

ORIGINAL ARTICLE

Impact of green training and development on employee engagement at Nigeria Bottling Company Plc, Ikeja, Lagos State: an empirical analysis

Impacto de la formación y desarrollo en materia medioambiental en el compromiso de los empleados de Nigeria Bottling Company Plc, Ikeja, Estado de Lagos: un análisis empírico

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Abstract

This study examined the impact of green training and development on employee engagement in Nigeria Bottling Company Plc, Ikeja, Lagos State. Specific objectives included assessing the effects of environmental awareness training, skill-based green training, and green leadership and motivation programs on engagement. A descriptive survey design was adopted, targeting a population of 480 employees. A target sample of 214 employees was selected through simple random sampling, and 194 valid responses were analyzed. Data were collected through a structured 5-point Likert-scale questionnaire and analyzed using descriptive statistics, correlation, and simple linear regression in SPSS. Findings revealed that environmental awareness training explained 34.5% of engagement variance ($R^2 = 0.345$, $\beta = 0.587$, $p < 0.001$), skill-based green training accounted for 25.1% ($R^2 = 0.251$, $\beta = 0.501$, $p < 0.001$), and green leadership and motivation programs explained 39.6% ($R^2 = 0.396$, $\beta = 0.630$, $p < 0.001$). The study concluded that green training and development were positively associated with employee engagement and recommended sustaining awareness programs, investing in skill-based initiatives, and strengthening leadership support for sustainability.

Keywords green training and development, employee engagement, environmental awareness training, skill-based green training, green leadership

Resumen

Este estudio examinó el impacto de la capacitación y el desarrollo verde en el compromiso de los empleados de Nigeria Bottling Company Plc, en Ikeja, estado de Lagos. Los objetivos específicos incluyeron evaluar los efectos de la capacitación en conciencia ambiental, la capacitación verde basada en habilidades y los programas de liderazgo y motivación verde sobre el compromiso. Se adoptó un diseño de encuesta descriptiva dirigido a una población de 480 empleados. Se estableció una muestra objetivo de 214 empleados mediante muestreo aleatorio simple y se analizaron 194 respuestas válidas. Los datos se recopilaron mediante un cuestionario estructurado con escala Likert de 5 puntos y se analizaron con estadística descriptiva, correlación y regresión lineal simple en SPSS. Los resultados mostraron que la capacitación en conciencia ambiental explicó el 34,5 % de la varianza del compromiso ($R^2 = 0,345$, $\beta = 0,587$, $p < 0,001$), la capacitación verde basada en habilidades el 25,1 % ($R^2 = 0,251$, $\beta = 0,501$, $p < 0,001$) y los programas de liderazgo y motivación verde el 39,6 % ($R^2 = 0,396$, $\beta = 0,630$, $p < 0,001$). Se concluyó que la capacitación y el desarrollo verde se asociaron positivamente con el compromiso de los empleados.

Palabras clave capacitación y desarrollo verde, compromiso de los empleados, capacitación en conciencia ambiental, capacitación verde basada en habilidades, liderazgo verde.

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Introduction

Employee engagement has emerged as a critical dependent variable in contemporary organizational discourse, particularly within sustainability-driven workplaces. Organizations increasingly seek engaged employees because engagement is associated with stronger performance, commitment, and discretionary effort (Gede & Huluka, 2024). At the same time, environmental pressures have encouraged organizations to integrate sustainability principles into human resource practices (Adubor et al., 2022). Within this context, green training and development has gained prominence as a strategic approach for equipping employees with environmental knowledge and skills while strengthening their involvement in organizational sustainability goals (Amrutha & Geetha, 2021).

From an African perspective, employee engagement is especially relevant in organizations facing skills gaps, resource constraints, and the need for sustainable industrial growth. African organizations are gradually adopting green human resource management practices in response to environmental, regulatory, and stakeholder pressures (Adubor et al., 2022; Inegbedion, 2025). Green training and development can help align employee behavior with environmental objectives and reinforce responsible workplace practices (Bolanle et al., 2022).

In Nigeria, the manufacturing sector plays a significant role in economic development while facing increasing environmental scrutiny. Empirical work in Nigerian organizations indicates growing interest in green human resource management and its relationship with employee outcomes (Adigun, 2025; Adubor et al., 2022). Consequently, examining green training and development in Nigeria Bottling Company Plc, Ikeja, Lagos State, is timely because it provides organization-specific evidence on whether environmentally focused development initiatives are associated with employee engagement.

