# GREENING THE WORKFORCE: INVESTIGATING THE NEXUS BETWEEN GREEN HUMAN RESOURCE MANAGEMENT PRACTICES AND ENVIRONMENTAL SUSTAINABILITY IN THE MANUFACTURING SECTOR

**Waliu Mulero ADEGBITE[1]*, Adekunle Emmanuel IBIRONKE[2] & Adeolu Oludare OLATOYE[3]**
[1&2]Department of Employment Relations and Human Resource Management
Faculty of Administration and Management Sciences
Olabisi Onabanjo University, Ago Iwoye, Nigeria
[3]Department of Entrepreneurship
Tai Solarin Federal University of Education, Ijebu-Ode, Nigeria
[1*]adegbite.waliu@oouagoiwoye.edu.ng

**ABSTRACT**

Environmental sustainability remains a critical challenge in Nigeria's manufacturing sector, where unsustainable production practices have exacerbated environmental degradation. Despite increasing global emphasis on green strategies, many manufacturing firms in Nigeria have yet to integrate sustainability into their human resource management systems. This study explores the influence of green human resource management (GHRM) practices on environmental sustainability in a plastic production plant in Nigeria. Employing Structural Equation Modelling (SEM) for data analysis, the research utilised a non-probability convenience sampling technique with 219 respondents, guided by the 10-times rule of thumb for sample adequacy. The study examined four key dimensions of GHRM: green recruitment, green performance management, green compensation, and green training and development. The findings reveal that green recruitment, performance management, and training significantly contribute to environmentally responsible behaviour and organisational alignment with sustainability goals. These practices promote the embedding of environmental values, enhance employee capabilities, and foster a culture of accountability and continuous improvement. However, green compensation was found to be a less effective motivator, suggesting that financial incentives alone may not drive long-term environmental engagement in the Nigerian context. The study underscores the strategic role of GHRM in building organisational resilience and ecological responsiveness.

**Keywords:** Green human resource management, Environmental sustainability, Manufacturing industry, Sustainable development, Nigeria, Structural equation modelling

## INTRODUCTION

The growth of global environmental challenges, including climate disruption and other ecological issues, has exacerbated the need for businesses to embrace best practices and eco-friendly policies in their daily operations. With ecological issues plaguing humanity, there has been a global debate over whether organisations with high- and low-emitting operations must adopt proactive workplace measures to protect the environment from further damage. In response to growing concern about climate change and its environmental impacts, organisations are encouraged to take responsibility for their actions and implement green policies. Advanced technologies have enabled organisations to implement green policies, supporting HR functions virtually through teleconferencing, e-learning and training, e-recruitment, and e-performance management systems (Ahmed & Bakare, 2022; Tang et al., 2018). This approach enables organisations to enhance their environmental and social responsibility while maintaining efficient HR operations. The notion of Green HRM involves utilising HR practices to advance environmental sustainability and preservation. These practices focus on the environmental aspects of conventional HR practices, such as recruitment, training, and performance management, while simultaneously striving to achieve organisational objectives and promote environmental sustainability. Research has shown that green HR practices not only contribute to environmental sustainability but also enhance an organisation's competitive advantage, reputation, and economic efficiency (Muisyo et al., 2017; Tang et al., 2018).

In recent times, organisations have faced many environmental challenges (e.g., natural disasters, climate change and pandemics), which have affected their performance and profitability. To preserve the environment, organisations are redesigning their operation and processes to preserve the natural environment and reduce climate-related problems (Ahmed & Bakare, 2022; Saeed et al., 2019). With the adoption of green practices, organisations have been exploring their potential influence on various organisational outcomes such as profitability, performance, commitment, and employee pro-environmental behaviour. This approach is constructive in promoting environmental sustainability and can lead to a better world for future generations.

The significance of incorporating green human resource management (HRM) practices is increasingly clear to organisations committed to environmentally sustainable operations. Recent research by Balchat et al. (2022) highlights the potential of green HRM practices to drive both environmental and innovative outcomes. Although the field of green HRM is relatively new, it holds significant implications for an organisation's overall strategic management process, as noted by Pham et al. (2020). A study by Oluwasanmi and Ogunro (2018) found that green HR practices are positively correlated with environmental sustainability across industries, particularly in the oil and gas and service sectors. The essence is to streamline business processes, enhance product or service quality, and demonstrate a commitment to environmental concerns (Oluwasanmi & Ogunro, 2018). This approach provides a practical framework for developing human capital to support sustainable development and improve environmental performance.

