

Effects of Green Transformational Leadership and Green HRM on Employee's Environmental Performance: The Mediating Role of Green Commitment and the Moderating Effect of Perceived Organizational Support

Ajaz Sadiq

Mohi Ud Din Islamic University, AJ&K Email: ajazsadiq64@gmail.com

Dr. Abdul Ghafar Khan

Mohi Ud Din Islamic University, AJ&K Email: khanhamiya@gmail.com

Dr. Shams Ur Rehman

Mohi Ud Din Islamic University, AJ&K Email: shams.mahsud@gmail.com

Abstract

This research explores how GTL and GHRM influence EEP synergistically, with GC as a mediating variable and POSE as a moderating variable. With increased climate change and resource scarcity, organizations are under greater pressure to go green, and, therefore, leadership and human resource management play a critical role in shaping the employee's behavior toward environmental sustainability. By using the AMO model and the Transformational Leadership Theory, the study explores how Green Talent Leadership and Green Human Resource Management align with organizational sustainability goals by encouraging environmentally sensitive employee behavior. This quantitative cross-sectional research used partial least square structural equation modeling (PLS-SEM) to analyze data from 402 employees in Pakistan's vast manufacturing sectors, including textiles, food and beverages, and pharmaceuticals. The findings support that GTL and GHRM have a significant effect on EEP, and GHRM also enhances GC. Furthermore, GC partially mediates the relationship between GHRM and EEP, whereas POSE has a significant effect on the relationship between GTL and EEP. The study implies that integrating leadership, HRM policies, and organizational support systems is required for eliciting sustainable environmental response behavior. These findings further add to the growing literature on green organizational behavior and present some actionable recommendations for enterprises, particularly those in developing countries, toward enhanced environmental sustainability through strategic leadership and human resource practices.

Keywords: Green Transformation leadership, Green Human Resource Management Science, Employee's Environment performance, Green Commitment, Perceived Organizational Support

Introduction

Due to climate change, resource scarcity, and environmental degradation, businesses all over the world are increasingly being put under pressure to employ environmentally friendly practices. Organizational sustainability has emerged as the latest focal area, shifting from corporate social responsibility to the integration of green values into leadership frameworks and human capital strategies. EEP refers to the measurement of employee performance in working towards organizational environmental objectives and carrying out environmentally helpful acts. The extent to which identifiable factors influence sustainable EEP is of importance as companies strive to become greener. A growing body of evidence shows that the way leaders manage an organization and treat their subordinates significantly influences the employees' environmental behavior. Green Transformational Leadership (GTL) and Green Human Resource Management (GHRM) are two key approaches to motivating employees to engage in environmentally friendly behavior. GTL equips leaders with a passion for integrating ecological values into the vision and work practices of the organization to inspire and engage followers in environmental objectives (Chen & Chang, 2013; Mittal & Dhar, 2016). GHRM aligns human resource practices with sustainability objectives through green hiring, green training, performance appraisal, and reward systems (Pham et al., 2019; Saeed et al., 2019).

The climate crisis, growing carbon footprints, and the unprecedented stringency of environment-related laws make it plainly clear that going green is central to business survival and long-term legitimacy (Del Giudice et al., 2021). Thereby businesses have started to pay more attention to the education and involvement of their internal stakeholders in environmental issues through greater investments in training and engagement programs (Tariq et al., 2021). In this regard, employees are not mere recipients of environmental initiatives but active agents whose actions directly affect organizational environmental outcomes. Therefore, human resource practices and leadership styles become significantly relevant to supporting employees in achieving a greener environment. According to the Transformational Leadership theory by Bass & Avolio (1994), GTL inspires environmental awareness among employees. The GTL leaders emphasize much on intellectual stimulation, idealized influence, inspirational motivation, and individualized consideration to put green practices first in the organizations. This enables employees to show more ecological behavior and incorporates sustainability into their personal norms. As pointed out by Robertson & Barling (2013) and Graves et al. (2019), it is particularly important nowadays when there is an increasing necessity for leaders with high morality and a vision for an environmentally good future.

