioritize environmental CSR aim to protect natural resources, reduce waste, and promote community well-being (Masum *et al*., 2020). This commitment motivates employees to engage in environmental protection beyond their formal job roles. Green HRM reinforces sustainable actions through practices such as green recruitment, training, performance evaluations, and rewards (Usman *et al*., 2023). From an SCT perspective, these practices expand employees' environmental knowledge and motivation, supporting sustainable behaviors in daily life. Environmental CSR further embeds sustainability into corporate culture, shaping employees' attitudes and actions outside the workplace (Tian and Robertson, 2019).

Despite the acknowledged importance of both green HRM and environmental CSR in corporate strategies, existing research offers limited insights into how the two interact to transmit the influence of ECL to OCBE. This gap is noteworthy, as current debates highlight the need for multilevel mediating mechanisms to clarify how leadership translates into employee-driven sustainable behaviors (Malik *et al*., 2021; Queiri and Alhejji, 2025). Therefore, we propose the following:

H6: Green HRM positively relates to environmental CSR.

H7: Green HRM and environmental CSR mediate the relationship between ECL and External OCBE, including the three dimensions of **H7a** eco-initiative, **H7b** eco-civic engagement, and **H7c** eco-helping behavior.

The Moderating Role of Managerial Discretion

We propose that managerial discretion moderates the relationship between ECL and green HRM because SCT indicates that executives' subjective perceptions affect decision-making and corporate strategies (Schunk and DiBenedetto, 2020). Senior managers evaluate situations based on their cognitive abilities and respond accordingly (Tao and Hutchinson, 2013). By contrast, environmental managers with limited authority or unclear responsibilities face barriers to launching waste prevention initiatives (López-Cotarelo, 2018).

Managerial discretion also varies across functional areas. Without support from peers in other managerial roles, environmental leaders struggle to implement green initiatives (Jiang *et al*., 2022). Executives responsible for strategy must consider organizational capabilities and environmental constraints when pursuing sustainability reforms (e.g., reducing carbon emissions), efforts that are often restricted by limited discretion (Liao and Zhang, 2020). Greater autonomy enables better decision-making and stronger employee engagement in eco-initiatives, improving the effectiveness of green strategies (Jiang *et al*., 2022). Research shows that managerial support is linked to employees' eco-initiatives (Ramus and Steger, 2000). High discretion allows managers to implement environmental CSR initiatives more effectively, thereby enhancing environmental, social, and financial outcomes. As a result, managerial discretion strengthens the influence of environmental CSR on organizational sustainability and employees' pro-environmental behaviors.

Contemporary theories on strategic flexibility also suggest that leaders' discretion enables them to integrate HRM initiatives and CSR practices with sustainable organizational change. Yet

there remains little empirical evidence on how managerial discretion shapes the effect of ECL on green HRM practices and, in turn, amplifies their influence on external OCBE. SCT posits that discretion, rather than objective conditions, directly shapes corporate behavior (Chen and Chang, 2013). Managers interpret external signals to guide corporate actions, thereby shaping sustainability initiatives (Jiang *et al*., 2022). In the context of green HRM, ECL sets environmental priorities, but successful implementation depends on managerial discretion. Greater discretion enables managers to tailor green policies to organizational needs, fostering innovation in HRM practices. Therefore, we propose the following:

H8: Managerial discretion moderates the relationship between ECL and green HRM such that the relationship will be stronger when managerial discretion is higher.

H9. Managerial Discretion moderates the indirect relationship between ECL and External OCBE via green HRM and environmental CSR (mediated moderation), such that the relationship will be stronger when managerial discretion is higher.

Proposed Model

Figure 1 presents the proposed model.

INSERT FIGURE 1 HERE

Methodology

Research context

We collected data from Pakistani manufacturing firms in 2023. These firms were selected for several reasons. First, Pakistan faces severe environmental degradation primarily driven by population growth, deforestation, declining freshwater resources, unsustainable agricultural and industrial practices, insufficient ecological measures, and unsustainable economic activities (Ullah *et al*., 2025; Usman *et al*., 2023). Consequently, Pakistan ranks among the lowest in Asia in terms of resource sustainability (Usman *et al*., 2023). Second, although the Government of Pakistan has been implementing sustainable policies and plans, there is still limited awareness of environmental degradation and of the roles industries, consumers, and society play in protecting the environment (Moon *et al*., 2021). Third, this research provides valuable insights into the role of manufacturing industries in promoting external citizenship behaviors and encouraging environmentally responsible actions among employees, such as taking initiative, engaging with communities, and

helping others. Such behaviors outside of work are essential for addressing environmental challenges.

Study Design

We conducted a quantitative study focusing on employees from 45 companies in Pakistan's manufacturing sector. Each company had at least 49 employees and a dedicated HRM department. A time-lagged survey design was used to collect data from 400 employees across these organizations. To develop the sample, we targeted large-scale manufacturing firms, given their critical role in Pakistan's economy and cultural transformation. The sector contributes 12.8% to GDP and employs 16.1% of the labor force, making it the country's second-largest industry (Government of Pakistan, FY2021; Pakistan Bureau of Statistics).

Cluster sampling was applied to examine relationships at different levels while maintaining efficiency among the 42,578 manufacturing firms across Pakistan's 121 districts (Pakistan Bureau of Statistics, 2016). Companies with at least 49 employees and a dedicated HR department were approached. We contacted HR managers at 84 firms, of which 60 granted permission to invite employees to participate. After obtaining approval, we met with senior management to explain our research objectives and societal contribution. They were assured that all data would remain confidential and used exclusively for academic purposes. Responsible officials then provided access to employees who agreed to participate. An online questionnaire was distributed to respondents.

Data collection occurred from June 1 to July 8, 2023, in three waves. After receiving ethical approval, we again met with senior management to explain the goals and highlight the voluntary nature of participation. Employees who consented received survey links at each time point. To reduce common method bias, different constructs were measured separately (Podsakoff *et al*., 2012), and the time-lagged design further mitigated bias.

Unique identification codes were assigned to track responses across the three waves. In the first round (June 1, 2023), we sent surveys to 600 employees measuring ECL, environmental CSR, and demographics, receiving 433 responses (72% response rate). In the second round (June 18, 2023), surveys assessed green HRM, yielding 421 responses (70%). In the third round (July 8, 2023), surveys measured external OCBE and managerial discretion, with 415 responses (69%). After removing incomplete data, the final sample included 400 employees.

Participant Demographics

Participants ranged in age from 20 to 54 years, with an average of 43 years. Of these, 63% were men and 37% were women. The majority (57%) held a bachelor's degree. Work experience ranged from fewer than three years to more than twelve years, with an average of between seven and nine years.

Measures

All variables were measured using a 7-point Likert scale (1 = "Strongly Disagree" to 7 = "Strongly Agree"), unless otherwise specified.

Eco-Centric Leadership (ECL)

Measured with a 6-item scale developed by Chen and Yan (2022). A sample item is, "Our leader inspires the employees about the environment." Employees completed this part of the survey to enable us to assess the perceptions of their supervisor. Cronbach's alpha = 0.84.

Green Human Resource Management (HRM)

Measured with a 6-item scale developed by Dumont *et al.* (2017). A sample item is, "My organization sets green goals for its employees." Cronbach's alpha = 0.86.

Environmental Corporate Social Responsibility (CSR)

Measured with a 4-item scale developed by De Roeck and Farooq (2018). A sample item is, "My organization participates in activities which aim to protect and improve the quality of the natural environment" Cronbach's alpha = 0.82.

Managerial Discretion

Measured with a 3-item scale developed by Ball *et al.* (2018), also used by Gupta *et al.* (2019). A sample item is, "The top managers of the firm generally have freedom in environmental decision-making." Cronbach's alpha = 0.70.