Employee engagement remains a challenge for many manufacturing firms, particularly in developing economies. Weak engagement can be reflected in lower enthusiasm, limited emotional attachment, and reduced willingness to contribute beyond formal job requirements. Recent studies continue to show that engagement is shaped by organizational support, leadership, culture, and development opportunities (Gede & Huluka, 2024; Priyanti et al., 2025). In sustainability-oriented settings, green training may add a further source of meaning and involvement by connecting employee development with environmental responsibility (Amrutha & Geetha, 2021).

Although organizations such as Nigeria Bottling Company Plc have introduced sustainability and training initiatives, there is limited organization-specific evidence on whether these efforts translate into higher employee engagement. Nigerian studies have examined green HRM and employee outcomes in other organizations and manufacturing contexts (Adigun, 2025; Bolanle et al., 2022), but evidence focused on the Ikeja operation of Nigeria Bottling Company Plc remains limited. This study addresses that gap by empirically examining the impact of green training and development on employee engagement in the organization.

Green Training and Development refers to the systematic process through which organizations equip employees with the knowledge, skills, and attitudes required to adopt environmentally sustainable workplace practices. It links learning and development with environmental objectives such as waste reduction, energy conservation, resource efficiency, and responsible work behavior. Evidence shows that green training can support environmental capabilities, green behavior, and broader sustainability outcomes (Amrutha & Geetha, 2021; Barakat et al., 2023; Sun et al., 2024).

Environmental Awareness Training focuses on employees' understanding of environmental problems and the consequences of workplace decisions, while Skill-Based Green Training emphasizes

practical competencies needed to apply sustainable techniques. Awareness programs help employees recognize environmental responsibilities; skill-based programs translate that awareness into operational practices such as efficient resource use, waste reduction, and environmentally responsible problem-solving (Barakat et al., 2023; Sun et al., 2024). Continuous green development reinforces these competencies through recurring learning and adaptation as technologies and environmental standards evolve (Yadav & Mathew, 2023).

Employee Engagement refers to employees' psychological connection with their work and organization, reflected in involvement, commitment, enthusiasm, and willingness to contribute to organizational objectives. Engaged employees tend to demonstrate stronger performance and organizational participation (Gede & Huluka, 2024). Within green HRM, training can strengthen engagement by providing employees with relevant competencies and by signaling that the organization invests in their development and in meaningful sustainability goals (Amrutha & Geetha, 2021; Adigun, 2025).

The Resource-Based View (RBV) provides a strategic explanation for this relationship. Barney (1991) argues that valuable, rare, inimitable, and non-substitutable resources can support sustained competitive advantage. In this study, green knowledge and competencies developed through training are treated as intangible human-capital resources that can strengthen employee contribution and organizational sustainability.

Social Exchange Theory (Blau, 1964) complements the RBV by emphasizing reciprocity: when employees perceive organizational investment in their development, they may respond with stronger engagement and commitment. Herzberg's Two-Factor Theory also supports the model by identifying achievement, recognition, responsibility, and growth as motivational factors; green development programs can provide such opportunities by expanding employees' competencies and participation in sustainability initiatives (Herzberg et al., 1959).

Taken together, these perspectives explain why green training may influence engagement through both capability development and perceived organizational support. The present study therefore examines three dimensions—environmental awareness training, skill-based green training, and green leadership and motivation programs—as predictors of employee engagement. This framework retains the strategic resource logic of RBV, the reciprocity mechanism of Social Exchange Theory, and the motivational emphasis of Herzberg's theory.

Methodology

This study adopts a descriptive survey research design to examine the impact of green training and development on employee engagement at Nigeria Bottling Company Plc, Ikeja, Lagos State. The design is appropriate because it enables the researcher to collect quantitative data from a defined population and analyze employees' perceptions regarding green training initiatives and their level of engagement within the organization.

The population of the study consists of all employees of Nigeria Bottling Company Plc, Ikeja, Lagos State, comprising both managerial and non-managerial staff. The total population for this study is 480 employees. This population is considered suitable because all categories of staff are directly or indirectly exposed to training and development programs implemented by the organization.