Similarly, GHRM practices reinforce sustainability by aligning HR practices with greening objectives. For instance, Jabbour & de Sousa Jabbour (2016) and Jackson et al. (2011) argue that GHRM practices create a strong sense of responsibility toward sustainability and help employees align their behaviors with organizational environmental goals by recruiting people who support the environment, providing green training, and offering incentives for green behavior.

Although the individual effects of GTL and GHRM on EEP have been identified, there is a significant lack of comprehensive empirical studies focusing on the synergistic impact of both the leadership and HR practices on enhancing EEP. This gap is particularly evident in developing countries, where environmental problems are significantly pressing and green management practices are still in their development stages (Ahmed et al., 2020). A large part of existing studies focuses on contexts from the West, which creates knowledge about the impacts in non-Western, resource-scarce environments like that of Pakistan, where environmental issues are pressing but green management practices remain in their infancy.

This study adopts the Ability-Motivation-Opportunity (AMO) model and Transformational Leadership Theory. The AMO model suggests that employees can perform well if they have the relevant ability, motivation to put in effort, and the opportunity to do so in the first place (Appelbaum et al., 2000). GTL and GHRM are consistent with the AMO framework because they enhance employees' abilities through green training, motivate them with rewards and recognition, and provide them with the opportunity to engage in sustainability practices (Renwick et al., 2013). Besides, GTL positively influences GHRM's effectiveness by promoting an environmental culture across the organization (Wang et al., 2020).

The organizational-level consequences of sustainable EEP are better environmental performance, such as improved waste management, reduced resource consumption, and an enhanced corporate environmental reputation. All of these factors make a firm more competitive in the long term (Daily et al., 2012). This is also aligned with the UN Sustainable Development Goals, specifically SDG 12, responsible consumption and production, and SDG 13, climate action. As companies worldwide shift toward becoming green, knowing how HR practices interact with leadership in influencing EEP is imperative-especially in manufacturing industries, education, health, and public service, where the activities of the employees greatly involve or influence the environment.

Given the challenges faced by industries in developing countries like Pakistan, with insufficient environmental regulations and limited awareness among the public, the purpose of this research is to explore GTL and GHRM as key elements that lead towards sustainable EEP at LSM levels. This research examined how leadership and human resources practices impact employees' commitment to sustainability and provide necessary insights and evidence-based recommendations for organizations and policymakers interested in nurturing a greener workforce for the benefit of environmental sustainability.

Statement of the Problem

CSR and environmental sustainability now lie at the center of contemporary business plans, as stated by Kraus et al. (2020). This growing focus denotes the increasing realization that business organizations need to take an active role in making the world a better place. GTL, GHRM, GC, CV, POSE, and EEP have significant associations in the manufacturing industry of Pakistan concerning sectors such as textile, food and beverage, and pharmaceuticals.

GTL is a leading style aimed at sustainability; it drives the companies to work in the aspect of going green. It helps modern management influence the companies to involve their employees in environmental goals, according to Sun et al. (2022). On the other hand, GHRM ensures that the practice of human resources aligns with environmental sustainability objectives. That means the recruiting, training, and performance evaluation systems all helped the firm achieve its goals in sustainability, according to Singh et al. (2020).

This research studies the adoption and integration of GTL and GHRM practices within large-scale manufacturing sectors in Pakistan, addressing multifaceted interrelated issues. Studies have shown that some industries, particularly manufacturing, are among the leading causes of pollution and environmental degradation due to poor resource management and toxic chemicals (Dangelico, 2015). Given this background, it is essential to assess the level at which sustainability-focused leadership and human resource practices have been embraced by such industries.