External OCBE

Measured with a 10-item scale adapted from Boiral and Paillé (2012), as rated by supervisors, which allows cross-validation across organizations and departments (Luu, 2019). A sample item is, "In my non-work activities, I weigh the consequences of my actions before doing something that could affect the environment." Besides external OCBE, three dimensions were also measured: (a) eco-initiative, (b) eco-civic engagement, and (c) eco-helping behavior. Cronbach's alpha = 0.89.

Measurement Model and Validity Assessment

Common Method Bias

To test for common method bias, we used a comprehensive multicollinearity test (Kock, 2015). Variance Inflation Factor (VIF) values were below 3, indicating no bias. Table I shows descriptive statistics and correlations. All demographic variables were non-significant, except gender and education.

Model Fit Indices

INSERT TABLE I HERE

Table II presents model fit indices from Covariance-Based Structural Equation Modeling (CB-SEM). Confirmatory factor analysis (CFA) was conducted using Smart PLS 4. Model fit indices were satisfactory: $\chi^2 = 254.544$, $p < .001$, $\chi^2/df = 1.831$, CFI = 0.964, TLI = 0.955, RMSEA = 0.046, and SRMR = 0.043. All factor loadings exceeded 0.50 (Hair *et al*., 2019). The five-factor model showed superior fit compared with alternatives (see Table II).

INSERT TABLE II HERE

Confirmatory Factor Analyses

Table III displays Confirmatory Factor Analysis (CFA) results from Smart PLS 4. All item loadings were above the recommended 0.50 threshold (Stevens, 2002). Cronbach's alpha values exceeded the recommended 0.70 (Bagozzi and Yi, 1988), confirming strong internal consistency: ECL (0.84), green HRM (0.86), environmental CSR (0.81), managerial discretion (0.70), and external OCBE (0.89). Composite reliability values were above 0.70, and Average Variance Extracted (AVE) exceeded 0.50, confirming convergent validity. VIF values were all below 3, indicating no multicollinearity. Thus, the measures are reliable and valid for hypothesis testing (see Table III).

INSERT TABLE III HERE

Analytical Strategy

All hypotheses were tested using Partial Least Squares (PLS) Structural Equation Modeling (SEM) with Smart PLS Version 4 (Ringle, 2015). PLS-SEM is well-suited for relatively small samples and specified constructs (Hair *et al*., 2019) and is widely used in HRM research (Pham *et al*., 2020).

Results

R2 Predictive Accuracy and Q2 Predictive Relevance

The R^2 value ranges from 0 to 1, with higher values indicating greater predictive accuracy (Chin, 1998). R^2 values of 0.25, 0.50, and 0.75 are considered weak, moderate, and substantial, respectively. The overall R^2 value for external OCBE was 0.61, indicating that the independent variables, mediators, and moderators together explained 61% of the variance in external OCBE. The R^2 values for its three dimensions were: eco-initiative = 0.55, eco-civic engagement = 0.51, and eco-helping = 0.41.

We also conducted a partial least squares (PLS) prediction test. If the Q^2 value for a reflective endogenous latent variable is greater than 0, the path model can be considered predictive. All Q^2 values exceeded zero (environmental CSR = 0.60, green HRM = 0.67, external OCBE = 0.55), confirming predictive relevance (Hair *et al*., 2017).

Direct Path

H1 proposed that ECL positively relates to external OCBE. As shown in Table IV, this relationship was significant ($\beta = 0.697$, $p < 0.05$), supporting H1. For H1a–c, we hypothesized positive relationships between ECL and the three dimensions of external OCBE. Results indicate that ECL was significantly related to eco-initiative ($\beta = 0.592$, $p < 0.05$), eco-civic engagement ($\beta = 0.595$, $p < 0.05$), and eco-helping behavior ($\beta = 0.675$, $p < 0.05$), supporting H1a–H1c.

INSERT TABLE IV HERE

Serial Mediation Testing

Before testing the serial mediation of green HRM and environmental CSR, the direct paths were examined. ECL was positively related to green HRM ($\beta = 0.677$, $p < 0.05$), supporting H2. Green HRM was positively related to external OCBE ($\beta = 0.571$, $p < 0.05$), supporting H3. ECL was also positively related to environmental CSR ($\beta = 0.641$, $p < 0.05$), supporting H4, and environmental CSR positively related to external OCBE ($\beta = 0.339$, $p < 0.05$), supporting H5. Additionally, green HRM was positively related to environmental CSR ($\beta = 0.636$, $p < 0.05$), supporting H6.

The serial mediation hypothesis (H7) proposed that green HRM and environmental CSR sequentially mediate the relationship between ECL and external OCBE. Results support this hypothesis, with the specific indirect effect at $\beta = 0.146$ ($p < 0.05$) and the total indirect effect at $\beta = 0.457$ ($p < 0.05$). The three sub-dimensions of OCBE were also supported. For eco-initiative (H7a), the specific indirect effect was $\beta = 0.196$ ($p < 0.05$), and the total indirect effect was $\beta =$

0.448 ($p < 0.05$). For eco-civic engagement (H7b), the specific indirect effect was $\beta = 0.138$ ($p < 0.05$) and the total indirect effect was $\beta = 0.458$ ($p < 0.05$). For eco-helping behavior (H7c), the specific indirect effect was $\beta = 0.050$ ($p < 0.05$) and the total indirect effect was $\beta = 0.289$ ($p < 0.05$). The serial mediation results, including specific and total indirect effects, are summarized in Tables V and VI.

INSERT TABLE V HERE

INSERT TABLE VI HERE

Moderation Analysis

H8 hypothesized that managerial discretion moderates the relationship between ECL and green HRM, such that the relationship is stronger when managerial discretion is higher. Results support H8 ($\beta = 0.142$, $p < 0.05$), as shown in Table V and illustrated in Figure 2.

INSERT FIGURE 2 HERE

Finally, H9 proposed that managerial discretion moderates the indirect relationship between ECL and external OCBE through green HRM and environmental CSR (mediated moderation), strengthening the relationship when managerial discretion is higher. The results support this hypothesis ($\beta = 0.088$, $p < 0.05$). For transparency, Table VII presents the Gaussian Copula Test results, which indicate that none of the paths were significantly affected. There is no evidence of endogeneity in the relationships between ECL and external OCBE (0.54), environmental CSR and external OCBE (0.054), or green HRM and external OCBE (0.305), suggesting that endogeneity is unlikely to be a concern (Becker *et al*., 2022).

INSERT TABLE VII HERE

Discussion

This research highlights the importance of eco-centric leadership (ECL) in promoting external organizational citizenship behavior for the environment (OCBE) among frontline employees in the Pakistani manufacturing sector. Eco-centric supervisors inspire employees to initiate environmental efforts, engage in community sustainability activities, and support colleagues in adopting eco-friendly behaviors. This leadership approach enhances intrinsic motivation and cultivates sustainable habits, benefiting both workplaces and broader societal development. These findings align with Biswas *et al.* (2022), who suggest that organizational managers are expected

to integrate social and environmental commitments into their leadership strategies, thereby fostering sustainable voluntary practices and community engagement.

Our findings extend SCT by demonstrating how ECL influences employees' engagement in sustainable practices not only through role modeling but also via organization-wide initiatives such as green HRM and environmental CSR. Leadership behaviors become institutionalized when supported by HRM policies and CSR initiatives, reflecting SCT's principle of reciprocal determinism between employees and their environment. These results offer practical implications for companies seeking to enhance pro-environmental practices by encouraging leaders to support sustainable behaviors and reshape HRM interventions toward the external environment, rather than relying solely on leaders' influence. Furthermore, the moderating role of managerial discretion provides insight into how leadership actions translate into sustainable results, emphasizing SCT's assertion that contextual factors shape the effectiveness of observational learning.

