



IMPACT OF GREEN HRM ON EMPLOYEE COMMITMENT: MODERATING ROLE OF GREEN LEADERSHIP

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Abstract

This study examined the impact of Green Human Resource Management (Green HRM) on employee commitment and investigated the moderating role of green leadership. A quantitative cross-sectional design was employed, and data were collected from 285 employees working in sustainability-oriented organizations. Hierarchical regression analysis was used to test the proposed hypotheses. The findings indicated that Green HRM had a significant positive effect on employee commitment ($\beta = 0.64, p < 0.001$) and explained 41% of the variance ($R^2 = 0.41$). When green leadership was added to the model, the explained variance increased to 52%, confirming its independent contribution. Furthermore, the interaction term between Green HRM and green leadership was significant ($\beta = 0.21, p < 0.01$), raising the total explained variance to 56%, which confirmed the presence of moderation. The results demonstrated that environmentally oriented HR practices enhanced employees' emotional attachment and loyalty, particularly when supported by sustainability-driven leadership behaviours. The study contributed to sustainability and HRM literature by integrating structural HR mechanisms with leadership dynamics within a moderated regression framework. Practically, the findings suggested that organizations seeking to strengthen employee commitment should align green HR policies with authentic environmental leadership practices. The integration of sustainability-focused HR systems and green leadership created a reinforcing mechanism that supported long-term organizational commitment and environmental responsibility.

Keywords: Employee Commitment, Green HRM, Green Leadership, Moderation, Organizational Sustainability, Sustainable Management

Introduction

Strategic focus on environmental sustainability was the answer when organizations had to react to the climate change and the growing impact of regulations as well as the growing expectations of stakeholders (AlKetbi & Rice, 2024). With this analogy, Green Human Resource Management (Green HRM) came out as a key approach managerial strategy that incorporated the environmental agenda on the recruitment procedures, training procedure, performance management and the compensation system. The concept of green HRM was perceived as a tool with the help of which the organizations motivated the employees, institutionalized the environmental values, and stimulated them to adopt pro-environmental behaviors (Renwick et al., 2013). Through institutionalizing the ecological responsibility of an organization in its HR systems, organizations aimed at building a long-term sustainability potential, and internal environmental adherence.

Employee commitment was a very vital outcome in the organization since committed workers were



loyal, emotionally attached, and more committed to organizational objectives (Meyer et al., 2002). In the context of research on sustainability, the relevance of environmental commitment emerged as a psychological connection helping to indicate their attachment to green-related values among employees (Raineri & Paille, 2016). According to previously carried-out studies, Green HRM had a positive impact on affective commitment as it positively impacted value congruence between the employee and the organization (Gomes et al., 2023). When sustainability goals and commitments were internalized by the employees and enhanced commitment occurred where environmental responsibility was perceived to be an organizational value.

Leadership theory made leadership also significant in influencing employee attitude and strengthen organizational strategies. Green transformational leadership was also found out as a style of leadership that motivated employees to the environmental objectives and sustainable performance (Chen & Chang, 2013). It was also discovered that sustainable leadership contributed positively to the commitment of the organization through the alignment of strategic goals of sustainability with employee motivation (Ahmed & Asif, 2026; Hatipoglu & Akduman, 2025). Leaders that led by example and demonstrated a clean environmentally friendly approach were more successfully in controlling the sustainability policies into employee participation and psychological attachment.

Even though previous studies had established direct relations between Green HRM and employee outcomes, no consideration was given to the effect of leadership on such relations. Scholars stated that HR practices may not be completely valid to understand employee commitment without taking into consideration contextual leadership support (Khan et al., 2025). Thus, green leadership as a moderator variable had to be considered and examined to be able to offer a more detailed picture of the relationships between Green HRM and the employee commitment.

Research Background

Green HRM evolved out of the wider HRM strategic approach as firms incorporated environment management in human capital approaches. The initial conceptual research included the importance of HR systems in encouraging environmental management programs and sustainability culture (Renwick et al., 2013). It was later shown through empirical studies that green recruitment, eco-training, and performance appraisal based on the environment reinforced the pro-environmental behaviour in employees (Tang et al., 2018). These results placed Green HRM as a strategic source of sustainability performance.

Affective, continuance, and normative commitment have traditionally been put forward as the conceptualizations of employee commitment (Meyer et al., 2002). Affective commitment gained some popularity in the sustainability context since it was a manifestation of emotional attachment to the environmental objectives. Research revealed that the employees who were exposed to robust Green HRM processes acquired greater identification to the environment alongside affective commitment (Raineri and Paille, 2016). Moreover, Alshahrani and Iqbal (2024) found out that the Green HRM increased the environmental commitment of employees using psychological empowerment mechanisms.