Despite increasing advocacy and awareness of the negative environmental impacts of traditional practices, many organisations in developing countries, such as Nigeria, have yet to adopt green management practices. The development could be attributed to a lack of clarity and limited studies linking green HR to environmental sustainability in developing countries. Elsewhere, studies have reported that practices such as green recruitment, training and development, performance management, and compensation (Begum et al., 2022; Balchat et al., 2022; Ojo et al., 2020) have a significant impact on organisational outcomes and the nature-environment. Also, there is still a dearth of research on the impact of green HR practices on environmental sustainability, with no study focusing on the specific effects of practices such as green recruitment, green training, green performance appraisal, and green compensation on environmental sustainability in the Nigerian manufacturing industry. Consequently, there is a gap in this area, as most existing studies employed aggregation techniques to analyse the combined effects of various green HRM practices on environmental sustainability. However, this approach has its limitations, as it fails to determine the individual contributions of each practice to environmental sustainability. The current study seeks to address this gap by exploring the specific effect of green HR practices on environmental sustainability within the manufacturing sector in Nigeria.

**Underpinning Theory**

The planned behaviour and institutional theories provide a solid theoretical foundation for examining the relationship between green human resources management (GHRM) and environmental sustainability in this study. The theory of planned behaviour, introduced by Ajzen (1991), posits that individual behaviour is influenced by three key components: attitude toward the behaviour, subjective norms, and perceived behavioural control. These components work together to shape a person's intention, the most immediate predictor of behaviour. Within green human resources management, TPB is a robust framework for understanding how HR practices can encourage pro-environmental behaviour in the workplace. Green recruitment focuses on attracting individuals with positive environmental values, fostering alignment between personal and organisational objectives (Renwick et al., 2013). This selection process enhances employees‘ environmental attitudes, a fundamental aspect of TPB. On the other hand, green training cultivates environmental knowledge and skills, thereby increasing perceived behavioural control, the belief in one‘s ability to engage in sustainable practices (Tang et al., 2018). Similarly, green performance management utilises feedback and appraisals to shape expectations for behaviour, thus reinforcing subjective norms and fostering accountability for sustainable outcomes (Jabbour & De-Sousa, 2016). Pham et al. (2020) demonstrated that green training and reward systems positively influenced employees‘ intentions to adopt eco-friendly behaviours, aligning with the TPB constructs. Therefore, TPB effectively illustrates how GHRM practices promote employee intentions and behaviours that collectively contribute to environmental sustainability in manufacturing firms.