The results indicate that green HRM mediates the link between ECL and external OCBE. Practices such as green goal-setting, environmental training, and the integration of sustainability into performance assessments equip employees with the knowledge and skills necessary to adopt environmentally friendly behaviors. Incorporating sustainability into HRM functions enhances organizational environmental performance and fosters a workforce committed to sustainability (Pham *et al*., 2019; Zafar *et al*., 2023). This influence extends beyond the workplace, as employees engage in local environmental initiatives and promote a culture of sustainability in their personal lives (Canbul Yaroğlu, 2025).

From a managerial perspective, these findings underscore the importance of embedding human resource management into overall organizational strategy. Leaders should focus on green training and performance indicators to institutionalize sustainability and enable employees to practice environmentally friendly behaviors both at work and in the community. This approach aligns with the UN SDGs, which advocate sustainability through human resource policies and practices (Miah *et al*., 2024). Similarly, environmental CSR influences the effect of ECL on external OCBE. Leadership-driven organizational initiatives help reduce environmental harm and promote sustainability activities in the community, highlighting the need for strong environmental CSR policies alongside responsible leadership to reinforce environmental initiatives (Sahar *et al*., 2025).

Theoretically, these findings highlight the role of environmental CSR as a bridge between organizational values and employee behaviors, reinforcing SCT's proposition that environmental context shapes individual actions. Practically, organizations should communicate CSR initiatives transparently and create shared meaning to strengthen employees' external OCBE. Engaging employees in community environmental efforts may reinforce the connection between corporate values and individual behavior (Zawawi *et al*., 2025).

Our results also emphasize the importance of ECL and supervisory behaviors in shaping pro-environmental behaviors, with green HRM and environmental CSR acting as mediators. Understanding how ECL operates enables employees to become environmental advocates, enhancing external OCBE and promoting social change. Scholars note that collaboration between environmental leadership, green HRM practices, and CSR is crucial for fostering sustainable behaviors (Sampene *et al*., 2024). Without green HRM support, CSR initiatives may not effectively promote eco-friendly employee actions. To maximize the impact of environmental CSR, leaders must clearly communicate and actively support sustainability efforts at all organizational levels (Lu *et al*., 2022).

The serial mediation model enhances SCT by demonstrating how ECL flows through organizational systems such as green HRM and environmental CSR to influence individual behaviors. For practitioners, this underscores the importance of a coordinated approach: ECL provides direction, green HRM implements it, and environmental CSR extends its influence to society. This framework can assist organizations in developing interventions that align internal policies with broader sustainability goals (Ahmed *et al*., 2024; Yue *et al*., 2023).

Lastly, managerial discretion plays a key role in the implementation of green policies. When managers adopt environmental initiatives, they align more closely with organizational objectives, enhancing the contribution of ECL and green HRM to external OCBE. We found that managerial discretion moderates the relationship between ECL and external OCBE via green HRM and environmental CSR. Greater discretion allows managers to optimize green HRM and CSR programs, advance employee-driven environmental initiatives, and contribute to social-environmental development. These findings emphasize the need to provide managerial autonomy to implement sustainability operations effectively (Bhardwaj *et al*., 2025). The moderating effect of managerial discretion enriches SCT by demonstrating that abstract modeling alone cannot account for behavior without considering situational factors such as autonomy (Sun *et al*., 2025).

For practice, organizations should empower middle managers with decision-making authority to tailor sustainability initiatives, ensuring alignment with both local needs and global standards (Mehboob and Chowdhury, 2024).

Theoretical Implications

This study contributes to theoretical development by examining the effects of ECL on external OCBE and its three dimensions (i.e., eco-initiative, eco-civic engagement, and eco-helping behavior) within the Pakistani manufacturing industry. In environmentally committed organizations, ECL acts as a role model for employees, who can emulate and internalize sustainable behavior through observation. Our findings indicate that when leaders embody environmental responsibility, employees are more likely to engage in pro-environmental behaviors outside the workplace (Biswas *et al*., 2022; Daily *et al*., 2009; Dumont *et al*., 2017).

The study further highlights the key roles of green HRM and environmental CSR in linking ECL to external OCBE. Green HRM practices such as training programs, performance evaluations, and reward systems enhance environmental awareness among frontline employees and encourage engagement in pro-environmental behaviors beyond work (Malik *et al*., 2021). Similarly, effective environmental CSR initiatives help employees internalize corporate environmental responsibility, integrating sustainability into daily routines as both a company value and personal commitment.

Managerial discretion (the freedom managers have to make decisions) amplifies the effectiveness of ECL, green HRM, and CSR. This autonomy enables managers to allocate resources, set sustainability priorities, and create incentives that align organizational goals with employees' environmentally friendly actions. Unlike earlier studies that treated OCBE primarily as an organizational phenomenon and examined CSR, HRM, and leadership as independent influences, our research uses the SCT framework to analyze how leadership, HRM, and CSR interact to shape behaviors of individuals and groups beyond organizational boundaries (Schunk and DiBenedetto, 2020).

Finally, these results contribute to broader sustainability objectives by explaining how the combined effects of ECL, green HRM, and environmental CSR foster ecological responsibility at a local level. This aligns with several UN SDGs, including environmental preservation, resource sustainability, and environmentally responsible behavior. Cultivating a culture of environmental responsibility allows organizations to impact communities beyond their employees. This study identifies a theoretical gap in which ECL, coupled with sustainable resource management and

ecological responsibility, advances both organizational and societal sustainability. By leveraging these elements effectively, eco-centric leadership, sustainable resource management, and managerial discretion become strategic tools for achieving a sustainable environment and driving social change.

Practical Implications

Our research provides valuable insights for practitioners seeking to enhance sustainability in the manufacturing industry. First, frontline employees are more likely to adopt eco-friendly behaviors when they observe leaders prioritizing sustainability. Organizations should invest in leadership development programs that train supervisors and managers to promote environmental awareness both at work and in employees' personal lives. Case studies, such as Nestlé's leadership programs, illustrate how ECL training fosters employee engagement in sustainability (Fazal and Kanwal, 2020).

Second, green HRM practices are essential for improving environmental performance. This includes setting green goals, providing training, and integrating sustainability into performance evaluations and reward systems. These initiatives enhance employees' environmental skills and enable them to adopt eco-friendly behaviors beyond the workplace. For example, the Green HRM Toolkit employed by Siemens Pakistan uses gamified sustainability training and peer-based reward systems to promote environmentally responsible behavior. Dwumah *et al.* (2025) report that such tools increase participation in external OCBE by 40 percent and reduce non-participation by 20 percent.

Third, integrating environmental CSR into corporate strategy fosters a culture of sustainability. Organizations should engage in community-led environmental initiatives, reduce waste, and encourage environmentally responsible behaviors. Such practices benefit both the organization and broader societal sustainability (Wyszomirski and Olkiewicz, 2020). Examples include PepsiCo Pakistan's "Clean Green Pakistan" initiative, which involves employees in tree-planting activities and offers grant matching for community projects, and Interloop Limited's zero-discharge water treatment system, which reduced industrial waste by 30 percent while involving employees in water conservation workshops (Interloop Annual Report, 2023).

Fourth, managerial discretion is critical for the effective implementation of green policies. Empowered managers can align ECL, green HRM, and environmental CSR to drive sustainability throughout the organization. Fauji Fertilizer Company, for instance, provides plant managers with

discretionary budgets for local sustainability projects, resulting in a 25 percent reduction in carbon footprint across facilities within two years (FFC Sustainability Report, 2024). Organizations can increase managerial discretion by decentralizing decision-making, establishing clear environmental mandates with flexible implementation, and providing discretionary funds for green innovation (Nurasa *et al*., 2025). Incorporating environmental KPIs into managerial evaluations, offering training in strategic environmental management, and promoting a culture that recognizes proactive green initiatives further enable managers to act effectively (Lu *et al*., 2025).