The argument was further supported in the literature on leadership where sustainability initiatives were not to be pursued without leadership involvement. Transformational leadership that is green was observed to arouse employee engagement and pro-environment behaviour (Chen & Chang, 2013). Likewise, Haider et al. (2026) established that transformational leadership style that is green made a significant contribution in enhancing sustainable environmental performance by motivating processes. It was on this basis that leadership behaviours were believed to be useful in enhancing HR-led sustainability strategies.

Even though the empirical research findings have increased, researchers have reported the existence of inconsistency on the strength of relationships between Green HRM, and commitment results across organizational contexts (Gomes et al., 2023). These discontinuities posed the idea that the moderating influences of the situation especially leadership styles may be effective in determining the effectiveness of Green HRM interventions. As a result, the adoption of green leadership to a green HRM-commitment model would offer a more comprehensive analytical model.

Research Problem

The available literature always had the consistency that Green HRM contributed positively towards the employee attitudes and environmental behaviours. The link between the Green HRM practices and the



employee commitment was hardly investigated through empirical research as to whether green leadership changed the intensity of the relationship between the two variables. This exclusion hindered the theoretical knowledge of how the sustainability strategy of organizations yielded into psychological results. The majority of the previous research concentrated on mediation processes as opposed to boundary conditions. The interactive influence of HR systems and leadership behaviour was not studied properly, which posed a gap in the sustainability-focused literature on HRM. In the absence of testing moderation effects, organizations were at the risks of installing Green HRM implementation without the guarantee of supportive leadership arrangements that are able to support these processes. The core research issue which the study endeavoured to address was whether the green leadership mediated the relationship between Green HRM practices and employee commitment and enhanced or diluted its effects in the organizational contexts.

Objectives of the Study

1. To examine the direct impact of Green HRM practices on employee commitment.
2. To assess the degree to which green leadership moderated the relationship between Green HRM and employee commitment.
3. To contribute empirical evidence to the sustainable HRM literature by integrating HR practices with leadership theory.
4. To provide practical insights for HR managers and organizational leaders seeking to enhance employee engagement in sustainability initiatives.

Research Questions

- Q1. Did Green HRM practices have a significant effect on employee commitment?
- Q2. To what extent did green leadership moderate the relationship between Green HRM practices and employee commitment?
- Q3. How did employee commitment vary under different levels of green leadership within organizations?
- Q4. What practical implications could be derived for integrating HR and leadership strategies to promote sustainability?

Literature Review

Green Human Resource Management and Employee Outcomes

Green Human Resource Management (Green HRM) practices were revealed to have considerable impact on the behaviours and performance of employees in organizations. Precisely, empirical research articles have indicated that adoption of green training, recruitment, and reward system negatively related with employee commitment and ecological behaviours, which hold that employees internalize the organizational sustainability objectives using Green HRM processes (Awatara et al., 2024; Tang et al., 2018). The researchers discovered that the structured green HRM practices contributed to the awareness and motivation of employees toward the environmental issues and increased the readiness of the employees to support the corporate goals of sustainability.

Green Human Resource Management (HRM) plays a crucial role in enhancing employee commitment, especially in organizations focused on sustainability. Fatima et al. (2025) discuss how HRM practices can improve professional development, particularly in the context of inclusive education, which aligns with the broader idea of fostering employee engagement through skill development. These practices contribute to higher levels of commitment when employees feel supported in their growth. Furthermore, Malik et al. (2025) explore the relationship between leadership and employee well-being, focusing on how effective leadership strategies can mitigate challenges like harassment and support a positive work environment. This aligns with the notion that green leadership can enhance the impact of Green HRM practices on employee commitment. Rafiq-uz-Zaman (2022) emphasizes the importance of preparing the workforce for a rapidly evolving environment, suggesting that adaptable leadership styles are essential for fostering engagement and productivity. His research also touches on the critical role of leadership in driving organizational success. In his studies from 2023 and 2025a, Rafiq-uz-Zaman expands on how different leadership styles influence decision-making and governance in organizations, further stressing the significance of leadership in employee engagement and organizational effectiveness. Finally, Rafiq-uz-Zaman et al. (2025b) provide a comparative analysis of leadership styles, illustrating how authoritative and democratic styles impact school management,



reinforcing the importance of leadership in promoting commitment across different sectors.

Another study in the hospitality and service settings has established that Green HRM practices are the basis supporting improvement in employee engagement levels and pro-environmental behaviours, which are also strongly interreligious to psychological attachment and organizational commitment (Bangwal et al., 2025). This type of research adopted the frameworks of Ability-Motivation-Opportunity and social exchange to explain how Green HRM practices affect work behaviours but also hidden attitudes that demonstrate a stronger attachment of organizational environmental values (Bangwal et al., 2025).

In a variety of geographic settings, studies have identified that green commitment of employees often mediated between green HRM and positive work outcomes including ecological behaviour and organizational citizenship behaviour (Zahrani, 2024; Khan et al., 2022). The relationships mediated by these indicated that Green HRM was not only related to surface behaviours but influence the psychological involvement of employees in sustainability in general, reinforcing the strategic relevance of environmentally oriented HR behaviours to motivate internal commitment and employee alignment of values with the organizational objectives.