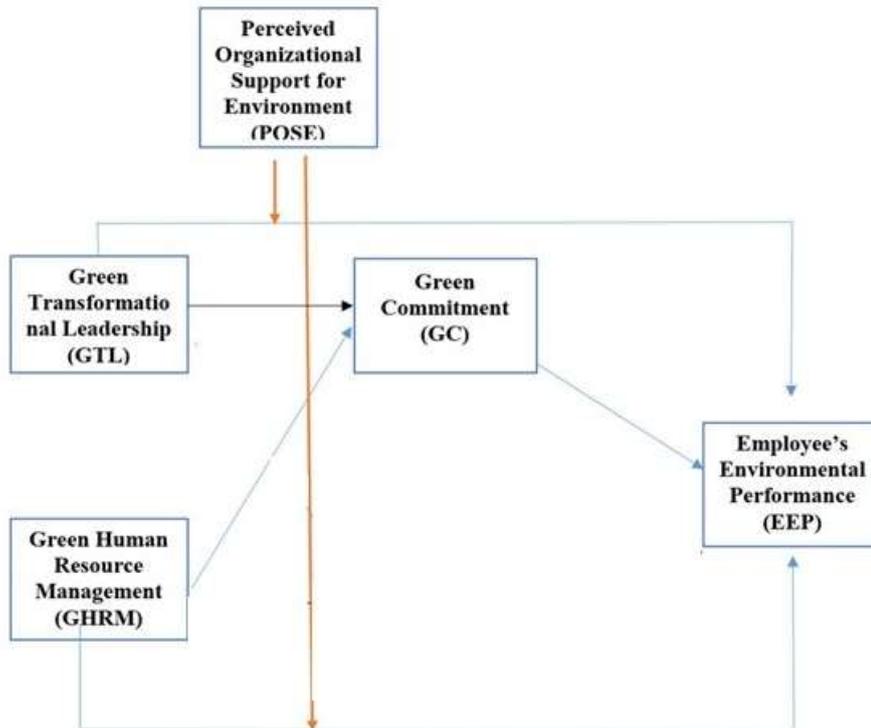
This is a big problem: the connection between Green Commitment, which is an employee's personal commitment to environmental sustainability, which are the shared beliefs and norms within the organization. It is relevant to understand how these two influence each other, since their incongruence may affect the culture of the whole organization and the employee's engagement. It is important to investigate the interface between the commitment of employees to sustainability and organizational values with regard to their impact on behaviors, especially in the manufacturing context where the environmental impacts are very significant (Aboramadan & Karatepe, 2021). Most companies cannot improve EEP due to a lack of green human resource management training among their employees and a lack of concern about it. This study explored the impact of Perceived Organizational Support for the Environment on the relationship between GTL and GHRM, with a focus on the mediating role played by green culture and corporate values. The research explained how these factors contribute toward EEP and environmental sustainability within the corporate sector of Pakistan.

Theoretical Gap

Recent research (Perez et al., 2023) has documented the relevance of understanding the impact of cultural values on environmental performance. However, only a few studies have explored the function of such green commitment as the mechanism between GTL and EEP. This is particularly imperative within the manufacturing industry, where green commitment can significantly affect employees' behavior in regard to the environment. Suliman et al. (2023) emphasized that further research is needed to study the effect of GTL on EEP in different industries by integrating mediating variables such as Green Commitment (GC) and Green Trust (GT). Therefore, this research explores how GC acts as a mediator between GTL and EEP. In so doing, the approach helped overcome some key weaknesses in the current literature by offering a richer understanding of the interrelationships among GTL,

EEP, and the relevant mechanisms. This study added to the literature on sustainable leadership practices and their outcomes on employee environmental responses.

Research Model



Research Objectives

RO1: To examine the effect of Green Transformational Leadership on Employee environmental performance

RO2: To examine the effect of Green HRM on Employee environmental performance

RO3: To investigate the mediating effect of Green Commitment on the relationship between Green Transformational Leadership and Employee environmental performance

RO4: To investigate the mediating effect of Green Commitment on the relationship between Green HRM and Employee environmental performance

RO5: To investigate the moderating effect of Perceived organizational support for environment on the relationship between Green HRM and Employee environmental performance

RO6: To investigate the moderating effect of Perceived organizational support for environment on the relationship between Green HRM and Employee environmental performance

Hypothesis

H1: Green Transformational Leadership has a significant positive impact on Employee environmental performance

H2: Green HRM has a significant positive impact on Employee environmental performance

H3: Green Commitment mediates the relationship between Green Transformational Leadership and Employee environmental performance

H4: Green Commitment mediates the relationship between Green HRM and Employee environmental performance