Finally, an integrated approach combining ECL, green HRM, environmental CSR, and managerial discretion can foster a collective sustainability mindset. By promoting environmental stewardship both within and outside the organization, companies can enhance long-term sustainability impact. Encouraging employees to practice green behaviors beyond the workplace contributes to the development of a more environmentally responsible society (Ullah *et al*., 2025).

Limitations and Future Research Directions

Although this study provides valuable insights, the findings are specific to Pakistani manufacturing. Future research could examine other regions and industries to assess the generalizability of results. Longitudinal studies spanning three to five years could track how external OCBE evolves with continued exposure to ECL, while cross-sector comparisons using matched sampling could identify industry-specific factors that facilitate or hinder external OCBE. Examining organizational culture as a mediator between ECL and external OCBE may reveal how sustainability-focused norms strengthen leadership effects. Field experiments testing targeted cultural interventions, such as sustainability onboarding programs, would provide causal evidence of culture's mediating role (Juvan *et al*., 2025).

The reliance on self-reported data may introduce social desirability bias. Future studies should incorporate objective measures, including ecological footprint metrics, third-party evaluations of community engagement, or digital tracking of pro-environmental behaviors (Tang *et al*., 2023). Additional research could explore other moderators and mediators, such as technological empowerment, to deepen understanding of how ECL fosters external OCBE and institutionalizes eco-friendly behaviors across diverse industries.

Conclusion

This study underscores the pivotal role of ECL in promoting external OCBE among frontline employees in Pakistan's manufacturing sector. Drawing on SCT, our findings show that green HRM and environmental CSR sequentially mediate the relationship between ECL and external OCBE, extending sustainability efforts beyond the workplace. Managerial discretion moderates this relationship by enabling managers to customize green initiatives and enhance their effectiveness. By integrating ECL, green HRM, environmental CSR, and managerial discretion, organizations can cultivate a culture of environmental responsibility that extends beyond work, influencing employees' personal lives and broader communities.

Author Statements

Conflicts of Interest

The authors declare no conflicts of interest. All authors contributed equally to this paper.

Ethics Statement

Ethical approval was obtained, and all participants provided informed consent before participating in the study.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

Abualigah, A., Koburtay, T., Bourini, I., Badar, K. and Gerged, A.M. (2023). "Towards sustainable development in the hospitality sector: Does green human resource management stimulate green creativity? A moderated mediation model", *Business Strategy and the Environment*, Vol. 32 No 6, pp. 3217-3232.

Afsar, B., Maqsoom, A., Shahjehan, A., Afridi, S.A., Nawaz, A. and Fazliani, H. (2020), "Responsible leadership and employee's proenvironmental behavior: The role of organizational commitment, green shared vision, and internal environmental locus of control", *Corporate Social Responsibility and Environmental Management*, Vol. 27 No.1, pp. 297-312.

Ahmed, Z., Ali, M.A., Saleemi, A. and Ahmad, I. (2024), "Exploring the impact of green HRM, corporate social responsibility, organizational green culture, and work-life balance on sustainable corporate performance: The moderating role of organizational citizenship behavior for environment". *Journal of Asian Development Studies*, Vol. 13 No. 3, pp. 1601-1617.

Alhejji, H., Garavan, T., Carbery, R., O'Brien, F. and McGuire, D., (2016), "Diversity training programme outcomes: A systematic review", *Human Resource Development Quarterly*, Vol. 27 No.1, pp. 95-149.

Alhejji, H., Hamlin, R.G. and Aldosemani, T. (2025), "Exploring female managers' perceptions of the behavioral effectiveness of male managers: evidence from Kuwait", *Gender in Management*, Vol. 40 No. 4, pp. 639-657.

Babalola, M.T., Ren, S., Ogbonnaya, C., Riisla, K., Soetan, G.T. and Gok, K. (2022), "Thriving at work but insomniac at home: Understanding the relationship between supervisor bottom-line mentality and employee functioning", *Human Relations*, Vol. 75 No. 1, pp. 33-57.

Bagozzi, R.P., and Yi, Y. (1988), "On the evaluation of structural equation models", *Journal of the Academy of Marketing Science*, Vol. 16, pp. 74-94.

Ball, G.P., Shah, R. and Wowak, K.D. (2018), "Product competition, managerial discretion, and manufacturing recalls in the US pharmaceutical industry", *Journal of Operations Management*, Vol. 58, pp. 59-72.

Bandura, A. (1986), *Social Foundations of Thought and Action*, Englewood Cliffs, NJ, Prentice Hall

Bandura, A. (1991). "Social cognitive theory of self-regulation", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 248-287.

Bandura, A. (2001), "Social cognitive theory: An agentic perspective", *Annual Review of Psychology*, Vol. 52 No. 1, pp. 1-26.

Becker, J.-M., Proksch, D. and Ringle, C.M. (2022). "Revisiting Gaussian copulas to handle endogenous regressors", *Journal of the Academy of Marketing Science*, Vol. 50 No. 1, pp. 46-66.

Bhardwaj, B., Sharma, D. and Chand, M. (2025), "Ensuring sustainability through green HRM practices: a review, synthesis and research avenues", *Journal of Organizational Effectiveness*, Vol. 12 No. 1, pp. 57-90.

Bisla, M., Prakash, D. and Bamel, U. (2024), "Interplay among responsible leadership, corporate social responsibility perspective and organizational citizenship behaviour towards environment: A study of the Indian IT sector", *FIIB Business Review*, doi: 10.1177/23197145231220428.

Bissing-Olson, M. J., Iyer, A., Fielding, K.S. and Zacher, H. (2013), "Relationships between daily affect and pro-environmental behavior at work: The moderating role of pro-environmental attitude", *Journal of Organizational Behavior*, Vol. 34 No. 2, pp. 156-175.

Biswas, S.R., Uddin, M.A., Bhattacharjee, S., Dey, M. and Rana, T. (2022), "Ecocentric leadership and voluntary environmental behavior for promoting sustainability strategy: The role of psychological green climate", *Business Strategy and the Environment*, Vol. 31 No. 4, pp. 1705-1718.

Boiral, O. and Paillé, P. (2012), "Organizational citizenship behaviour for the environment: Measurement and validation", *Journal of Business Ethics*, Vol. 109, pp. 431-445.

Boiral, O., Paillé, P. and Raineri, N. (2015), "The nature of employees' pro-environmental behaviors", J.L. Robertson and J. Barling (Eds.), *The Psychology of Green Organizations*, Oxford, Oxford University Press, pp. 12-32.

Canbul Yaroğlu, A. (2025). Firm performance through green orientation, environmental culture and green absorptive capacity. *Management Decision*. doi: 10.1108/MD-05-2024-1016.

Chen, Y.-S. and Chang, C.-H. (2013), "The determinants of green product development performance: Green dynamic capabilities, green transformational leadership, and green creativity", *Journal of Business Ethics*, Vol. 116, pp. 107-119.

Chin, W.W. (1998), "Commentary: Issues and opinion on structural equation modeling", *Management Information Systems*, Vol. 22 No. 1, pp. vii-xvi.

Choudhary, P. and Datta, A. (2024), "Bibliometric analysis and systematic review of green human resource management and hospitality employees' green creativity", *The TQM Journal*, Vol. 36 No. 2, pp. 546-571.

Chuang, S.-P. and Huang, S.-J. (2018), "The effect of environmental corporate social responsibility on environmental performance and business competitiveness: The mediation of green information technology capital", *Journal of Business Ethics*, Vol. 150, pp. 991-1009.

Daily, B.F., Bishop, J.W. and Govindarajulu, N. (2009), "A conceptual model for organizational citizenship behavior directed toward the environment", *Business and Society*, Vol. 48, pp. 243-256.