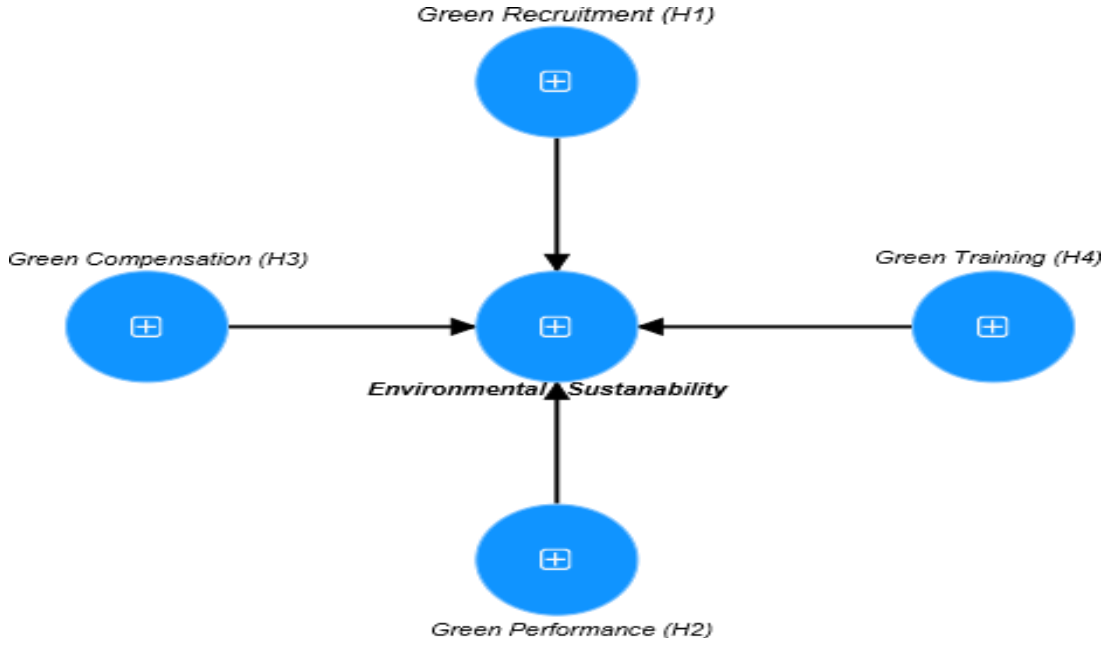



Figure 1: Hypothesised Model Linking Green HRM and Environmental Sustainability

## LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

### Green Human Resource Management and Environmental Sustainability

The importance of safeguarding the environment and enacting measures for cleaner production is rising. Consequently, organisations are becoming increasingly mindful of meeting the growing expectations of consumers, the market, and the law (Pham et al., 2020), and taking greater responsibility for achieving sustainable outcomes, particularly regarding the environmental impact of their operations. Implementing human resource management (HRM) practices plays a critical role in promoting sustainability in organisations, leading to the emergence of green HRM as a new field of study (Jabbour & De-Sousa, 2016). Previous research has examined the impact of green HRM practices on corporate environmental performance, including studies by Begum et al. (2022) and Ojo et al. (2020), among others. Within HRM, the term "green" refers to the preservation and conservation of the natural environment, encompassing minimising environmental pollution and designing natural-looking spaces (Ojo et al., 2020; Prakash & Das, 2022). When an employee prioritises these aspects, they are considered a "green employee." Green HRM practices are centred around environmental sustainability and waste reduction and encompass policies, practices, and systems that cultivate environmental consciousness among employees for the benefit of individuals, society, the natural environment, and business (Saeed et al., 2019). By adopting these green HRM practices, an organisation can gain a sustainable competitive advantage, enhance its reputation, and improve its economic efficiency (Muisyo et al., 2017). This study adopted four commonly reported human resource management practices: green recruitment,

green training, green performance appraisal, and green compensation, as the endogenous variables.

**Green Recruitment and Environmental Sustainability**

Many organisations around the globe have embraced green HRM practices to enhance their selection process by promoting eco-friendly work environments to attract potential green employees. In the current scenario, virtual recruitment practices are widely used to provide crucial insights into eco-friendly practices. A notable correlation exists between an organisation's positive, eco-friendly reputation and its ability to attract top talent (Ahmad & Baakare, 2022). Green recruiting initiatives support long-term job performance by assessing performance and educating employees about green corporate efforts, such as reducing waste and environmental damage. In green recruitment, environmental management is integrated into organisational recruitment and selection processes for nature preservation (Ahmad & Bakare, 2022; Ojo et al., 2020). Studies have emphasised the importance of selecting environmentally aware employees who are willing to minimise the negative environmental impact of their activities, thereby improving organisational effectiveness. A study by Prakash and Das (2022) found that green recruitment can help reduce environmental degradation, thereby improving organisational sustainability outcomes. Although empirical evidence links green recruitment to environmental sustainability, Nigeria has less visible research outcomes in this area; thus, this study posits that:

*$H_{1a}$: Green recruitment practice enhances environmental sustainability*

**Green Performance Management and Environmental Sustainability**

Implementing green performance management practices involves establishing green performance standards for individual employees and assessing their progress toward those standards (Ahmad & Bakare, 2022). Incorporating environmental management into the performance appraisal process enables organisations to align employees' performance behaviours with their sustainability objectives (Saeed et al., 2019). Effective green human resources management involves using relevant metrics and performance indicators to track employee engagement in pro-environmental practices (Saeed et al., 2019). This practice holds employees accountable for environmental management and promotes a culture of sustainability within the organisation. Environmental performance indicators provide employees with timely feedback on their pro-environmental behaviour, encouraging their participation and commitment to sustainable practices (Prakash & Das, 2022). Ojo et al. (2020) suggest that comparing employee performance with desired environmental outcomes will help evaluate their progress and make necessary adjustments. Accordingly, one practical approach is to implement a conceptual model that tracks and audits the production and use of assets, allowing for high performance (Ojo et al., 2020; Prakash and Das, 2022). This aspect of management practice is less researched in relation to organisational performance, particularly in emerging countries like Nigeria; therefore, the current study hypothesised that:

*$H_{2a}$: Green performance appraisal system enhances environmental sustainability*

**Green Compensation and Environmental Sustainability**

Adequate compensation and reward management practices are crucial for acknowledging employees' contributions toward attaining environmental goals in organisations (Darvishmotevali & Altinay, 2022; Prakash & Das, 2022). These practices serve as a catalyst, motivating employees to participate in green activities, both voluntary and work-related, which bolster the environmental priorities of the organisation. Green compensation and rewards incorporate financial and non-financial incentives that motivate individuals to support sustainable environmental initiatives (Saeed et al., 2019). These incentives could include rewards for developing skills, cognitive interpersonal abilities, embracing sustainable technologies, and engaging in green and sustainable practices (Oluwasanmi & Ogunro, 2018). Studies have shown that offering employees cash incentives for engaging in environmentally sustainable activities can increase their loyalty to sustainability programs (Prakash & Das, 2022). Similarly, Muisyo et al. (2017) and Tang et al. (2018) found that green rewards and compensation positively impact work performance and the environment. Furthermore, incentives and recognition based on environmental performance have been shown to motivate staff to participate in green projects (Prakash & Das, 2022). This study, therefore, posits that:

*$H_{3a}$: Green compensation and reward system enhances environmental sustainability*

**Green Training and Environmental Sustainability**

Green human resources management promotes environmental sustainability while enhancing employee awareness and performance (Saeed et al., 2019). However, organisations often struggle to balance green development strategies and overall performance. Green training and development focus on improving employees' understanding of environmental issues and teaching them various ways to conserve energy and reduce waste within the organisation (Jabbour & De-Sousa et al., 2016). This approach aims to enhance environmental performance by educating the workforce and helping them recognise different environmental issues within the organisation (Tang et al., 2018). Green training can equip employees with effective working methodologies that reduce waste, optimise resource utilisation, save energy, and minimise environmental degradation (Begum et al., 2022). Recent research by Balchat et al. (2022) indicates that green HRM practices, including training, development, learning, and recruitment, significantly contribute to organisational sustainability. Green training involves equipping staff with essential competencies, such as collecting waste data, improving the firm's efficiency, and enhancing their environmental awareness (Balchat et al., 2022; Ojo et al., 2020). Employees' willingness to contribute to environmentally sustainable efforts requires environmental training (Mishra, 2017). Based on the foregoing, this study examines whether green training relates to environmental sustainability.

*$H_{4a}$: Green training and development enhance environmental sustainability*

## METHODOLOGY

This study investigated the integrated effects of four core green human resource management practices: green recruitment, green training, green compensation, and green performance management on environmental sustainability. The principal objective was to critically examine

and clarify the nature of the relationship between each GHRM practice and its influence on the promotion of environmentally sustainable behaviour within organisational settings. Data were collected from employees of a Southwest Nigerian manufacturing firm that specialises in the production of various plastic products.

**Population, Sample and Characteristics**

Data for this study were collected through a structured online survey administered to employees of a plastics manufacturing company located in Southwest Nigeria. A total of 230 respondents completed the questionnaires between August and November 2024. Of these, 219 completed responses were deemed valid and usable for further statistical analysis. The study used the 10-times rule to determine the minimum sample size for PLS-SEM, a common approach when models have multiple constructs and indicators. It states that the sample should be at least ten times the highest number of structural paths or indicators for a single construct. This rule suggests that the minimum sample size should be 10 times the maximum number of structural paths pointing at a single construct in the model (Hair et al., 2017). In this study, the most complex construct had a maximum of six predictors, thus requiring at least sixty observations (10 × 6). Therefore, the final sample size of 219 valid responses exceeded the minimum threshold, ensuring robust statistical power for the analysis. Demographic analysis revealed that the sample comprised a higher proportion of male employees (n = 144; 65.7%), indicating gender imbalance. Regarding age distribution, the data showed a predominantly young workforce, with 153 respondents (69.86%) aged 21-30. Additionally, 42 employees (19.17%) were aged 30 or older, while 24 respondents (10.93%) were aged 21 or younger. The findings showed that most respondents (154 employees; 70.3%) had 1-3 years of organisational tenure, suggesting that most participants were relatively new to the firm.

**Study Measures**

A structured questionnaire comprising 25 items was adapted from existing validated scales to assess the influence of four key green human resource management practices on employees' environmental sustainability behaviour. All items were measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) to capture the extent of agreement with each statement. A 6-item scale was adopted to measure green recruitment from Jabbour and De-Sousa (2016) and Renwick et al. (2013). These items assessed how the organisation integrates environmental concerns into the recruitment and selection process, including the preference for candidates with strong environmental values, knowledge, and attitudes. Green performance management was evaluated using a 5-item scale based on the work of Renwick et al. (2013) and Tang et al. (2018). The items focus on how environmental objectives are incorporated into employee performance appraisals. For green compensation and rewards, a 4-item scale was utilised, drawing from Zibarras and Coan (2015). This scale measures the extent to which employees are incentivised and rewarded for their environmentally responsible behaviours. The dimension of green training and development was captured through a 5-item scale adapted from Jabbour and De-Sousa (2016) and Tang et al. (2018). This scale assesses the availability, frequency, and relevance of environmental training programs for employees, aiming to enhance their environmental awareness and skills. Lastly, environmental sustainability behaviour was

assessed using a 5-item scale derived from Zibarras and Coan (2015). This scale captures the perceived impact of environmental initiatives on organisational outcomes.