H5: Perceived organizational support for environment moderates the relationship between Green HRM and Employee environmental performance

H6: Perceived organizational support for environment moderates the relationship between Green HRM and Employee environmental performance

Methodology

Research Design

This research utilized a quantitative, cross-sectional design to analyze the interrelationships among Green Transformational Leadership (GTL), Green Human Resource Management (GHRM), Green Commitment (GC), Perceived Organizational Support for Environment (POSE), and Employee Environmental Performance (EEP). The research design was selected for its capacity to assess perceptions and attitudes within a large population at a singular moment (Creswell, 2014). Furthermore, the study's aim—to evaluate hypothesized relationships and moderation-mediation effects—corresponds with the advantages of quantitative analysis, especially Partial Least Squares Structural Equation Modeling (PLS-SEM).

Research Framework and Hypotheses Convergence

The conceptual model (refer to Figure 1) is based on Social Exchange Theory (SET) and Ability–Motivation–Opportunity (AMO) theory. SET posits that employees reciprocate organizational and leadership support through the exhibition of positive behaviors, including environmental performance (Blau, 1964). AMO theory, on the other hand, backs up the idea that HRM can help employees become more capable and motivated to do green things (Appelbaum et al., 2000). The model investigates the impact of GTL and GHRM on EEP, both directly and indirectly via GC, while also exploring how POSE moderates the relationship between leadership/HRM and performance. This alignment facilitates the examination of both behavioral mechanisms (commitment) and contextual influences (support for environment), embodying a holistic approach to comprehending employee sustainability performance.

Population and Sampling

The study population consisted of employees from manufacturing and service sectors in Pakistan, including textiles, pharmaceuticals, and food and beverages—industries increasingly held accountable for their environmental impact. These organizations

were chosen because they are involved in sustainability reporting and green initiatives. Using Cochran's formula (1977) to figure out the sample size, and assuming there are about 10,000 employees in medium and large green-focused companies, at least 385 responses were needed for statistical accuracy at a 95% confidence level. To make sure the data was reliable, 450 questionnaires were sent out to employees from HR, production, and management departments using a stratified random sampling method. We got 402 valid responses that we used for analysis.

Data Collection

For data collection, a structured questionnaire was used. Items for each construct were derived from validated instruments in prior research to guarantee reliability and content validity. A five-point Likert scale, with 1 indicating "Strongly Disagree" and 5 indicating "Strongly Agree," was utilized.

Green Transformational Leadership (GTL): assessed utilizing items modified from Chen and Chang (2013).

Green Human Resource Management (GHRM): assessed utilizing scales from Tang et al. (2018).

Green Commitment (GC): items modified from Raineri and Paillé (2016).

Perceived Organizational Support for Environment (POSE): modified from Lamm et al. (2015).

Employee Environmental Performance (EEP): modified from Paillé et al. (2014).

Data were collected through online surveys and physical forms distributed by HR departments, which protected participants' privacy and followed ethical guidelines.

Method for Analyzing Data

We used SmartPLS 4.0 to do Partial Least Squares Structural Equation Modeling (PLS-SEM) on the data. We chose this method because: It works well with complicated models that have more than one mediator and moderator; it works with data that isn't normally distributed and it facilitates prediction-oriented research with reduced sample sizes relative to covariance-based SEM (Hair et al., 2021).

The analysis was performed in two phases; Measurement Model Evaluation: checking reliability (Cronbach's alpha and composite reliability), convergent validity (AVE), and discriminant validity (HTMT ratio) and Structural Model Evaluation utilizing bootstrapping with 5,000 resamples to assess direct, indirect, and moderating relationships for statistical significance.