De Roeck, K. and Farooq, O. (2018), "Corporate social responsibility and ethical leadership: Investigating their interactive effect on employees' socially responsible behaviors", *Journal of Business Ethics*, Vol. 151, pp. 923-939.

Dumont, J., Shen, J. and Deng, X. (2017), "Effects of green HRM practices on employee workplace green behavior: The role of psychological green climate and employee green values", *Human Resource Management*, Vol. 56 No. 4, pp. 613-627

Dwumah, K., Sappor, P. and Sarpong, F. A. (2025). "Navigating the green path: Strategies for enhancing organizational citizenship behavior for the environment through green HRM practices", *Business Strategy and the Environment*. Vol. 34 No. 3, pp. 3045-3061

Farooq, R., Zhang, Z., Talwar, S. and Dhir, A. (2022), "Do green human resource management and self-efficacy facilitate green creativity? A study of luxury hotels and resorts", *Journal of Sustainable Tourism*, Vol. 30 No. 4, pp. 824-845.

Fazal, O. and Kanwal, S. (2020), "Managing the Change in a Dynamic Environment: A Case Study of Engro Foods LTD", *Journal of Public Value and Administrative Insight*, Vol. 3 No. 1, pp. 23-27.

Febriani, R. and Irawati, S. (2024), "The role of organizational citizenship behavior for environment (OCBE) in mediating the effect of Corporate Social Responsibility (CSR) on green performance", in R.I. Robbie, A. Roziqin, S.M. Deniar, A. Praharjo and K. Roz (Eds.), *Environmental Issues and Social Inclusion in a Sustainable Era*, Routledge, New York, pp. 289-294.

Gupta, A., Nadkarni, S. and Mariam, M. (2019), "Dispositional sources of managerial discretion: CEO ideology, CEO personality, and firm strategies", *Administrative Science Quarterly*, Vol. 64 No. 4, pp. 855-893.

Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M. and Thiele, K. O. (2017). "Mirror, mirror on the wall: a comparative evaluation of composite-based structural equation modeling methods", *Journal of the Academy of Marketing Science*, Vol. 45, pp. 616-632.

Hair, J.F., Sarstedt, M. and Ringle, C.M. (2019), "Rethinking some of the rethinking of partial least squares", *European Journal of Marketing*, Vol. 53 No. 4, pp.566-584.

Hameed, Z., Naeem, R.M., Hassan, M., Naeem, M., Nazim, M. and Maqbool, A. (2022), "How is GHRM related to green creativity? A moderated mediation model of green transformational leadership and green perceived organizational support", *International Journal of Manpower*, Vol. 43 No. 3, pp. 595-613.

Hamlin, R.G., Alhejji, H. and Patel, T. (2024), "Perceived managerial and leadership effectiveness within multinational corporations in Saudi Arabia: The role of Islamic and Wasta values", *Human Resource Development Quarterly*, Vol. 35 No. 3, pp. 327-361.

Han, Z., Jiang, C. and Li, J. (2025), Stimulating Chinese college students' organizational citizenship behavior toward the environment: the role of pro-environmental organizational climate, green self-efficacy and intrinsic motivation. *International Journal of Sustainability in Higher Education*.

He, J., Morrison, A.M. and Zhang, H. (2021), "Being sustainable: The three-way interactive effects of CSR, green human resource management, and responsible leadership on employee green behavior and task performance", *Corporate Social Responsibility and Environmental Management*, Vol. 28, pp. 1043-1054

Hernández, M. and Muñoz, P. (2022), "Reformists, decouplists, and activists: A typology of ecocentric management", *Organization & Environment*, Vol. 35 No. 2, pp.282-306.

Jiang, W., Chai, H., Shao, J. and Feng, T. (2018). "Green entrepreneurial orientation for enhancing firm performance: A dynamic capability perspective", *Journal of Cleaner Production*, Vol. 198, pp. 1311-1323.

Jiang, Y., Hu, Y., Asante, D., Ampaw, E.M. and Asante, B. (2022), "The Effects of Executives' low-carbon cognition on corporate low-carbon performance: A study of managerial discretion in China", *Journal of Cleaner Production*, Vol. 357, 132015.

Juvan, E., Zhu, O.Y., Grün, B. and Dolnicar, S. (2025), "On the importance of field studies for testing theory-driven behavioral change interventions in (sustainable) tourism", *Journal of Travel Research*, Vol. 64 No. 6, pp. 1449-1463.

Kaur, S., Arora, M. and Mittal, A. (2025), "Nurturing green employee behavior: Exploring the role of leadership, human resource management practices and individual values", *Management Decision*.

Khassawneh, O., Mohammad, T., Bouchon, F. and Behery, M. (2024), "Eco-innovation and customer satisfaction in the hospitality industry in Dubai: the role of green leadership", *Journal of Human Resources in Hospitality & Tourism*, Vol. 23 No. 3, pp. 413-438.

Kim, Y.J., Kim, W.G., Choi, H.-M. and Phetvaroon, K. (2019), "The effect of green human resource management on hotel employees' eco-friendly behavior and environmental performance", *International Journal of Hospitality Management*, Vol. 76, pp. 83-93.

Kock, N. (2015), "Common method bias in PLS-SEM: A full collinearity assessment approach", *International Journal of e-Collaboration*, Vol. 11, pp. 1-10.

Liao, Z. and Zhang, M. (2020), "The influence of responsible leadership on environmental innovation and environmental performance: The moderating role of managerial discretion", *Corporate Social Responsibility and Environmental Management*, Vol. 27 No. 5, pp. 2016-2027.

López-Cotarelo, J. (2018), "Line managers and HRM: A managerial discretion perspective", *Human Resource Management Journal*, Vol. 28 No. 2, pp. 255-271.

Lu, H., Liu, X. and Falkenberg, L. (2022), "Investigating the impact of corporate social responsibility (CSR) on risk management practices", *Business & Society*, Vol. 61 No. 2, pp. 496-534.

Lu, J., Yan, S., Ogbonnaya, C., Gorny, T., Song, M. and Wang, C. (2025), "Unpacking the linkage between green volunteering and ethical leadership behavior in managers", *Journal of Business Ethics*, Vol. 200, pp. 911-926.

Luu, T.T. (2019), "Building employees' organizational citizenship behavior for the environment: The role of environmentally-specific servant leadership and a moderated mediation mechanism", *International Journal of Contemporary Hospitality Management*, Vol. 31 No. 1, pp. 406-426.

Ma, Y., Teng, Y. and Yan, B. (2024), "Bring more than green? The impact of green human resource management on hospitality employees' organizational citizenship behaviors", *Corporate Social Responsibility and Environmental Management*, Vol. 31 No. 3, pp. 2537-2556.

Malik, S.Y., Hayat Mughal, Y., Azam, T., Cao, Y., Wan, Z., Zhu, H. and Thurasamy, R. (2021), "Corporate social responsibility, green human resources management, and sustainable performance: is organizational citizenship behavior towards environment the missing link?", *Sustainability*, Vol. 13 No. 3, pp. 1044.

Masum, A., Aziz, H. and Hassan, M. (2020), "Corporate social responsibility and its effect on community development: An overview", *Journal of Accounting Science*, Vol. 22 No. 1, pp. 35-40.

Mehboob, M.A., and Chowdhury, S.P. (2024), "Discretion of front-line managers at the operational level-A qualitative study on pro-environment behavior practices in fast-food restaurants in Sweden". https://gupea.ub.gu.se/handle/2077/83146

Mehmood, K., Kiani, A. and Rashid, M. (2025), "Is data the key to sustainability? The roles of big data analytics, green innovation, and organizational identity in gaining green competitive advantage", *Technology Analysis & Strategic Management*, Vol. 37 No. 5, pp. 494-508.