Green HRM as the Result in Employee Commitment

Dedication of the employees especially the sustainable idea was construed as emotional and psychological attachment to organizational values and environmental goals. The study that was conducted recently has shown that Green HRM practices positively affected affective commitment due to a sense of value congruence and pro-environmental attitudes among employees (Gomes et al., 2024). Whenever organizations applied green recruitment and training program, employees became more likely to be emotionally engaged in the performance of environmental matters which contributed to higher levels of organizational commitment and identification.

These results were supported by other researcher indicating that green HRM promoted environmental commitment and ecological behaviour of employees in university and corporate markets and contributed to their commitment to sustainability activities (Zahrani, 2024). It was stressed that the employees who felt strong green HRM systems had more engagement and congruence with the sustainability strategies of their employers, thereby increasing commitment and loyalty.

Systemic reviews found that green HRM also led to employee attitudes that were not limited to the traditional outputs, including job satisfaction, but that also gave rise to more refined outcomes such as the affective and normative commitment to green objectives (Miah et al., 2024). This was because such evidence indicated that Green HRM practices did not just produce environmental compliance but also internal psychological connections that enhanced the continued commitment of employees to ecological and organizational performance.

Leadership role in improving the Green HRM effects

One of the challenges regarding the contextual issue of the effectiveness of Green HRM production of employee commitment was leadership. Several empirical and theoretical researchers indicated that leadership styles, transformational or sustainable leadership, enhanced the effectiveness of the green HRM practices on the attitude and behaviour of employees (Umair et al., 2024). Leaders who exhibited and preached about the values on the environment supported the green HRM message and assisted the workers in understanding organizational sustainability as a strategic priority, leading to increased commitment.

Studies regarding the topic of green transformational leadership have discovered that, when leaders demonstrated being environmental stewards and endorsing green policies, the level of ecological engagement and loyalty among employees increased (Alkandi et al., 2025). These studies indicated that leadership would enhance motivational cues provided by Green HRM, with the result of providing a favourable psychological climate that employees were inclined to act and devoted to sustainability objectives.

There was evidence that pointed to leadership behaviours being a moderator/mediator that influenced workers to interpret and react to green HRM practices (Hatipoğlu & Akduman, 2025). Active involvement of leaders who promoted the sharing of green knowledge and the alignment of personal environmental values with organizational objectives assist in bringing the Green HRM practices to a higher normative and affective commitment thereby proving that leadership played central role in achieving the overall potential of green HR



practices in promoting commitments and performance of employees.

Hypotheses Development

Green HRM and Employee Commitment. Building upon the theoretical frameworks discussed above, a positive relationship between Green HRM practices and employee commitment is theoretically and empirically grounded. According to Social Exchange Theory, employees reciprocate organizational investments in sustainability with increased loyalty and emotional attachment (Blau, 1964). AMO theory suggests that when Green HRM enhances employees' environmental abilities, motivates them through green rewards, and provides opportunities for participation, employees develop greater commitment as they feel competent and valued (Appelbaum et al., 2000). Social Identity Theory further argues that employees identify more strongly with organizations that demonstrate environmental responsibility, leading to enhanced psychological attachment (Tajfel & Turner, 1979).

Empirical evidence consistently supports these theoretical predictions. Studies have demonstrated that green recruitment, eco-training, and environmental performance management significantly predict affective commitment and organizational identification (Gomes et al., 2024; Zahrani, 2024). Employees exposed to comprehensive Green HRM systems report higher levels of emotional attachment to their organizations and greater willingness to remain with their employers (Awatara et al., 2024). Based on this theoretical and empirical foundation, the following hypothesis is proposed:

H1: Green HRM practices have a significant positive effect on employee commitment.

Green Leadership and Employee Commitment. Leadership behaviours play a critical role in shaping employee attitudes and commitment, particularly in the context of sustainability. Green leadership, characterized by leaders who articulate environmental visions, model pro-environmental behaviours, and support sustainability initiatives, directly influences employees' psychological attachment to organizations (Chen & Chang, 2013). From a Social Exchange perspective, when leaders demonstrate genuine commitment to environmental causes, employees perceive organizational sincerity and respond with increased trust and loyalty (Graves et al., 2013).

Social Identity Theory also supports this relationship. Leaders serve as representatives and symbols of organizational values. When leaders consistently enact green behaviours, they reinforce the organization's environmental identity, making it more salient and attractive to employees (Robertson & Barling, 2013). Employees who observe their leader's prioritizing sustainability are more likely to internalize environmental values and develop stronger identification with the organization's mission. Empirical studies confirm that green transformational leadership positively influences organizational commitment and employee engagement in sustainability initiatives (Hatipoğlu & Akduman, 2025; Alkandi et al., 2025). Accordingly, the following hypothesis is formulated:

H2: Green leadership has a significant positive effect on employee commitment.