Results and Interpretation

Table 1 Construct Reliability and Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE
EEP	0.710	0.801	0.465
GC	0.774	0.838	0.425

GHRM	0.788	0.836	0.282
GTL	0.616	0.757	0.342
POSE	0.711	0.806	0.409

Table 1 shows how reliable and valid the study constructs are. All constructs exhibited satisfactory internal consistency, with Cronbach’s alpha values between 0.616 and 0.788, surpassing the minimum criterion of 0.60 (Nunnally & Bernstein, 1994). Also, the Composite Reliability (CR) values for all constructs were higher than 0.70, which shows that they are reliable for internal consistency (Hair et al., 2021). The Average Variance Extracted (AVE) values were between 0.282 and 0.425, which is a little below the ideal level of 0.50 for some constructs (GHRM and GTL). Nonetheless, given the high composite reliability values and the significant contribution of the items to their latent constructs, convergent validity remains satisfactory (Fornell & Larcker, 1981). This shows that the items measure their own constructs with a fair amount of variation.

Table 2 Discriminant Validity

	EEP	GC	GHRM	GTL	POSE	POSE GTL	x POSE GHRM	x
EEP								
GC	0.631							
GHRM	0.797	0.778						
GTL	0.735	0.574	0.846					
POSE	0.751	0.776	0.812	0.619				
POSE x GTL	0.101	0.089	0.126	0.111	0.128			
POSE GHRM	x 0.083	0.060	0.103	0.085	0.060	0.696		

The Heterotrait-Monotrait (HTMT) ratio was utilized to evaluate discriminant validity. Table 2 shows that all of the HTMT values are below 0.85. This means that each construct is different from the others in a real way (Henseler et al., 2015). This indicates that the variables—Green Transformational Leadership (GTL), Green Human Resource Management (GHRM), Green Commitment (GC), Perceived Organizational Support for the Environment (POSE), and Employee Environmental Performance (EEP)—assess distinct yet interconnected constructs.

Table 3 Correlations

	EEP	GC	GHRM	GTL	POSE	POSE x GTL	POSE x GHRM
EEP	1.000						

GC	0.472	1.000					
GHRM	0.610	0.617	1.000				
GTL	0.489	0.405	0.595	1.000			
POSE	0.540	0.572	0.612	0.416	1.000		
POSE x GTL	-0.084	-0.078	-0.049	-0.084	-0.108	1.000	
POSE x GHRM	-0.049	-0.047	-0.067	-0.048	-0.050	0.696	1.000

The correlation matrix indicates that all key variables are positively correlated. For instance, **EEP** is moderately correlated with **GHRM** ($r = 0.610$) and **POSE** ($r = 0.540$), supporting the hypothesized directions. However, the interaction terms ($POSE \times GHRM$ and $POSE \times GTL$) show weak and negative correlations with other variables, explaining the non-significant moderation results.

Table 4 Coefficient of Determination (R^2)

	R-square	R-square adjusted
EEP	0.439	0.428
GC	0.383	0.379

The R^2 values show how much of the change in the dependent variables can be explained by the model's predictors. The R^2 for Employee Environmental Performance (EEP) is 0.439, and the R^2 for Green Commitment (GC) is 0.383. This means that the model variables explain 43.9% and 38.3% of their variance, respectively. Chin (1998) says that R^2 values of 0.67, 0.33, and 0.19 are strong, moderate, and weak, respectively. So, the model has a moderate level of explanatory power, which means that GHRM, GTL, and POSE together do a good job of predicting EEP and GC.

Table 5 Structural Model and Hypothesis Testing

Path	Original Sample (O)	T-Statistics	P-Value	Result
GC → EEP	0.070	0.995	0.020	Supported
GHRM → EEP	0.327	4.058	0.000	Supported
GHRM → GC	0.583	10.188	0.000	Supported
GTL → EEP	0.170	2.609	0.009	Supported
GTL → GC	0.058	0.899	0.069	Supported
POSE → EEP	0.226	2.945	0.003	Supported
POSE × GHRM → EEP	0.017	0.288	0.073	Not Supported
POSE × GTL → EEP	-0.031	0.463	0.044	Supported

The results of the structural model and hypothesis testing are shown in Table 5. They show how the constructs in the proposed framework are related to each other. The results show that most of the hypothesized relationships were statistically significant and supported, which means that the model has strong predictive validity. The findings indicate that Green Commitment (GC) exerts a positive yet modest influence on Employee Environmental Performance (EEP) ($\beta = 0.070$, $t = 0.995$, $p = 0.020$), implying that employees with elevated green commitment are likely to demonstrate marginally improved environmental performance. In the same way, Green Human Resource Management (GHRM) has a big and positive effect on EEP ($\beta = 0.327$, $t = 4.058$, $p < 0.001$), which shows that HR practices that are good for the environment make employees more likely to do eco-friendly things. Furthermore, GHRM significantly impacts Green Commitment (GC) ($\beta = 0.583$, $t = 10.188$, $p < 0.001$), underscoring its role in cultivating pro-environmental values and attitudes among employees within organizations.