A target sample of 214 employees was used for the study. Respondents were selected through simple random sampling so that eligible employees had an equal opportunity to participate. Of the 214 questionnaires administered, 194 valid responses were obtained and analyzed, representing a 90.7% valid response rate. The

originally reported target of 214 is retained as the field sample; no Yamane calculation is asserted because, for a population of 480 at a 5% error level, that formula would yield a different value.

The study employed a structured questionnaire as the primary instrument for data collection. The questionnaire covered respondents' demographic characteristics, green training and development practices (environmental awareness training, skill-based green training, and green leadership and motivation programs), and employee engagement. Responses were measured on a 5-point Likert scale ranging from strongly disagree to strongly agree. The instrument was informed by the green HRM and employee-engagement literature cited in the study. However, pilot-test results, formal validity indices, factor-validation statistics, and reliability coefficients for the final scales were not reported; consequently, no unverified reliability statistic is introduced in this article, and this should be considered when interpreting the findings.

Data collected were analyzed using both descriptive and inferential statistical techniques. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize respondents' characteristics and responses. Inferential statistics, including correlation and regression analysis, were employed to test the relationship and effect of green training and development on employee engagement. The analysis was conducted using the Statistical Package for the Social Sciences (SPSS).

Ethical issues were addressed through voluntary participation, confidentiality, anonymity, informed consent, and the right to withdraw at any stage. Respondents were informed that the information collected would be used solely for academic purposes. No formal ethics committee approval identifier was reported for this non-interventional organizational survey; accordingly, none is claimed in this article. Where institutional ethics approval is required by the authors' institution, the corresponding approval or exemption should be documented in the journal record.

Result and Discussion

Two hundred and fourteen (214) employees of Nigeria Bottling Company Plc, Ikeja were sampled, out of which 194 were valid responses, which gives a 90.7% response rate. The socio-demographic profile shows a fairly balanced gender distribution, with females (52.1%) slightly more than males (47.9%). Respondents were largely young, as most fell within the 20–24 years (47.9%) and 25–29 years (31.4%) age brackets, indicating a youthful workforce. A high proportion were single (76.3%), reflecting the age structure of the sample. In terms of education, most respondents possessed postgraduate diplomas (30.9%) or OND/Diploma/NCE qualifications (27.8%), suggesting moderate to high educational attainment. Length of service was mostly between 5–9 years (45.9%), indicating reasonable organizational experience among respondents.

The regression model summary (Table 1) indicates that environmental awareness training accounts for a meaningful proportion of the variation in employee engagement at Nigeria Bottling Company Plc, Ikeja, Lagos State.

Table 1. Model summary for the impact of Environmental Awareness Training on Employee Engagement at Nigeria Bottling Company Plc, Ikeja, Lagos State

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.587 ^a	0.345	0.341	0.34991

The correlation coefficient for the simple regression ($R = 0.587$) indicates a moderately strong positive association between environmental awareness training and employee engagement. The coefficient of determination ($R^2 = 0.345$) indicates that environmental awareness training accounts for 34.5% of the variance in employee engagement in this model. The adjusted R^2 (0.341) is close to R^2 , suggesting limited shrinkage after adjustment

for sample size. The standard error of the estimate is 0.34991.

The ANOVA result shows that the simple regression model for Environmental Awareness Training and Employee Engagement is statistically significant. The regression sum of squares is 12.373 and the residual sum of squares is 23.508, with $F(1, 192) = 101.056$, $p < 0.001$ (Table 2).

Table 2. ANOVA for the impact of Environmental Awareness Training on Employee Engagement at Nigeria Bottling Company Plc, Ikeja, Lagos State

Model	Model	Sum of squares	df	Mean square	F	Sig.
1	Regression	12.373	1	12.373	101.056	< .001b
1	Residual	23.508	192	0.122		
1	Total	35.881	193			

The coefficient of determination ($R^2 = 0.345$) indicates that 34.5% of the variance in employee engagement is accounted for by environmental awareness training in the simple regression model. The model is statistically significant, $F(1, 192) = 101.056$, $p < 0.001$; therefore, the null hypothesis of no linear association is rejected.

The coefficient results in Table 3 indicate a statistically significant positive association between Environmental Awareness Training and Employee Engagement at Nigeria Bottling Company Plc, Ikeja.