Mi, L., Gan, X., Xu, T., Long, R., Qiao, L. and Zhu, H. (2019), "A new perspective to promote organizational citizenship behaviour for the environment: The role of transformational leadership", *Journal of Cleaner Production*, Vol. 239, 118002.

Miah, M., Rahman, S.M., Biswas, S., Szabó-Szentgróti, G. and Walter, V. (2024). "Effects of green human resource management practices on employee green behavior: the role of employee's environmental knowledge management and green self-efficacy for greening workplace", *International Journal of Organizational Analysis*. doi: 10.1108/IJOA-04-2024-4462.

Moon, M.A., Mohel, S.H., and Farooq, A. (2021), "I green, you green, we all green: Testing the extended environmental theory of planned behavior among the university students of Pakistan", *The Social Science Journal*, Vol. 58 No. 3, pp. 316-332.

Norton, T.A., Parker, S.L., Zacher, H. and Ashkanasy, N.M. (2015), "Employee green behavior: A theoretical framework, multilevel review, and future research agenda", *Organization & Environment*, Vol. 28 No. 1, pp.103-125.

Nurasa, H., Putri, S.S.U., Abdillah, A. and Widianingsih, I. (2025), "Green leadership in policy making towards sustainable future: Systematic critical review and future direction. *Polish Journal of Environmental Studies*, Vol. 34 No. 1, pp. 519-534.

Nwosu, L. (2025), “The mediating effect of green self-efficacy in the impact of green inclusive leadership on green organizational citizenship behavior”, *Future Business Journal*, Vol. 11, 186.

Özgül, B. and Demir, İ. (2025), “The mediating role of green perceived organizational support in the relationship between green transformational leadership and green self-efficacy”, *Social Responsibility Journal*, Vol. 21 No. 1, pp. 78-96.

Paillé, P. and Francoeur, V. (2022), “Enabling employees to perform the required green tasks through support and empowerment”, *Journal of Business Research*, Vol. 140, pp. 420-429.

Pham, N.T., Hoang, H.T. and Phan, Q.P.T. (2020), “Green human resource management: A comprehensive review and future research agenda”, *International Journal of Manpower*, Vol. 41 No. 7, pp. 845-878.

Pham, N.T., Tučková, Z. and Jabbour, C.J.C. (2019), “Greening the hospitality industry: How do green human resource management practices influence organizational citizenship behavior in hotels? A mixed-methods study”, *Tourism Management*, Vol. 72, pp. 386-399.

Podsakoff, P.M., MacKenzie, S.B. and Podsakoff, N.P. (2012), “Sources of method bias in social science research and recommendations on how to control it”, *Annual Review of Psychology*, Vol. 63 No. 1, pp.539-569.

Queiri, A. and Alhejji, H., (2025), “Examining the link between narcissism and perceived inequity: the mediating role of sense of entitlement”, *International Journal of Organizational Analysis.*

Ramus, C.A. and Steger, U. (2000), “The roles of supervisory support behaviors and environmental policy in employee “Ecoinitiatives” at leading-edge European companies”, *Academy of Management Journal*, Vol. 43 No. 4, pp. 605-626.

Ringle, C.M., Wende, S. and Becker, J.M. (2015), *Smart PLS 3*, SmartPLS GmbH, Boenningstedt.

Robertson, J. L., and Barling, J. (2013), “Greening organizations through leaders' influence on employees' pro-environmental behaviors”, *Journal of organizational behavior”*, Vol. 34 No. 2, pp. 176-194.

Sahar, N.E., Zawawi, D., Jaharuddin, N.S. and Abbasi, M.A. (2025). "Responsible leadership and organisational citizenship behaviour for the environment: mediated by environmental corporate social responsibility", *International Journal of Ethics and Systems*, Vol. 41 No. 2, pp. 353-371.

Sampene, A.K., Li, C., Wiredu, J., Agyeman, F.O. and Brenya, R. (2024), "Examining the nexus between social cognition, biospheric values, moral norms, corporate environmental responsibility and pro-environmental behaviour. Does environmental knowledge matter?", *Current Psychology*, Vol. 43 No. 7, pp. 6549-6569.

Schunk, D.H. and DiBenedetto, M.K. (2020), "Motivation and social cognitive theory", *Contemporary Educational Psychology*, Vol. 60, 101832.

Shah, N. and Soomro, B.A. (2023), "Effects of green human resource management practices on green innovation and behavior", *Management Decision*, Vol. 61 No. 1, pp. 290-312.

Somerville, L.H., Jones, R.M. and Casey, B. (2010), "A time of change: behavioral and neural correlates of adolescent sensitivity to appetitive and aversive environmental cues", *Brain and Cognition*, Vol. 72 No. 1, pp. 124-133.

Spyridonidis, D. and Currie, G. (2016), "The translational role of hybrid nurse middle managers in implementing clinical guidelines: Effect of, and upon, professional and managerial hierarchies", *British Journal of Management*, Vol. 27 No. 4, pp. 760-777.

Stevens, J. (2002). *Applied Multivariate Statistics for the Social Sciences* (Vol. 4). Mahwah, NJ, Lawrence Erlbaum Associates.

Sun, Y., San, Z., Xu, C. and Davey, H. (2025), "The nexus of managerial myopia and transparency in ESG information: Evidence from the textual analysis of ESG disclosures", *Corporate Social Responsibility and Environmental Management*. Vol. 32 No. 4, pp. 5469-5489

Tang, G., Ren, S., Wang, M., Li, Y. and Zhang, S. (2023), "Employee green behaviour: A review and recommendations for future research", *International Journal of Management Reviews*, Vol. 25 No. 2, pp. 297-317.

Tao, N.B. and Hutchinson, M. (2013), "Corporate governance and risk management: The role of risk management and compensation committees", *Journal of Contemporary Accounting & Economics*, Vol. 9 No.1, pp. 83-99.

Tian, Q. and Robertson, J.L. (2019), "How and when does perceived CSR affect employees' engagement in voluntary pro-environmental behavior?", *Journal of Business Ethics*, Vol. 155, pp. 399-412.

Uddin, M.A., Biswas, S.R., Bhattacharjee, S., Dey, M. and Mahmood, M. (2021), "Inspiring employees' ecological behaviors: The roles of corporate environmental strategy, biospheric values, and eco-centric leadership", *Business Strategy and the Environment*, Vol. 30 No. 5, pp. 2367-2381.

Ullah, I., Wang, B., Fiaz, M., Mughal, Y.H., Din, S.U. and Durrani, S. K. (2025). "Shaping a sustainable future through multilevel environmental behaviors inside and outside organizations", *Business Ethics, the Environment & Responsibility*. doi: 10.1111/beer.12791

Usman, M., Rofcanin, Y., Ali, M., Ogbonnaya, C. and Babalola, M.T. (2023), "Toward a more sustainable environment: Understanding why and when green training promotes employees' eco-friendly behaviors outside of work", *Human Resource Management*, Vol. 62, pp. 355-371.

Wyszomirski, A. and Olkiewicz, M. (2020), "Environmental corporate social responsibility as a tool for creating the future of environmental protection", *Rocznik Ochrona Środowiska*, Vol. 22 No. 2, pp. 1145-1161.

Yue, G., Wei, H., Khan, N.U., Saufi, R.A., Yaziz, M.F.A. and Bazkiaei, H.A. (2023), "Does the environmental management system predict TBL performance of manufacturers? The role of green HRM practices and OCBE as serial mediators", Sustainability, Vol. 15 No. 3, 2436.

Yusliza, M. and Muhammad, Z. (2024), "Do green human resource practices influence employee ecological behaviour? *Polish Journal Of Management Studies*, Vol. 30 No. 1, pp. 82-97.

Zafar, H., Malik, A., Gugnani, R., Agarwal, R. and Nijjer, S. (2023), "Green thumbs at work: Boosting employee eco-participation through ecocentric leadership, green crafting, and green human resource management", *Journal of Cleaner Production*, Vol. 432, 139718.