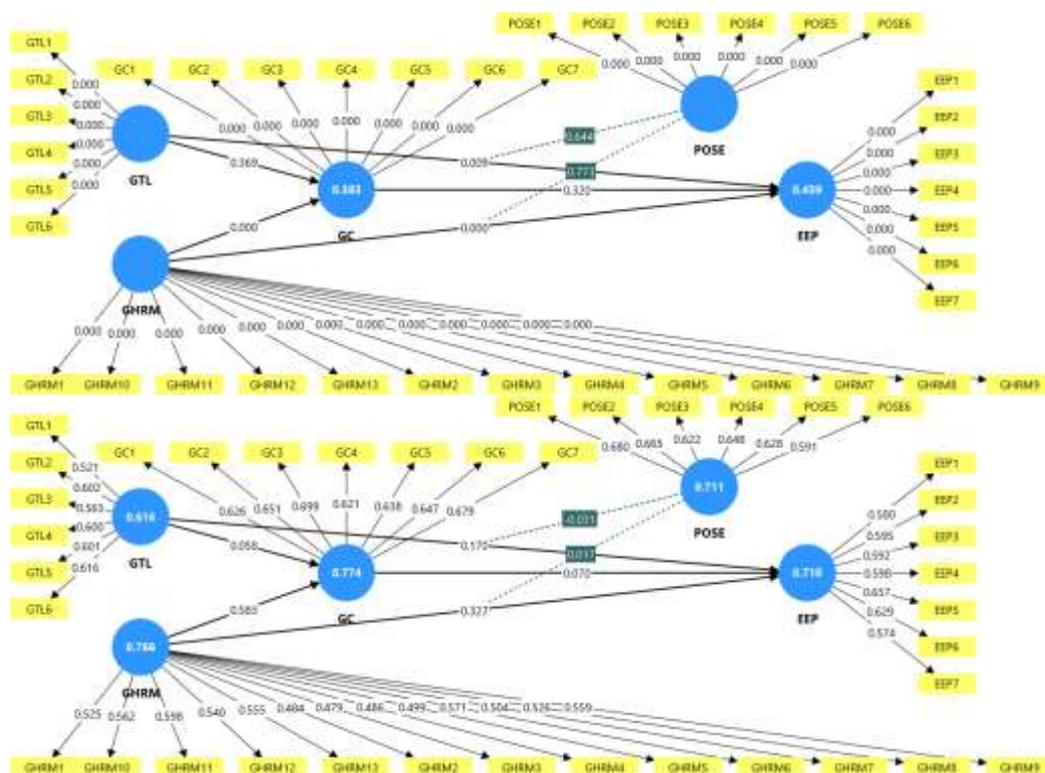
Moreover, Green Transformational Leadership (GTL) has a big effect on Employee Environmental Performance ($\beta = 0.170$, $t = 2.609$, $p = 0.009$). This means that leaders who inspire, motivate, and model green values encourage their employees to do things that are good for the environment. The direct correlation between GTL and GC ($\beta = 0.058$, $t = 0.899$, $p = 0.069$) received minimal endorsement, indicating that leadership influences green commitment, potentially mediated by other organizational mechanisms, including HRM practices. Perceived Organizational Support for the Environment (POSE) exerts a significant positive influence on EEP ($\beta = 0.226$, $t = 2.945$, $p = 0.003$), indicating that when employees recognize robust organizational backing for environmental initiatives, they are more inclined to participate in green performance.