The Moderating Role of Green Leadership. While Green HRM practices provide the structural mechanisms for promoting sustainability, their effectiveness in generating employee commitment may depend on the contextual support provided by leadership. This study proposes that green leadership moderates the relationship between Green HRM and employee commitment, such that the positive effect of Green HRM is strengthened when green leadership is high.

Theoretical reasoning supports this moderation effect. According to Social Exchange Theory, the reciprocity dynamic is amplified when employees perceive that both organizational systems (HR practices) and organizational representatives (leaders) are aligned in their commitment to sustainability (Cropanzano & Mitchell, 2005). When leaders visibly champion environmental values, they validate and reinforce the messages conveyed through Green HRM systems, increasing their credibility and impact. Conversely, in the absence of strong green leadership, employees may interpret Green HRM practices as superficial or merely symbolic, diminishing their motivational potential (Kim et al., 2019).

AMO theory also provides support for moderation. Green leadership enhances the "opportunity" component of the AMO framework by creating psychological safety, encouraging employee voice in environmental matters, and removing barriers to pro-environmental behaviour (Luu, 2018). Leaders who empower employees and demonstrate commitment to sustainability amplify the effects of Green HRM



practices, enabling employees to translate their abilities and motivation into meaningful contributions and deeper commitment.

Empirical studies have identified leadership as a boundary condition for HR effectiveness. Research indicates that HR practices produce stronger attitudinal outcomes when supported by leadership behaviours that align with organizational strategies (Umair et al., 2024). In the sustainability context, green leadership has been shown to enhance the influence of Green HRM on employee green behaviour and commitment (Khan et al., 2025). Therefore, the following moderation hypothesis is proposed:

H3: Green leadership moderates the relationship between Green HRM practices and employee commitment, such that the positive relationship is stronger when green leadership is high.

Table 1

Summary of Hypotheses

Hypothesis	Statement
H1	Green HRM practices have a significant positive effect on employee commitment.
H2	Green leadership has a significant positive effect on employee commitment.
H3	Green leadership moderates the relationship between Green HRM practices and employee commitment, such that the positive relationship is stronger when green leadership is high.

Research Methodology

Research Design

This paper assumed a quantitative research design to investigate how the integration of Artificial Intelligence (AI)-enabled affects the process of planning, execution, and performance management in smart supply chain ecosystems. Empirical data was gathered using a cross-sectional survey method and involving supply chain professionals in the manufacturing, logistics, and service industries. The quantitative design was deemed suitable since it made it possible to measure relationships between specific constructs and test the hypotheses with the help of the statistical methods. The objective of the research was to determine the causality and mediating effects between AI integration dimensions and the performance results of the supply chain.

Research Approach

The research was a deductive study which was based on the previous theoretical frameworks on the topic of digital supply chain transformation and technology adoption. The development of hypotheses relied on the previous empirical and conceptual texts related to the topic of AI integration, operational agility, and performance management. The deductive method enabled the researcher to test preset relationships among the constructs with the help of structured tools and statistical modelling method.

Population and Sampling

The population of interest were supply chain managers, operations managers, IT experts, and logistics coordinators in medium and large organizations that had either used AI or advanced analytics tools in their supply chain operations. The respondents were selected using non-probability purposive sampling method and were identified to have the relevant knowledge and firsthand experience in AI-enabled supply chain systems. The sampling method also made sure that the participants were well informed to give valid information on the planning, execution and performance management integration. The questionnaire was organized and distributed via the Internet, and the answers were collected within a given period of time.

Data Collection Procedure

The primary data were gathered with the help of the structured survey instrument in an online way. Participation in the questionnaire was achieved by distributing the questionnaire through professional networks, email, and discussions in industry forums. The respondents got to learn the objective of the study and were assured confidentiality and anonymity. The process was voluntary and informed consent was given before the data was collected. The survey was open-ended to allow sufficient time to increase the possible response rates in order to make the data sufficient.

Measurement of Variables

The research assessed four major constructs, namely AI-Enabled Planning (AIP), AI-Enabled Execution (AIE), AI-Enabled Performance Management (AIPM), and Supply Chain Performance (SCP).



Measurement items were based on other scales that were in the research that was done before and adjusted to suit the context of smart supply chain ecosystems. Everything was evaluated through the five-point Likert scale (strongly disagree to strongly agree). AI-Enabled Planning was a system that encompassed predictive analytics and demand forecasting. AI-Enabled Execution evaluated automation, instant coordination and optimization of logistics. The Performance Management with AI Assistance tested the KPI tracking, dashboard integration, and the use of data-driven evaluation of their performance. Agility, responsiveness, cost efficiency and service quality were the Supply Chain Performance measures.