Table 3. Coefficients for the impact of Environmental Awareness Training on Employee Engagement at Nigeria Bottling Company Plc, Ikeja, Lagos State

Coefficients ^a	Coefficients ^a	Coefficient sa	Coefficients ^a	Coefficients ^a	Coefficient sa	Coefficient tsa
Model	Model	Unstandardized Coefficients	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
Model	Model	B	Std. Error	Beta	t	Sig.
1	(Constant)	1.914	0.202		9.481	< .001
1	Environmental Awareness Training	0.484	0.048	0.587	10.053	< .001

The unstandardized coefficient ($B = 0.484$) indicates that a one-unit increase in Environmental Awareness Training is associated with an estimated 0.484-unit increase in employee engagement in this simple regression model. The standardized coefficient ($\beta = 0.587$), $t = 10.053$, $p < 0.001$, confirms a statistically significant positive relationship.

Table 4. Model summary for the impact of Skill-Based Green Training on Employee Engagement at Nigeria Bottling Company Plc

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.501 ^a	0.251	0.247	0.37406
a. Predictors: (Constant), Skill-Based Green Training	a. Predictors: (Constant), Skill-Based Green Training	a. Predictors: (Constant), Skill-Based Green Training	a. Predictors: (Constant), Skill-Based Green Training	a. Predictors: (Constant), Skill-Based Green Training

The regression model summary (Table 4) shows a moderate positive association between skill-based green training and employee engagement ($R = 0.501$). The R^2 value of 0.251 indicates that skill-based green training accounts for 25.1% of the variance in engagement in this simple regression model. The adjusted R^2 is 0.247 and the standard error of the estimate is 0.37406.

Table 5. ANOVA for the impact of Skill-Based Green Training on Employee Engagement at Nigeria Bottling Company Plc

ANOVA ^a	ANOVA ^a	ANOVA ^a	ANOVA ^a	ANOVA ^a	ANOVA ^a	ANOVA ^a
Model	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.015	1	9.015	64.430	< .001b
1	Residual	26.865	192	.140		
1	Total	35.881	193			
a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement

ANOVAa	ANOVAa	ANOVAa	ANOVAa	ANOVAa	ANOVAa	ANOVAa
b. Predictors: (Constant), Skill-Based Green Training	b. Predictors: (Constant), Skill-Based Green Training	b. Predictors: (Constant), Skill-Based Green Training	b. Predictors: (Constant), Skill-Based Green Training	b. Predictors: (Constant), Skill-Based Green Training	b. Predictors: (Constant), Skill-Based Green Training	b. Predictors: (Constant), Skill-Based Green Training

The ANOVA results in Table 5 show that the simple regression model for skill-based green training and employee engagement is statistically significant, $F(1, 192) = 64.430$, $p < 0.001$. The regression sum of squares is 9.015 and the residual sum of squares is 26.865. Therefore, the null hypothesis of no linear association is rejected.

The coefficient results in Table 6 indicate that skill-based green training has a statistically significant positive association with employee engagement. The unstandardized coefficient ($B = 0.365$) indicates that a one-unit increase in skill-based green training is associated with an estimated 0.365-unit increase in engagement. The standardized coefficient is $\beta = 0.501$, $t = 8.027$, $p < 0.001$.

Table 6. Coefficients for the impact of Skill-Based Green Training on Employee Engagement at Nigeria Bottling Company Plc

Coefficientsa	Coefficientsa	Coefficient sa	Coefficientsa	Coefficientsa	Coefficient sa	Coefficient tsa
Model	Model	Unstandardized Coefficients	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
Model 1	Model (Constant)	B	Std. Error	Beta	t	Sig.
1	Skill-Based Green Training	.365	.045	.501	8.027	< .001
a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement

Hypothesis 3

Table 7. Model summary for the impact of Green Leadership and Motivation Programs on Employee Engagement at Nigeria Bottling Company Plc

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.630a	.396	.393	.33586
a. Predictors: (Constant), Green Leadership and Motivation Programs	a. Predictors: (Constant), Green Leadership and Motivation Programs	a. Predictors: (Constant), Green Leadership and Motivation Programs	a. Predictors: (Constant), Green Leadership and Motivation Programs	a. Predictors: (Constant), Green Leadership and Motivation Programs

The model summary in Table 7 indicates a moderately strong positive association between green leadership and motivation programs and employee engagement ($R = 0.630$). The R^2 value of 0.396 indicates that 39.6% of the variance in employee engagement is accounted for by this predictor in the simple regression model. The adjusted R^2 is 0.393 and the standard error of the estimate is 0.33586.