**Data Analysis**

For data analysis, this study employed Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS version 4.0 to assess the hypothesised relationships between green human resource management practices and environmental sustainability within the manufacturing organisation. PLS-SEM is particularly suited for exploratory research in which the objective is to predict key target constructs and examine complex interrelationships, rather than to confirm a well-established theoretical model (Hair et al., 2017). This makes it an appropriate analytical tool for the current study, which seeks to understand the predictive influence of four distinct GHRM practices on employee-driven environmental sustainability outcomes. The data analysis followed the two-step approach (measurement and structural model) recommended in PLS-SEM literature (Hair et al., 2017).

## RESULTS AND DISCUSSIONS

This study employed Structural Equation Modelling (SEM) as the primary analytical technique to examine the hypothesised relationships among latent variables. Following the guidelines established by Hair et al. (2017), the SEM analysis was conducted using a two-stage approach (measurement and structural model) to ensure the rigour, validity, and reliability of the model (Kline, 2015). The measurement model was evaluated in the first stage to determine how well the observed indicators represented their underlying latent constructs. This involved item reliability through standardised factor loadings, with a minimum threshold of 0.50 considered acceptable (Hair et al., 2017), internal consistency using Cronbach‘s alpha and composite reliability (CR), with values above 0.70 (Nunnally & Bernstein, 1994). Furthermore, convergent validity was evaluated using Average Variance Extracted (AVE), with values of 0.50 or higher indicating that each construct explained more than half of its indicators' variance (Fornell & Larcker, 1981). Discriminant validity was also confirmed using the Fornell-Larcker criterion, ensuring that each construct was empirically distinct from others in the model (Henseler et al, 2015). The second stage involved assessing the structural model, which tested the hypothesised relationships among the validated latent constructs. This phase examined the direction, strength, and significance of the path coefficients. Hypothesis testing was conducted using the bootstrapping method with 5,000 resamples to derive robust standard errors, t-values, and p-values (Hair et al., 2017). The significance of each path was evaluated to confirm or refute the proposed hypotheses.

**Measurement Model Assessment**

**Items’ Reliability**

Factor loadings, Cronbach‘s alpha (α), and composite reliability (CR) were used to evaluate the internal consistency of the latent constructs. These three indices are widely recognised in the literature for assessing the degree to which items within a construct consistently reflect the underlying latent variable (Hair et al., 2017; Sarstedt et al., 2015). A commonly accepted threshold for adequate internal consistency is 0.70 for all the indices (Nunnally & Bernstein,

1994; Hair et al., 2017). Cronbach's alpha measures the average correlation among indicators, whereas CR provides a more precise reliability estimate by accounting for item factor loadings, making it especially suitable in SEM contexts. As shown in Table 1, the Cronbach's alpha values for the latent variables ranged from 0.711 to 0.883, while the corresponding CR values are within a similar range. These results exceed the minimum cut-off point, confirming that the constructs exhibit satisfactory internal consistency reliability.

**Table 1: Internal Consistency Reliability of Latent Constructs**

| **Construct** | **Indicators** | **Factor loading** | **CA** | **CR** | **AVE** |
|---|---|---|---|---|---|
| Environmental Sustainability | ES1 | 0.711 | 0.854 | 0.896 | 0.634 |
| | ES2 | 0.848 | | | |
| | ES3 | 0.842 | | | |
| | ES4 | 0.809 | | | |
| | ES5 | 0.78 | | | |
| Green Compensation | GC1 | 0.813 | 0.866 | 0.909 | 0.715 |
| | GC2 | 0.881 | | | |
| | GC3 | 0.876 | | | |
| | GC4 | 0.81 | | | |
| Green Performance | GP1 | 0.838 | 0.891 | 0.919 | 0.696 |
| | GP2 | 0.852 | | | |
| | GP3 | 0.787 | | | |
| | GP4 | 0.84 | | | |
| | GP5 | 0.852 | | | |
| Green Recruitment | GR1 | 0.706 | 0.88 | 0.908 | 0.623 |
| | GR2 | 0.838 | | | |
| | GR3 | 0.793 | | | |
| | GR4 | 0.849 | | | |
| | GR5 | 0.765 | | | |
| | GR6 | 0.776 | | | |
| Green Training | GT1 | 0.857 | 0.871 | 0.907 | 0.663 |
| | GT2 | 0.883 | | | |
| | GT3 | 0.831 | | | |
| | GT4 | 0.742 | | | |
| | GT5 | 0.747 | | | |

Note: CA = Cronbach's alpha; CR = Composite reliability, and AVE = Average variance extracted.

**Source:** Author's Computation, 2026.

**Constructs' Validity**

The present study employed the AVE technique to assess convergent validity, a method widely recognised in contemporary academic research for evaluating the measurement models (Hair et al., 2017). AVE measures the proportion of variance captured by a latent construct to the variance due to measurement error, thereby indicating how well the indicators represent the underlying concept. As shown in Table 1, all AVE values exceed the commonly accepted threshold of 0.50, indicating that the latent constructs explain more than 50% of the variance in the observed variables. These results confirm an acceptable level of convergent validity, reinforcing the measurement items' consistent convergence with their respective constructs (Sarstedt et al., 2015).