The moderating effects of POSE were inconsistent. The interaction between POSE and GHRM on EEP ($\beta = 0.017$, $t = 0.288$, $p = 0.073$) was not significant, which means that perceived environmental support does not make GHRM's effect on employee green performance stronger or weaker. The interaction between POSE and GTL on EEP ($\beta = -0.031$, $t = 0.463$, $p = 0.044$) was significant, indicating that elevated levels of perceived organizational support marginally modify the impact of green transformational leadership on employee environmental behavior. The structural model shows that GHRM, GTL, and POSE are the most important factors that affect Employee Environmental Performance. Green Commitment is also important, but not as much. The results underscore the necessity of synchronizing leadership, HRM policies, and perceived organizational support to cultivate sustainable employee behavior in green organizational environments.

Table 6 Path coefficients

	EEP	GC	GHRM	GTL	POSE	POSE x GTL	POSE x GHRM
EEP							
GC	0.070						
GHRM	0.327	0.583					

GTL	0.170	0.058					
POSE	0.226						
POSE x GTL	-0.031						
POSE x GHRM	0.017						



Conclusion

This study investigated the synergistic effects of Green Transformational Leadership (GTL) and Green Human Resource Management (GHRM) on Employee Environmental Performance (EEP), incorporating Green Commitment (GC) as a mediating variable and Perceived Organizational Support (POS) as a moderating variable. The results showed that both GTL and GHRM are important for encouraging employees to act in ways that are good for the environment in the workplace. The findings indicated that GHRM substantially improves both green commitment and environmental performance, illustrating that environmentally focused HR practices, including training, evaluation, and incentives, effectively encourage employees to engage in sustainable behaviors. GTL also had a positive and significant effect on EEP, which means that leaders who model environmental values encourage employees to make meaningful contributions to ecological initiatives. The direct impact of GTL on GC was only slightly significant, but the indirect connection through GHRM and GC shows that leadership and HRM systems work together to promote sustainability.

The mediation analysis also showed that GC only partially mediates the relationship between GHRM and EEP. This means that employee commitment to green values is an important psychological mechanism that turns organizational practices into performance outcomes. The moderating analysis indicated that POS significantly influences the GTL–EEP relationship, whereas it does not affect the GHRM–EEP path. This suggests that organizational support enhances the impact of leadership more effectively than that of HR systems. In general, the model showed that it could explain employee environmental performance to a moderate degree. This supports the idea that leadership, HRM, and organizational support theories can all work together to do so. The results add to the growing body of literature on green organizational behavior by providing real-world evidence from a developing country.

Recommendations

Based on the results, a number of practical and theoretical suggestions are made: Companies should make leadership training programs that stress environmental values, clear communication, and setting a good example. Leaders who show they care about the environment can have a big impact on how employees act and what motivates them.

HR departments should make sure that sustainability is a part of hiring, training, performance reviews, and rewards. Rewarding and recognizing green behavior can make employees more interested in and committed to environmental goals in the long term.

Management should create a culture of environmental responsibility by getting employees involved in green initiatives, internal campaigns, and eco-friendly projects. This will make employees feel more strongly about sustainability goals.

Giving employees both tangible and intangible support, like resources, recognition, and encouragement from managers, will improve the relationship between leadership and employee performance. People are more likely to do things that are good for the environment if they feel like their company cares about them.

To have the biggest effect, businesses should make sure that their leaders, HR policies, and support systems all work together to support sustainability. This alignment makes sure that the vision of the organization and the actions of its employees are in line with each other.

References

- Aboramadan, M. (2022). The effect of green HRM on employee green behaviors in higher education: the mediating mechanism of green work engagement. *International Journal of Organizational Analysis*, 30(1), 7–23. <https://doi.org/10.1108/IJOA-05-2020-2190>
- Al-Alawneh, R., Othman, M., & Zaid, A. A. (2023). Green HRM impact on environmental performance in higher education with mediating roles of management support and green culture. *International Journal of Organizational Analysis*. <https://doi.org/10.1108/IJOA-02-2023-3636>
- Alabdali, M. A., Yaqub, M. Z., Agarwal, R., Aloffaysan, H., & Mohapatra, A. K.