Zawawi, D., Jaharuddin, N.S. and Abbasi, M.A. (2025), "Asymmetrical effect of total quality management on organisational citizenship behaviour for the environment: mediated by environmental corporate social responsibility", *The TQM Journal*, Vol. 37 No. 4, pp. 926-952.

Zhao, C. and Liang, L. (2023), "A study on the influence of environmental responsible leadership on employee pro-environmental behavior", *Frontiers in Environmental Science*, Vol. 11.

Zientara, P., Zamojska, A. and Nikodemska-Wołowik, A.M. (2018), "CSR, age management and altruism: The role of future time perspective and personal altruistic convictions", *Przedsiębiorczość i Zarządzanie*, Vol. 19, pp. 439-454.

Ziv, Y. and Arbel, R. (2020), "Association between the mother's social cognition and the child's social functioning in kindergarten: the mediating role of the child's social cognition", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 1, 358.

Table I: Means, Standard Deviations and Correlations

Variables	Mean	STD	1	2	3	4	5	6	7	8	9	10	11	12	13
1- Age (T1)	33.92	7.402	1												
2- Gender (T1)	1.59	.492	-.031	1											
3- Education (T1)	4.28	.717	-.037	.327**	1										
4- Experience (T1)	3.44	1.219	.211**	-.011	.102*	1									
5- Size of Org (T1)	2.63	.778	-.096	.067	.414**	.000									
6- ECL (T1)	5.32	.891	-.032	.042	-.005	-.069	.073	1							
7- GHRM (T2)	5.62	.925	-.010	.096	.096	-.071	.099*	.695**	1						
8- ECSR (T2)	5.50	.954	-.011	.072	.064	-.098*	.029	.648**	.780**	1					
9- MD (T2)	5.85	.741	.128*	-.070	..076	.128*	.141**	-0.73	-.079	-.070	1				
10- Eco Initiative (T3)	5.30	1.013	.015	.073	.019	-.088	-.015	.596**	.684**	.730**	-.132**	1			
11- Eco Civic (T3)	5.22	1.029	-.025	.034	.135**	-.044	.055	.595**	.721**	.699**	-.025	.688**	1		
12- Eco Helping (T3)	5.38	1.019	-.013	-.0112	.058	-.081	.074	.671**	.676**	.616**	-.070	.613**	.710**	1	
13- OCBE (T3)	5.30	.901	-.009	.036	.080	-.080	.043	.702**	.785**	.711**	-.085	.867**	.906**	.877**	1

Note 1: n = 400; **Note 2:** *p <0.05; **p<0.01 and ***p<0.001 (two-tailed t-tests); **Note 3:** ECL = Eco-Centric Leadership; GHRM = Green Human resource Management; ESCR = Environmental Corporate social Responsibility; MD = Managerial Discretion: **Note 4:** Coding: Gender (1 = Male; 2 = Female). Education (1 = Primary; 2 = Middle; 3 = High School; 4 = Bacholar; 5 = Masters; 6 = PhD). Experience (1 = up to 3 years; 2 = 4-6 years; 3 = 7-9 years; 4 = 10-12 years; 5 = above 12 years). Size (1 = 1-49; 2 = 50-999; 3 = 1000-4999; 5 = above 5000).

Table II. Fit Indices for Measurement Model Comparisons

Study 2 Models	Five Factor Model (Full Measurement Model)	Four Factor Model	Three Factor Model	Two Factor Model	One Factor Model
X^2/(df)	254.544(139.000)***	395.223(196.000)***	483.281(239.000)***	699.320(339.000)***	921.396(423.000)***
X^2/ (df)	1.831	2.016	2.022	2.063	2.178
RMSEA	0.046	0.050	0.051	0.052	0.054
SRMR	0.043	0.047	0.048	0.049	0.053
TLI	0.955	0.939	0.934	0.920	0.903
CFI	0.964	0.948	0.943	0.928	0.912
NFI	0.924	0.903	0.894	0.870	0.849
AIC	356.544	509.223	605.281	833.320	1067.396
$X^2_{dif}{}^{(df)}$	560.108	736.736	848.760	1100.748	1358.773

Note: N = 400; χ2, chi square; df, degrees of freedom; χ2/df, normed chi-square; χ2 dif, chi-squared difference. Abbreviations: AIC, Akaike Information Criterion; CFI, Comparative Fit Index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; TLI, Tucker–Lewis Index.

Table III. Confirmatory Factor Analysis

Items	Items	loading	CA	CR	(AVE)	VIF
Eco-Centric Leadership (ECL)			0.847	0.882	0.554	
	ECL-1	0.765				1.841
	ECL-2	0.737				1.754
	ECL-3	0.647				1.536
	ECL-4	0.729				1.779
	ECL-5	0.724				1.691
	ECL-6	0.663				1.517
External OCEB						
Eco-Initiative			0.886	0.902	0.500	
	Eco-Ini-1	0.760				1.295
	Eco-Ini-1	0.781				1.330
	Eco-Ini-1	0.790				1.300
Eco-Civic Engagement			0.813	0.877	0.641	
	Eco-Civic-1	0.767				1.534
	Eco-Civic-1	0.807				1.701
	Eco-Civic-1	0.797				1.703
	Eco-civic-1	0.830				1.770
Eco–Helping Behvior			0.711	0.838	0.633	
	Eco-Help-1	0.800				1.339
	Eco-Help-1	0.807				1.443
	Eco-Help-1	0.779				1.402
Green Human Resource Management (GHRM)			0.861	0.896	0.591	
	GHRM-1	0.705				1.664
	GHRM-2	0.731				1.742
	GHRM-3	0.808				2.029
	GHRM-4	0.793				2.071
	GHRM-5	0.797				2.092
	GHRM-6	0.771				1.841
Environmental Corporate Social Responsibility (ECSR)			.817	.879	.644	
	ECSR-1	0.822				1.764
	ECSR-2	0.812				1.749
	ECSR-3	0.790				1.642
	ECSR-4	0.787				1.608

Managerial Discretion			.653	.795	.568	
	MD-1	0.600				1.275
	MD -2	0.784				1.323
	MD -3	0.855				1.238

Note: Indicators, CA Cronbach Alpha, CR=Composite Reliability. Average variance extracted (AVE), organizational citizenship behavior for the environment; VIF, variance inflation factor

Table IV. Total Direct Effect

	Beta	STD	T- Value	P- Value	Boot ULLCI	Boot ULLCI	Hypothesis	Decision
Path Analysis External OCBE								
ECL -> OCBE	0.697	0.040	17.589	0.000	0.617	0.768	Hypothesis 1	Accepted
GHRM -> OCBE	0.571	0.044	13.024	0.000	0.485	0.655	Hypothesis 3	Accepted
ECSR -> OCBE	0.339	0.045	7.506	0.000	0.251	0.428	Hypothesis 5	Accepted
Controls								
Age->OCBE	0.006	0.030	0.217	0.285	-0.051	0.066	Not significant	Not Controlled
Gender -> OCBE	-0.053	0.060	0.883	0.377	-0.717	0.065	Not significant	Not Controlled
Education -> OCBE	0.029	0.033	0.874	0.382	-0.034	0.096	Not significant	Not Controlled
Experience -> OCBE	-0.002	0.030	0.053	0.958	-0.061	0.054	Not significant	Not Controlled
Size of Organization -> OCBE	0.022	0.035	0.614	0.539	-0.049	0.091	Not significant	Not Controlled
Dimension of External OCEB								
ECL -> Eco-Initiative	0.592	0.047	12.491	0.000	0.495	0.680	Hypothesis 1a	Accepted
ECL -> Eco-Civic Engagement	0.595	0.044	13.372	0.000	0.505	0.673	Hypothesis 1b	Accepted
ECL -> Eco-Helping Behavior	0.675	0.040	16.758	0.000	0.588	0.743	Hypothesis 1c	Accepted
ECL -> GHRM	0.677	0.042	15.951	0.000	0.597	0.752	Hypothesis 2	Accepted
ECL -> ECSR	0.641	0.045	14.162	0.000	0.549	0.723	Hypothesis 4	Accepted
GHRM -> ECSR	0.636	0.044	14.600	0.000	0.547	0.720	Hypothesis 6	Accepted
Controls								
Gender-> Eco-Helping Behavior	0.080	0.036	2.243	0.025	0.150	0.011	Control Variable	Controlled
Education -> Eco-Civic Engagement	0.099	0.039	2.526	0.012	0.023	0.176	Control Variable	Controlled