**Table 2: Fornell-Lacker Criterion for Discriminant Validity**

| | Environmental Sustainability | Green Compensation | Green Performance | Green Recruitment | Green Training |
|---|---|---|---|---|---|
| Environmental Sustainability | 0.796 | | | | |
| Green Compensation | 0.702 | 0.846 | | | |
| Green Performance | 0.732 | 0.697 | 0.834 | | |
| Green Recruitment | 0.737 | 0.672 | 0.628 | 0.789 | |
| Green Training | 0.715 | 0.734 | 0.703 | 0.648 | 0.814 |

**Source:** Author's Computation, 2026.

In addition, the study evaluated discriminant validity using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio, both widely accepted and recommended in the literature (Henseler et al., 2015). As shown in Table 2, the Fornell-Larcker results indicate that each construct shares more variance with its indicators than with other constructs. Furthermore, all constructs meet the threshold recommended by Fornell and Larcker, confirming that the square root of each construct's AVE is greater than its correlation with any other construct. This provides strong evidence of discriminant validity and suggests that each latent variable is empirically distinct from the others, thereby supporting the structural integrity of the measurement model. Similarly, the HTMT values fall below the recommended threshold of 0.85, confirming that the constructs are empirically distinct (Sarstedt et al., 2015).

**Structural Model Assessment**

Before evaluating the structural model, it is imperative to examine multicollinearity among the predictor constructs, as excessive collinearity can undermine the stability and interpretability of path coefficient estimates. The Variance Inflation Factor (VIF) is a widely endorsed diagnostic metric for assessing multicollinearity, with acceptable values typically ranging from 0.20 to

5.00 (Hair et al., 2017). In the present study, the VIF values ranged from 2.102 to 2.765, falling well within the recommended threshold.