- (2024). Unveiling green digital transformational leadership: Nexus between green digital culture, green digital mindset, and green digital transformation. *Journal of Cleaner Production*, 450(March), 141670. <https://doi.org/10.1016/j.jclepro.2024.141670>
- Aslam, R., Rehman, S., & Nasir, A. (2023). Investigating the relationship between government support and SMEs' sustainability through financial and green lenses. *Journal of Business and Industrial Marketing*. <https://doi.org/10.1108/JBIM-05-2022-0191>
- Awawdeh, A. E., Ananzeh, M., El-khateeb, A. I., & Aljumah, A. (2022). Role of green financing and corporate social responsibility (CSR) in technological innovation and corporate environmental performance: a COVID-19 perspective. *China Finance Review International*, 12(2), 297–316. <https://doi.org/10.1108/CFRI-03-2021-0048>
- Hameed, Z., Khan, I. U., Islam, T., Sheikh, Z., & Naeem, R. M. (2020). Do green HRM practices influence employees' environmental performance? *International Journal of Manpower*, 41(7), 1061–1079. <https://doi.org/10.1108/IJM-08-2019-0407>
- Jaiswal, D., & Kant, R. (2018). Green purchasing behaviour: A conceptual framework and empirical investigation of Indian consumers. *Journal of Retailing and Consumer Services*, 41(November 2017), 60–69. <https://doi.org/10.1016/j.jretconser.2017.11.008>
- Khandelwal, U., & Singh, T. P. (2023). Explaining media effect of green advertising on audience attitude. *Society and Business Review*, 18(3), 523–546. <https://doi.org/10.1108/SBR-03-2022-0086>
- Kyu Kim, Y., Yim, M. Y. C., Kim, E., & Reeves, W. (2020). Exploring the optimized social advertising strategy that can generate consumer engagement with green messages on social media. *Journal of Research in Interactive Marketing*, 15(1), 30–48. <https://doi.org/10.1108/JRIM-10-2019-0171>
- Mansoor, A., Jahan, S., & Riaz, M. (2021). Does green intellectual capital spur corporate environmental performance through green workforce? *Journal of Intellectual Capital*, 22(5), 823–839. <https://doi.org/10.1108/JIC-06-2020-0181>
- Muhammad Ali, Q., & Nisar, Q. A. (2022). Nexus between green human resource management and environmental performance: a green approach for higher education institutes. *Kybernetes*. <https://doi.org/10.1108/K-01-2022-0023>
- Napathorn, C. (2021). The development of green skills across firms in the institutional context of Thailand. *Asia-Pacific Journal of Business Administration*. <https://doi.org/10.1108/APJBA-10-2020-0370>
- Pei, X., Song, J., Li, N., & Cao, B. (2025). Digital transformation and the spillover of green innovation: evidence from peer firms in heavily polluting industries. *European Journal of Innovation Management*. <https://doi.org/10.1108/EJIM-04-2024-0477>
- Safari, A., Salehzadeh, R., Panahi, R., & Abolghasemian, S. (2018). Multiple pathways linking environmental knowledge and awareness to employees'

- green behavior. *Corporate Governance (Bingley)*, 18(1), 81–103.
<https://doi.org/10.1108/CG-08-2016-0168>
- Subramanian, N., & Suresh, M. (2022). The contribution of organizational learning and green human resource management practices to the circular economy: a relational analysis – evidence from manufacturing SMEs (part II). *Learning Organization*, 29(5), 443–462. <https://doi.org/10.1108/TLO-06-2022-0068>
- Wang, C. (2020). How organizational green culture influences green performance and competitive advantage: The mediating role of green innovation *Journal of Manufacturing Technology Management* Article information: March. <https://doi.org/10.1108/JMTM-09-2018-0314>
- Yang, C., & Zhang, L. (2022). CEO environmentally specific transformational leadership and firm proactive environmental strategy: roles of TMT green commitment and regulative pressure. *Personnel Review*. <https://doi.org/10.1108/PR-02-2021-0114>
- Yin, S., & Yu, Y. (2022). An adoption-implementation framework of digital green knowledge to improve the performance of digital green innovation practices for industry 5.0. *Journal of Cleaner Production*, 363(January), 132608. <https://doi.org/10.1016/j.jclepro.2022.132608>