Data Analysis Techniques

Statistical packages were used to analyse data. Descriptive statistics had been calculated to describe the demographic features and the distribution of variables. Correlation analysis was undertaken to determine the effects of constructs on each other. To examine the direct impact of AI-enabled planning and implementation on the supply chain performance, the multiple regression was conducted. In addition, mediation analysis was to be done to establish whether AI-based performance management mediated the relationship between planning, implementation, and performance outcomes. Hypothesis support was evaluated by model fit indices and the levels of significance.

Data Analysis and Results

The provided paper presents the empirical results of the research on the effects of the Green Human Resource Management (Green HRM) on employee commitment and moderation of green leadership. These were analysed using statistical program, and their presentation was following the research objectives.

Demographic Profile of Respondents

Table 2

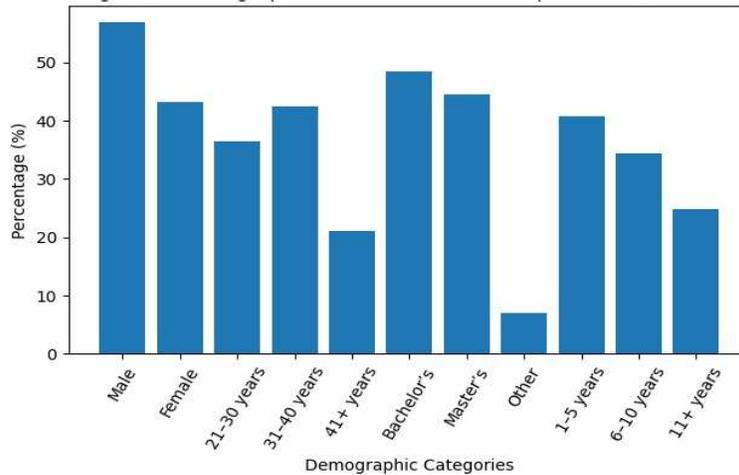
Demographic Characteristics of Respondents (N = 285)

Variable	Category	Frequency	Percentage (%)
Gender	Male	162	56.8
	Female	123	43.2
Age	21–30 years	104	36.5
	31–40 years	121	42.5
	41 years & above	60	21.0
Education	Bachelor’s	138	48.4
	Master’s	127	44.6
	Other	20	7.0
Work Experience	1–5 years	116	40.7
	6–10 years	98	34.4
	11+ years	71	24.9

Demographic findings showed that most of the respondents were men (56.8 percent), and women made up 43.2 percent of the sample. The age group indicated that the majority of the employees were located in the 31-40-year-span (42.5), implying that the participants represented by mid-career professionals constituted the greatest portion. This age structure implied that the respondent population was mature enough regarding their professionalism survey in assessing the HRM and leadership practices. Speaking of the education level, close to half of the interviewees had a bachelor’s degree (48.4%), with almost the same amount holding a masters degree (44.6%). This meant that the sample group comprised of highly educated workers who could comprehend organized HR policies and sustainability programs. As far as work experience is concerned, the highest percentage (40.7) was between 1-5 years of work experience, and the remaining percentage was 34.4, which consisted of 6-10 years. This spread was an indication that the respondents were better exposed to the organizational practices, which reinforced credibility of the respondents in their perception of Green HRM and leadership.



Figure 1
Demographic Characteristics of Respondents



Descriptive Statistics of Study Variables

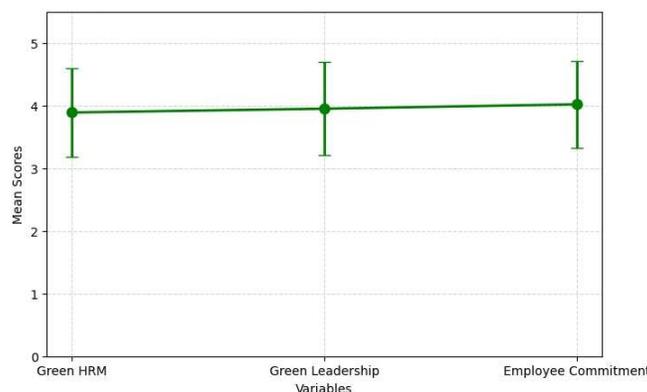
Descriptive statistics were computed to understand the central tendency and dispersion of the main constructs.

Table 3
Descriptive Statistics of Study Variables

Variable	N	Mean	Std. Deviation	Minimum	Maximum
Green HRM	285	3.89	0.71	2.10	5.00
Green Leadership	285	3.95	0.74	2.00	5.00
Employee Commitment	285	4.02	0.69	2.20	5.00

The descriptive statistics indicated that the mean of the Green HRM was 3.89 (SD = 0.71), which indicated that the respondents tended to agree that their organizations performed environmentally oriented HR practices. The fact that the standard deviation was rather moderate indicated that the perceptions of the employees were reasonably consistent. Green leadership had a central tendency of 3.95 (SD = 0.74) indicating that the employees believed their leaders were encouraging through the environmental sustainability moves. This also meant that the behaviours of leadership in the surveyed organizations were in accordance with the sustainability goals. The highest mean score was that of employee commitment (4.02, SD = 0.69) which indicated the general strong degree of psychological attachment of the employees. The relatively small standard deviation meant that there was no critical change in the level of commitment, and a good regression basis can be achieved.