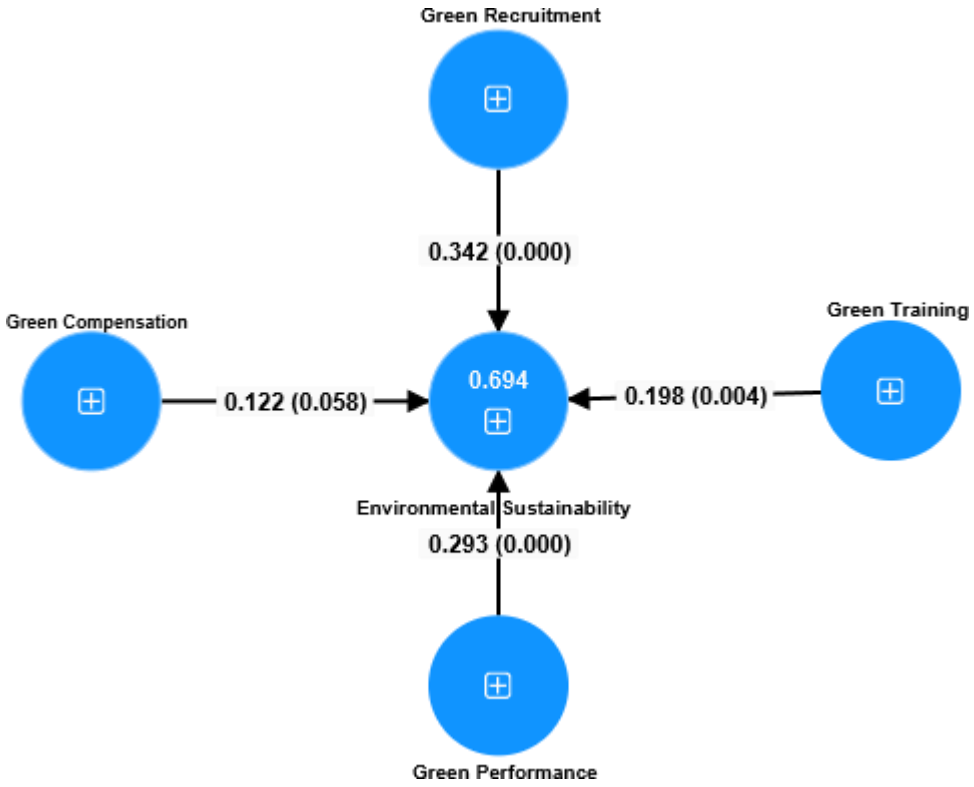



**Figure 2:** Assessment of the Structural Model

**Source:** Author's Computation, 2026.

In Table 3, the study assessed the direct relationships between selected exogenous variables and the endogenous construct of environmental sustainability by testing four hypothetical paths. The findings revealed that technology-driven green recruitment had a significant positive effect on environmental sustainability ($\beta = 0.342$, $p < 0.001$, $t = 5.759$), suggesting that integrating technologies into environmentally conscious recruitment practices can meaningfully enhance sustainable outcomes. Similarly, green performance management was found to have a significant positive impact ($\beta = 0.293$, $p < 0.001$, $t = 4.010$), indicating that incorporating environmental criteria into employee performance evaluations can advance sustainability objectives. In contrast, green compensation strategies exhibited a positive but statistically insignificant relationship with environmental sustainability ($\beta = 0.122$, $p = 0.058$, $t = 1.899$), implying that incentive-based sustainability efforts may not yet be strong drivers of environmental change in the sampled organisation. Interestingly, green training and

development showed a statistically significant positive relationship with environmental sustainability (β = 0.198, p = 0.004, t = 2.878), suggesting possible alignment between current training content or implementation and actual sustainable outcomes.

**Table 3: Path Coefficients (Standardised) for Hypothesis**

| Hypothesis | Path Link | β | t-Statistics | P-values |
|---|---|---|---|---|
| H1 | GR -> ES | 0.342 | 5.759 | 0.000 |
| H2 | GP -> ES | 0.293 | 4.01 | 0.000 |
| H3 | GC -> ES | 0.122 | 1.899 | 0.058 |
| H4 | GT -> ES | 0.198 | 2.878 | 0.004 |

**Source:** Author's Computation, 2026.

Overall, of the four hypotheses tested, three (H1, H2, and H4) were supported, while one (H3) was rejected. These findings indicate that technology-enabled green recruitment, as well as green performance management and training initiatives, significantly enhance environmental sustainability. Furthermore, the model's coefficient of determination ($R^2$) was 0.694, meaning that approximately 69.4% of the variance in environmental sustainability was explained by the independent variables. This substantial explanatory power underscores the critical role that technologically integrated and performance-focused human resource practices play in shaping an organisation's environmental sustainability outcomes.

**Discussion of Findings**

The study's findings revealed that technology-driven green recruitment significantly and positively influences environmental sustainability. This suggests that incorporating artificial intelligence (AI) and other digital tools into recruitment processes helps organisations attract talent whose values align with environmental objectives, thereby enhancing sustainable outcomes. In Nigeria's manufacturing sector, this is increasingly important as firms face intensifying global decarbonization pressures and shifting regulatory frameworks. These findings are echoed by Fapohunda et al. (2022), who reported that green recruitment practices, such as environmentally focused job descriptions and environmentally conscious selection criteria, had a statistically significant effect on the sustainability performance of manufacturing firms in Nigeria. Similarly, the results align with Renwick et al. (2013), that green recruitment serves as the first critical step in embedding environmental sustainability within the workforce by ensuring that new hires are predisposed to pro-environmental behaviours. Accordingly, organisations that show commitment to environmental values in their hiring practices attract talents that are not only skilled but also environmentally responsible, an increasingly important factor among younger, sustainability-conscious professionals (Shrivastava et al., 2021). In Nigeria, this result is particularly relevant as the youth-dominated workforce becomes more aware of global environmental challenges, as green recruitment lays the foundation for strategic alignment with the Sustainable Development Goals on environmental consciousness.

Green performance management also demonstrated a statistically significant and positive effect on environmental sustainability. This underscores the importance of integrating environmental indicators, such as energy consumption, carbon emissions, and waste reduction, into employee performance evaluations. A performance system that aligns with sustainability priorities reinforces individual accountability and fosters a culture of environmental responsibility. In the Nigerian context, empirical evidence supports these findings, as Nwosu and Ofoegbu (2023) observed that green HR practices, particularly those linking environmental performance to appraisal outcomes, led to measurable improvements in sustainability performance across several manufacturing firms. These practices not only enhanced eco-conscious behaviour among employees but also strengthened organisational transparency and responsiveness to ecological risks. Furthermore, integrating environmental key performance indicators into performance management aligns individual and organisational actions with long-term sustainability goals (Ahmed & Bakare, 2022). Beyond accountability, green performance management encourages proactive environmental behaviour by clearly defining expectations and recognising sustainable achievements. Employees who are rewarded or acknowledged for reducing energy usage or minimising waste are more likely to internalise and sustain these behaviours (Shrivastava et al., 2021). This feedback loop creates a self-reinforcing culture where sustainability becomes a shared value rather than a compliance obligation. This result reinforces the findings of Ahmed and Bakare (2022) that firms using structured environmental performance systems experience greater cohesion between sustainability strategy and operational execution, increased corporate reputation, and greater stakeholder trust, as transparent environmental reporting demonstrates commitment to responsible business practices.