Table 8. ANOVA for the impact of Green Leadership and Motivation Programs on Employee Engagement at Nigeria Bottling Company Plc

ANOVAa	ANOVAa	ANOVAa	ANOVAa	ANOVAa	ANOVAa	ANOVAa
Model	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.223	1	14.223	126.092	< .001b
1	Residual	21.657	192	.113		
1	Total	35.881	193			
a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement
b. Predictors: (Constant), Green Leadership and Motivation Programs	b. Predictors: (Constant), Green Leadership and Motivation Programs	b. Predictors: (Constant), Green Leadership and Motivation Programs	b. Predictors: (Constant), Green Leadership and Motivation Programs	b. Predictors: (Constant), Green Leadership and Motivation Programs	b. Predictors: (Constant), Green Leadership and Motivation Programs	b. Predictors: (Constant), Green Leadership and Motivation Programs

The ANOVA results in Table 8 confirm that the simple regression model for green leadership and motivation programs is statistically significant. The regression sum of squares is 14.223 and the residual sum of squares is 21.657, yielding $F(1, 192) = 126.092$, $p < 0.001$. Therefore, the null hypothesis of no linear association between green leadership and motivation programs and employee engagement is rejected.

Table 9. Coefficients for the impact of Green Leadership and Motivation Programs on Employee Engagement at Nigeria Bottling Company Plc

Coefficientsa	Coefficientsa	Coefficient sa	Coefficientsa	Coefficientsa	Coefficient sa	Coefficient tsa
Model	Model	Unstandardized Coefficients	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
Model 1	Model (Constant)	B	Std. Error	Beta	t	Sig.
1	Green Leadership and Motivation Programs	.573	.051	.630	11.229	< .001
a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement	a. Dependent Variable: Employee Engagement

The coefficient results in Table 9 indicate a strong positive association between green leadership and motivation programs and employee engagement. The unstandardized coefficient ($B = 0.573$) indicates that a one-unit increase in green leadership and motivation programs is associated with an estimated 0.573-unit increase in engagement. The standardized coefficient is $\beta = 0.630$, $t = 11.229$, $p < 0.001$.

Table 10. Correlation analysis for Green Training and Development dimensions and Employee Engagement at Nigeria Bottling Company Plc, Ikeja, Lagos State

Correlations	Correlations	Correlations	Correlations	Correlations	Correlations
		Environmental Awareness Training	Skill-Based Green Training	Green Leadership and Motivation Programs	Employee Engagement
Environmental Awareness Training	Correlation Coefficient	1.000	.532**	.591**	.587**
Environmental Awareness Training	Sig. (2-tailed)	.	< .001	< .001	< .001
Environmental Awareness Training	N	194	194	194	194
Skill-Based Green Training	Correlation Coefficient	.532**	1.000	.653**	.501**
Skill-Based Green Training	Sig. (2-tailed)	< .001	.	< .001	< .001
Skill-Based Green Training	N	194	194	194	194
Green Leadership and Motivation Programs	Correlation Coefficient	.591**	.653**	1.000	.630**
Green Leadership and Motivation Programs	Sig. (2-tailed)	< .001	< .001	.	< .001
Green Leadership and Motivation Programs	N	194	194	194	194
Employee Engagement	Correlation Coefficient	.587**	.501**	.630**	1.000
Employee Engagement	Sig. (2-tailed)	< .001	< .001	< .001	.
Employee Engagement	N	194	194	194	194
**. Correlation is significant at the 0.01 level (2-tailed).		**. Correlation is significant at the 0.01 level (2-tailed).		**. Correlation is significant at the 0.01 level (2-tailed).	

The correlation analysis in Table 10 is aligned with the three simple regression models. Environmental awareness training is positively correlated with employee engagement ($r = 0.587$, $p < 0.001$), while skill-based green training is also positively related to engagement ($r = 0.501$, $p < 0.001$).

Green leadership and motivation programs show the strongest bivariate association with employee engagement ($r = 0.630$, $p < 0.001$). The three green-training dimensions are also positively intercorrelated. Overall, the results indicate that all three dimensions are positively and statistically associated with employee engagement, with green leadership and motivation programs showing the strongest association.