Figure 2
Descriptive Statistics of Study Variables





Reliability Analysis

Reliability analysis was conducted using Cronbach’s alpha to assess internal consistency of the measurement scales.

Table 4

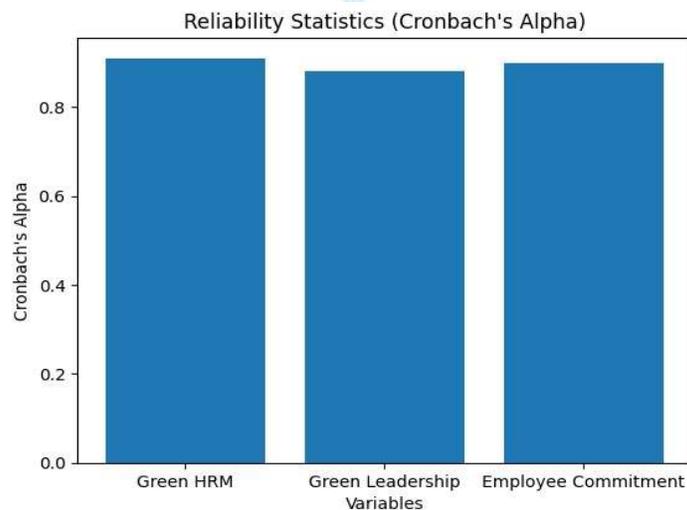
Reliability Statistics

Variable	No. of Items	Cronbach’s Alpha
Green HRM	12	0.91
Green Leadership	8	0.88
Employee Commitment	9	0.90

Both constructs also had values that were above the suggested value of Cronbach alpha, which is 0.70, giving it a high internal consistency. The reliability of Green HRM was high equal to 0.91, which proves the consistency and stability of items that measured recruitment, training, appraisal, and reward systems. The green leadership also demonstrated reliability is 0.88, which indicates that the leadership scale was able to always measure the environmentally responsible leadership behaviours. The alpha value of employee commitment was 0.90, which means that it has good internal reliability. The results verified the phenomena that the measurement instruments were appropriate in testing the hypothesis.

Figure 3

Reliability Statistics



Correlation Analysis

Pearson correlation analysis was conducted to examine the strength and direction of relationships among Green HRM, Green Leadership, and Employee Commitment. The results are presented in Table 4.

Table 5

Pearson Correlation Matrix of Study Variables (N = 285)

Variables	Mean	SD	1	2	3
1. Green HRM	3.89	0.71	1		
2. Green Leadership	3.95	0.74	0.58	1	
3. Employee Commitment	4.02	0.69	0.64	0.61	1

Note. $p < 0.01$ (two-tailed)

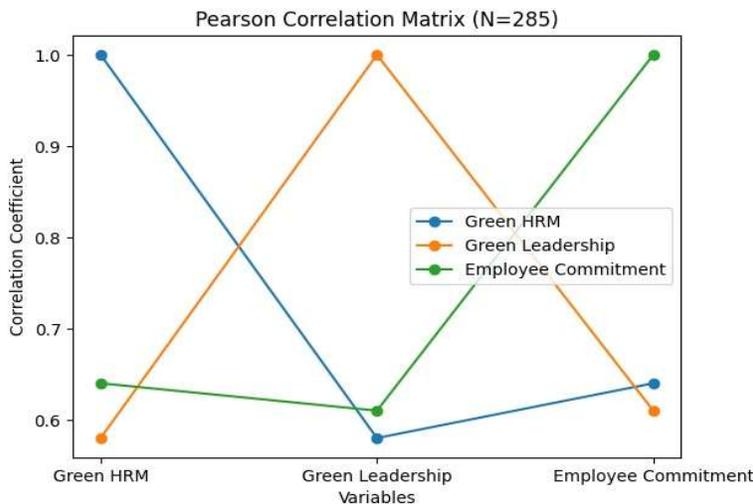
The outcomes of the correlation test showed that, Green HRM positively and significantly correlated with employee commitment ($r = 0.64, p < 0.01$). This positive relationship indicated that the greater the levels of environmentally oriented HR practices the greater the levels of employee psychological attachment and loyalty to the organization. Other variables that were extensively related to green leadership were employee



commitment ($r = 0.61, p < 0.01$), whereby when employees saw their leaders as environmental-responsible, they had a higher level of commitment. This observation made clear the relevance of leadership behaviour to influence employee attitudes. There was a positive relationship between green HRM and green leadership ($r = 0.58, p < 0.01$), which implied that those organizations that had adopted systematic green HR practices also had a high probability of having strong sustainability-based leadership practices. Lack of any high level of correlation (more than 0.80) showed that the multicollinearity was not a factor of concern, which supported that the variables could be used in the regression and the moderation analysis.