Conversely, green compensation was found to have a positive but statistically insignificant relationship with environmental sustainability, indicating that financial incentives alone may not be effective drivers of sustainable environmental performance behaviour in Nigeria‘s manufacturing sector. Several contextual factors may explain this outcome. First, many Nigerian manufacturing firms operate under weak institutional frameworks in which environmental compliance is poorly enforced, thereby reducing the strategic importance of sustainability-linked rewards (Ogiemwonyi et al., 2023). Second, the absence of standardised environmental performance metrics makes it difficult to fairly and transparently tie compensation to green outcomes. Amah and Ahiauzu (2022) note that without clear benchmarks, employees lack clarity on how their efforts contribute to sustainability objectives. Third, Nigeria's challenging economic landscape causes many employees to prioritise immediate financial needs over long-term ecological considerations, limiting the motivational power of green incentives. Findings from this study further show that green training and development have a statistically significant and positive relationship with environmental sustainability, highlighting the critical role of capacity building in driving sustainable practices. This finding aligns with the results of Fapohunda et al. (2022), who reported that structured green training programs in Nigerian manufacturing firms enhanced employee awareness of environmental risks, thereby improving performance in areas such as energy efficiency, pollution control, and resource conservation. Green training serves as a foundational mechanism for aligning employee competencies with organisational sustainability strategies,

particularly in sectors undergoing technological transitions, such as manufacturing. The positive relationship observed can be attributed to several underlying mechanisms. First, green training raises employees‘ environmental awareness, encouraging behavioural changes that support sustainable workplace practices (Renwick et al., 2013; Jabbour & De-Sousa, 2016). As employees become more conscious of the environmental impact of their actions, they are more likely to adopt energy-saving, waste-reducing, and recycling behaviours. Second, such training enhances employees' problem-solving and innovation capabilities, enabling them to identify and implement eco-friendly technologies and practices. This is especially crucial in industries facing pressure to innovate under environmental regulations.

## CONCLUSION AND RECOMMENDATIONS

This study examined the influence of green human resource management (GHRM) practices on environmental sustainability within Nigeria‘s manufacturing sector, a key driver of industrial growth and environmental impact. The empirical findings affirm that green recruitment, green performance management, and green training and development exert statistically significant and positive effects on environmental sustainability outcomes. Specifically, integrating technology into recruitment processes enables firms to attract candidates whose values align with environmental objectives, thereby strengthening organisational capacity for sustainability from the outset. Green performance management, operationalised using environmental key performance indicators, promotes individual accountability and embeds environmental considerations into employee appraisal systems, fostering a culture of environmental stewardship. Similarly, green training and development enhance employees‘ environmental awareness, competencies, and commitment, serving as a strategic mechanism to institutionalise sustainability within daily business operations. Conversely, green compensation demonstrated a positive but statistically insignificant relationship with environmental sustainability. This suggests that financial incentives, when implemented in isolation or without supporting institutional mechanisms, may not effectively motivate sustainable behaviour, particularly in economically constrained and weakly regulated contexts such as Nigeria. The findings underscore the need for a systemic, technology-driven approach to GHRM to advance sustainability goals.

### Limitations and Directions for Future Research

While this study significantly advances understanding of green human resources management practices for promoting environmental sustainability in Nigeria‘s manufacturing sector, several limitations merit scholarly attention. First, the study did not account for internal resistance to green transformation, particularly from mid-level managers or long-serving employees whose routines may conflict with newly adopted sustainability-oriented systems. Future research could examine how organisational inertia, cultural entrenchment, or role ambiguity can undermine the implementation and effectiveness of green human resources management practices, especially in sectors undergoing technological transitions. Second, the exclusive focus on formal HR mechanisms may understate the role of informal organisational dynamics, such as peer influence, informal learning, and managerial discretion, in shaping sustainable behaviour. Incorporating these informal elements could yield a more holistic understanding of how

sustainability norms diffuse within organisations, particularly in collectivist or relationship-oriented cultures like Nigeria's. Third, while the study explored the impact of green recruitment, it did not assess potential ethical or algorithmic biases arising from such systems, especially in contexts with weak data governance. Future research could examine the unintended consequences of digital green human resources management tools on fairness, inclusion, and sustainability, and how firms might balance automation with ethical recruitment. Finally, this study assumed that sustainability is universally valued within firms. However, ideological divergence, where sustainability is viewed as externally imposed or inconsistent with short-term business survival, may influence how GHRM practices are adopted. Future studies could investigate the politics of sustainability within organisations, particularly how leadership ideologies, union relations, and external pressures shape the perceived legitimacy and prioritisation of green HRM practices.

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