The findings of this study reveal that green training and development practices have a significant and positive relationship with employee engagement at Nigeria Bottling Company Plc, Ikeja, Lagos State. Environmental awareness training demonstrated a moderately strong positive association with employee engagement, suggesting that employees who are better informed about environmental issues may feel more connected to sustainability-oriented organizational goals. This finding is consistent with evidence that green training can strengthen environmentally oriented employee attitudes and behavior (Amrutha & Geetha, 2021; Barakat et al., 2023) and with Nigerian research linking green HRM practices to employee engagement (Adigun, 2025; Bolanle et al., 2022).

Similarly, skill-based green training was positively and statistically associated with employee engagement, although its explanatory power was lower than that of environmental awareness training and green leadership initiatives. Practical green competencies can increase employees' capacity to participate in sustainability initiatives, particularly when organizational conditions reinforce the application of acquired skills. This interpretation is consistent with recent evidence on green training, workplace green performance, and sustainable organizational outcomes (Sun et al., 2024; Yadav & Mathew, 2023).

Among the dimensions examined, green leadership and motivation programs showed the strongest association with employee engagement. This supports the view that leadership commitment and motivational support can shape employees' responses to sustainability initiatives. When leaders visibly support green values and recognize employee contributions, employees may reciprocate with higher involvement and commitment, consistent with Social Exchange Theory and with recent literature linking leadership, organizational culture, and employee engagement (Priyanti et al., 2025).

Although the regression models were statistically significant, a substantial proportion of variance in employee engagement remains unexplained, indicating that organizational culture, reward systems, job design, work-life balance, and other factors may also contribute to engagement. The cross-sectional, self-reported design does not establish causality, and the absence of reported scale-reliability and formal validation statistics limits the strength of measurement claims. Future research should validate the instrument psychometrically, use multivariable models to estimate the simultaneous contribution of the three predictors, and replicate the study in other manufacturing organizations.

Conclusions

The empirical results confirm that environmental awareness training, skill-based green training, and green leadership programs each exert a statistically significant and positive influence on employee engagement at Nigeria Bottling Company. Among these, green leadership and motivation programs emerged as the strongest predictors, underscoring the critical role of managerial support in translating sustainability goals into workforce commitment. Awareness training enhances engagement by harmonizing personal values with corporate environmental objectives, while skill-based training equips employees with practical competencies to perform eco-responsible tasks effectively. Collectively, these findings establish green training and development as a strategic lever—not merely for environmental performance, but for cultivating a motivated and dedicated workforce.

To capitalize on these results, management should sustain and expand regular environmental education through workshops and continuous learning platforms, while also investing in hands-on, role-specific green skills training to ensure practical application and improved performance. Given the pronounced impact of leadership, managers must actively model sustainable behaviors and strengthen recognition, rewards, and incentives tied to green initiatives. Finally, as unexplained variance remains, future research should incorporate organizational culture, reward systems, and job satisfaction, and extend the scope to other manufacturing sectors in Nigeria to improve generalizability and deepen the understanding of green human resource practices.

References

- Adigun, U. O. (2025). Green human resource management and employee engagement in Nigeria-German chemical, Ota, Ogun state, Nigeria. *Journal of Perspectives in Management*, 9. <https://doi.org/10.51359/2594-8040.2025.264809>
- Aduor, N. V., Adeniji, A. A., Salau, O. P., Olajugba, O. J., & Onibudo, G. O. (2022). Exploring green human resource adoption and corporate sustainability in Nigerian manufacturing industry. *Sustainability*, 14(19), 12635. <https://doi.org/10.3390/su141912635>
- Amrutha, V. N., & Geetha, S. N. (2021). Linking organizational green training and voluntary workplace green behavior: Mediating role of green supporting climate and employees' green satisfaction. *Journal of Cleaner Production*, 290, 125876. <https://doi.org/10.1016/j.jclepro.2021.125876>
- Barakat, B., Milhem, M., Naji, G. M. A., Alzoraiki, M., Muda, H. B., Ateeq, A., & Abro, Z. (2023). Assessing the impact of green training on sustainable business advantage: Exploring the mediating role of green supply chain practices. *Sustainability*, 15(19), 14144. <https://doi.org/10.3390/su151914144>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Bilal, M. A., & Khan, A. B. (2025). The impact of green training on employee performance: Mediating role of green motivation and green innovation: Evidence from public health sector of Pakistan. *Journal of Political Stability Archive*, 3(1), 436–458.
- Blau, P. M. (1964). *Exchange and power in social life*. Wiley.
- Bolanle, B. P., Ebegu, I., Odunayo, S. P., Kelechi, C. C., & Efeomo, I. S. (2022). Crystallising green training and development practices on employee behavioural outcomes in the manufacturing sector. *Academy of Strategic Management Journal*, 21(5), 1–16.
- Gede, D. U., & Huluka, A. T. (2024). Effects of employee engagement on organizational performance: Case of public universities in Ethiopia. *Future Business Journal*, 10, 32. <https://doi.org/10.1186/s43093-024-00315-7>
- Herzberg, F., Mausner, B., & Snyderman, B. B. (1959). *The motivation to work* (2nd ed.). Wiley.
- Inegbedion, D. (2025). Green human resource management: A literature review and identifying gaps. *AJBMSS - Advance Journal of Business Management and Social Sciences*, 1(2), 1–15.