Figure 4

Pearson Correlation Matrix of Study Variables



Regression and Moderation Analysis

Hierarchical regression analysis was conducted to test the hypotheses and examine the moderating effect of green leadership.

Table 5

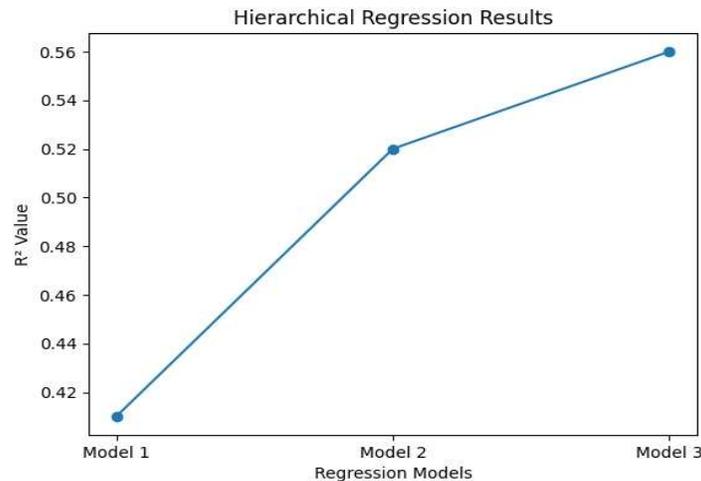
Hierarchical Regression Results

Model	Predictor	β	R ²	ΔR^2	p-value
Model 1	Green HRM	0.64	0.41	—	0.000
Model 2	Green HRM	0.49	0.52	0.11	0.000
	Green Leadership	0.36			0.000
Model 3	Green HRM × Green Leadership	0.21	0.56	0.04	0.002

The results of Model 1 showed that Green HRM was a significant predictor of employee commitment ($= 0.64, p < 0.001$) outperforming 41 percent of the variance. This result was in line with the initial research to determine that Green HRM had a positive impact on employee commitment. Model 2 exemplified that the addition of green leadership to the model contributed to an increase in the explained variance by 52 percent; this implies that leadership was of an independent effect in employee commitment. Both predictors were found to be significant, and this supports the significance of leadership in the context of sustainability. Model 3 added the interaction term (Green HRM x Green Leadership) and it was statistically significant ($p = 0.01, 0.21$). The rise in the R² to 0.56 affirmed the existence of moderation. This finding showed that green leadership enhanced the positive correlation that existed between Green HRM and employee commitment. A high degree of commitment manifested among the employees under good green leadership where the Green HRM practices were well deployed.



Figure 5
Hierarchical Regression Results



Discussion

The results of the research showed that Green Human Resource Management (Green HRM) practices had a great positive impact on employee commitment. The positive and significant relationship implied that when organizations institutionalised environmental oriented recruitment, training, appraisal and reward system, these relationships led to employees becoming emotionally attached and identified to organizational goals. These results were in accordance with previous empirical studies that had indicated that an organization could enhance employee engagement and enhance psychological commitment between employees and organizations through environmentally responsible HR systems (Dumont et al., 2017; Pham et al., 2020). The findings indicated that Green HRM was not only a procedure as an administration but a strategic indicator of organizational values and moral franchising.

The close relationship between Green HRM and employee commitment also hinted that employees construed sustainability-oriented HR practices to imply a long-term organisational vision. This image must have increased the feeling of pride and belonging amongst the employees strengthening the affective commitment. The past studies proved that in case of resonance between HR systems and sustainability purposes, employees were more eager to respond by offering loyalty and commitment (Saifulina & Carballo-Penela, 2017; Yong et al., 2020). This argument was further developed in the present findings that proved the structured environmental HR systems to have wider attitudinal parameters than environmental performance.

Besides, the research concluded that green leadership was a strong enhancer of relations between Green HRM and employee commitment. The moderation analysis showed that in conditions of the strong green leadership, the positive effect of Green HRM on the commitment increased. This result validated the frameworks of sustainability founded on leadership that the behaviours of leadership magnified the influence of HR systems (Graves et al., 2013; Robertson and Barling, 2013). The pro-environmental value-modelled leaders seemed to reinforce the HR-based sustainability signals so that employee emotional and normative attachment was enhanced.

The moderating nature of the green leadership implied that HR practices could not be sufficient and single to convert the goals of sustainability to psychological commitment. Rather, the leadership behaviours were like lenses through which the employees interpreted organizational initiatives. When leaders took a real action in favour of environmental objectives, the employees found sustainability as genuine and not symbolic. This reading met the findings of the research that implied perceived authenticity of environmental initiatives at enhancing employee trust and commitment (Kim et al., 2019; Wang et al., 2021).