Table V. Specific Indirect Effect

	Beta	STD	T- Value	P- Value	Boot ULLCI	Boot ULLCI	Hypothesis	Decision
Serial Mediation effect								
ECL -> GHRM -> ECSR -> OCBE	0.146	0.024	6.037	0.000	0.105	0.201	Hypothesis 7	Accepted
ECL -> GHRM -> ECSR -> Eco-Initiative	0.196	0.032	6.067	0.000	0.140	0.269	Hypothesis 7a	Accepted
ECL -> GHRM -> ECSR -> Eco-Civic Engagement	0.138	0.028	4.875	0.000	0.089	0.200	Hypothesis 7b	Accepted
ECL -> GHRM -> ECSR -> Eco-Helping Behavior	0.050	0.023	2.162	0.031	0.006	0.097	Hypothesis 7c	Accepted
Moderating Effect								
MD*ECL -> GHRM	0.142	0.065	2.205	0.027	0.003	0.259	Hypothesis 8	Accepted
Moderated Mediation	0.088	0.041	2.159	0.031	0.001	0.165	Hypothesis 9	Accepted

Table VI. Total Indirect Effect

	Beta	(STDEV)	T statistics	P values	Boot ULLCI	Boot ULLCI
ECL -> OCBE	0.457	0.038	12.092	0.000	0.391	0.537
ECL -> Eco-Initiative	0.448	0.045	9.860	0.000	0.364	0.543
ECL -> Eco-Civic Engagement	0.458	0.044	10.378	0.000	0.381	0.55
ECL -> Eco-Helping Behavior	0.289	0.038	7.572	0.000	0.222	0.372

Table VII. Results of Gaussian Copula Test

Paths	Sample mean	SD	T-Value	P values	LLCI	ULCI
[c]GC (ECL) -> External OCBE	-0.148	0.079	1.858	0.063	-0.316	0.002
[c]GC (ECSR) -> External OCBE	-0.151	0.078	1.93	0.054	-0.31	-0.004
[c]GC (GHRM) -> External OCBE	0.084	0.082	1.026	0.305	-0.079	0.246

Notes: [i]ndicates the copula term in the model; ECL = Eco-Centric Leadership; ECSR = Environmental Corporate Social Responsibility; GHRM = Green Human Resource Management; SD = Standard Deviation, LLCI = Lower Limit Confidence Interval, ULCI =Upper Limit Confidence Interval.

Figure 1

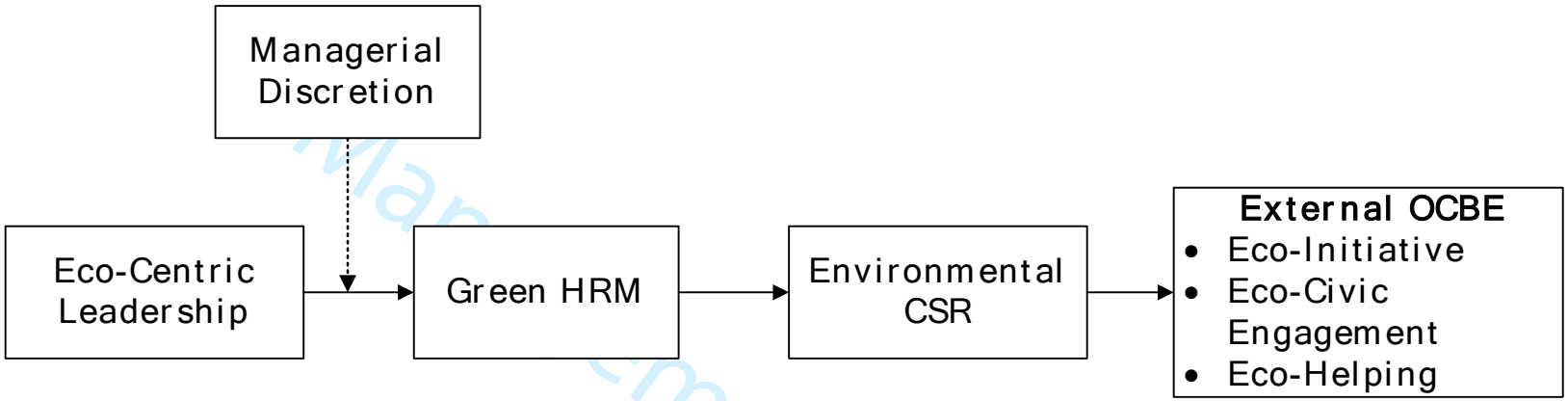

Figure 2

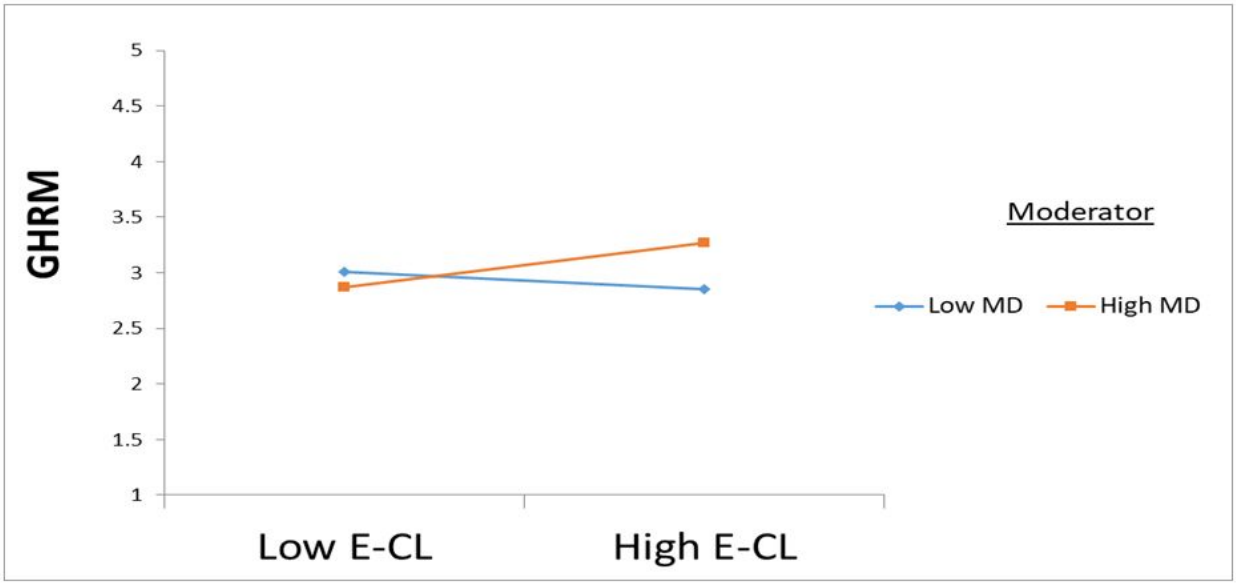

Figure Captions

Figure 1: The proposed model.

Figure 2: Moderation graph for Green Human Resource Management (GHRM).