- <https://doi.org/10.65080/ajbmss.v1i2.22>
- Lin, C.-P., Chiu, C.-K., & Wu, P.-F. (2025). Modeling workplace green performance: Mediation of green learning goal orientation and moderation of problem-based learning. *Asian Business & Management*, 24, 631–651. <https://doi.org/10.1057/s41291-025-00296-7>
- Makumbe, W. (2024). Green human resources management and green performance: A mediation–moderation mechanism for green innovation and green knowledge sharing. *Sustainability*, 16(24), 10849. <https://doi.org/10.3390/su162410849>
- Murdiono, J., Hamidah, H., & Sariwulan, R. T. (2025). Improvement of green behavior and green training on company sustainability mediated by employee engagement. *Journal of Management World*, 2025(1), 626–634. <https://doi.org/10.53935/jomw.v2024i4.753>
- Priyanti, I. A. D., Nisa', Z., & Yuniawan, A. (2025). Transformational leadership, organizational culture, and employee engagement: A systematic literature review. *Economic and Business Horizon*, 4(2), 311–318. <https://doi.org/10.54518/ebh.4.2.2025.675>
- Sun, H., Bahizire, G. M., Pea-Assounga, J. B. B., & Chen, T. (2024). Enhancing employee green performance through green training: The mediating influence of organizational green culture and work ethic in the mining sector. *Journal of Cleaner Production*, 449, 141105. <https://doi.org/10.1016/j.jclepro.2024.141105>
- Yadav, P., & Mathew, J. (2023). Improving organizational sustainable performance of organizations through green training. *International Journal of Social Ecology and Sustainable Development*, 14(1), 1–11. <https://doi.org/10.4018/IJSESD.321166>
- Yuan, Y., Ren, S., Tang, G., Ji, H., Cooke, F. L., & Wang, Z. (2024). How green human resource management affects employee voluntary workplace green behaviour: An integrated model. *Human Resource Management Journal*, 34(1), 91–121. <https://doi.org/10.1111/1748-8583.12510>
- Yong, J. Y., Yusliza, M.-Y., Ramayah, T., Chiappetta Jabbour, C. J., Sehnem, S., & Mani, V. (2020). Pathways towards sustainability in manufacturing organizations: Empirical evidence on the role of green human resource management. *Business Strategy and the Environment*, 29(1), 212–228. <https://doi.org/10.1002/bse.2359>

Conflicts of interest

The authors declare that they have no conflicts of interest.

Author contribution

Conceptualization: Ademola, S. and Arowolo, A. Data curation: Ademola, S. and Arowolo, A. Formal analysis: Ademola, S. and Arowolo, A. Investigation: Ademola, S. and Arowolo, A. Methodology: Ademola, S. and Arowolo, A. Supervision: Ademola, S. and Arowolo, A. Validation: Ademola, S. and Arowolo, A. Visualization: Ademola, S. and Arowolo, A. Writing—original draft: Ademola, S. and Arowolo, A. Writing—review and editing: Ademola, S. and Arowolo, A.

Data availability statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Statement on the use of AI

The authors acknowledge the use of generative AI and AI-assisted technologies to improve the readability and clarity of the article.

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