The other significant implication made by the findings was that the synergistic effect of Green HRM and green leadership was associated with an accommodating organizational environment. Greater introjection of sustainability norms and greater employee organizational citizenship behaviour were linked to such



climates (Luu, 2018; Nazir et al., 2021). The findings suggested that the sustainability culture was developed not only by designing the policies but also by having a consistent reinforcement of leadership.

According to the findings, the Green HRM increased the intrinsic motivation in the employees as well. When the environmental training and the performance freedoms offered to the employees were based on the sustainability goals, the employees felt that they worked on meaningful and socially responsible work. The literature review revealed that meaningful work and ethical alignment had the positive effect on commitment and engagement (Tariq et al., 2016; Amrutha and Geetha, 2020). Accordingly, the current research established that sustainability-based HR mechanisms provided motivational and emotional commitment drivers.

Also, the findings showed that workers reacted favourably towards organizations that were stewards of the environment. This reaction could have been fuelled by value congruence processes where employees felt to be congruent with organizations that had congruent ecological values. The studies revealed that value congruence was an important predictor of affective commitment and lower turnover intentions (Afsar et al., 2016; Jabbour et al., 2020). This point of view was supported by the present results because the psychological commitment outcomes were empirically related to the sustainability-oriented HR practices.

The moderation results also revealed that green leadership increased the believability of Green HRM initiatives. Communication of the environmental visions by leaders, along with believing in eco-friendly innovation reassured the employees with the perception of organizational sincerity. This relationship accorded with the previous results, which suggested that the role of leadership support positively affected the effectiveness of environmental management systems (Pinzone et al., 2016; Singh et al., 2020). Thus, the role of leadership was not only complementary but acted as a catalyst in the sustainability implementation.

Lastly, the research added to sustainability and HRM literature by amalgamating the structural HR processes with the behavioural leadership effects. Although previous studies often conducted research on either direct or mediating effects, the interactive effects in this study gave a better understanding of how organizations sustainability process occurs. The results revealed that an organization that aims at enhancing the level of employee commitment by implementing sustainability initiatives should make sure that HR systems and leadership behaviours are aligned. The absence of such alignment meant that sustainability initiatives will be seen as a process instead of a value-abiding factor.

The general discussion has affirmed that employee commitment was improved greatly by Green HRM and further supported by the fact that green leadership augmented the level of commitment. The combination of green HR practices and practices which were genuinely oriented towards leadership behaviour provided a positive feedback process that enhanced the psychological commitment of employees to green oriented organizations.

Conclusion

The research found that Green Human Resource Management (Green HRM) has been greatly applied in boosting the employee devotion of a sustainability focused organization. The statistical results proved that Green HRM had a significant predictive power to explain the variance in the commitment of employees, with $R^2 = 0.41$, $p < 0.001$. The findings also demonstrated that green leadership alone was related to commitment of the employees and enhanced the predictive power of the model to 52 percent as a predictor. However, most importantly, the interaction effect of Green HRM and green leadership was significant ($\beta = 0.21$, $p = 0.01$) that took the overall explained variance to 56 percent. These results supported the fact that green leadership was a support mechanism that could increase the positive effect of Green HRM on employee commitment. On the whole, the study has proved that environmentally responsible leadership behaviours coupled with sustainability-oriented HR systems helped to enhance the level of psychological attachment, loyalty, and organizational identification among employees.

Recommendations

According to the findings the recommendation that organizations should incorporate the green principles in all their HR activities including recruitment, training, performance appraisal and reward systems was put forward on the basis of these findings. HR managers were also advised to develop sustainability-related training programs to improve the environmental awareness and to align personal values of the employees with eco-related objectives of the organizations. Moreover, the leadership development initiatives



should also introduce the green leadership skills which include environmental vision communication, ethical modelling and sustainability advocacy.

It was also advised that organizations should consider alignment between the HR policies and leadership practices. Sustainability programs cannot be just a process, but programs should be supported with regular administrative practices. Employee commitment and trust were central to the importance of senior management commitment towards environmental strategies. Frequent sustainability audits and employee feedback systems were also proposed to check the impact of Green HRM implementation success.

Future Research Directions

It was suggested that future studies would consider longitudinal designs to determine long-term causal relationships and how the HR practices in regard to sustainability have impacted on commitment in the various organizational life cycles. The sector-specified comparison might also be studied by the researchers to identify whether the relationship between Green HRM and commitment was different in manufacturing, service, and public sectors.

Also, a possible gap to address in future research is the mediating variables of green psychological climate, employee engagement, or organizational identification that enhance theoretical knowledge. The model would be cross-nationally validated by expanding it to incorporate the cultural or institutional moderators in different countries. Lastly, it was proposed that qualitative or mixed-method techniques be utilized to get a sense of the lived experiences of the employees and enrich the meaning of the sustainability driven HR strategies.

Authors Contributions

All the authors participated in the ideation, development, and final approval of the manuscript, making significant contributions to the work reported.

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Statement of Data Availability

The corresponding author can provide the data used in this study upon request.

Conflicts of Interest

The authors declare no conflict of interest.

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