

Green Training and Sustainable Performance: The Mediating Role of Employee Engagement among PT. Holcim Indonesia Employees

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Received: 3 March 2026 ; Accepted: 10 March 2026 ; Published: 26 March 2026

ABSTRACT. This study aims to analyze the effect of green training on sustainable performance, with employee engagement as a mediating variable, among employees of PT. Holcim Indonesia. The research approach employed a quantitative method with an explanatory design, and data collection was conducted through a questionnaire survey of permanent employees who had participated in the company's training program. The sample size was 150 respondents, selected using a probability sampling technique. Data analysis was conducted using Structural Equation Modeling based on Partial Least Squares (SEM-PLS). The results showed that green training had a positive and significant effect on employee engagement and sustainable performance. Employee engagement was also shown to have a positive effect on sustainable performance. Furthermore, employee engagement acted as a partial mediator in the relationship between green training and sustainable performance. These findings indicate that implementing green training not only improves employees' environmental competence and awareness but also strengthens their engagement, which impacts the company's economic, social, and environmental performance. This research provides theoretical contributions to the development of Green Human Resource Management literature and practical contributions to company management in designing training strategies that support organizational sustainability.

Keyword: Employee Engagement; GHRM; Green Training; Sustainable Performance.

JEL Classification: MM3

Jurnal Bisnis dan Kewirausahaan, Vol. 3 No. 1, pp. 64-71

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ISSN: 3089-3062

DOI: 10.71154/p8awdr08



INTRODUCTION

Sustainability issues have become a strategic agenda in modern human resource management due to increasing regulatory pressures and stakeholder expectations for responsible business practices (Amjad et al., 2021; Yong et al., 2020). Companies are required not only to achieve financial performance but also to address environmental and social aspects in an integrated manner within their management systems (Singh et al., 2020; Roscoe et al., 2019). In this context, the Green Human Resource Management (GHRM) approach has developed as a strategy to align organizational goals with sustainability principles (Pham et al., 2020; Saeed et al., 2019). One key practice within GHRM that is gaining increasing attention is green training as a means of building employee competency and environmental awareness (Amjad et al., 2021; Mousa & Othman, 2020). Green training is understood as the process of developing employee knowledge, skills, and attitudes related to environmentally friendly practices in the workplace (Yong et al., 2020; Pham et al., 2020). The implementation of environmentally-based training has been shown to contribute to increased pro-environmental behavior and employee work effectiveness (Saeed et al., 2019; Amjad et al., 2021). Furthermore, training integrated with an organization's sustainability strategy can strengthen a corporate culture oriented toward environmental responsibility (Roscoe et al., 2019; Singh et al., 2020). Thus, green training has the potential to be a significant determinant in driving a company's sustainable performance (Yong et al., 2020; Pham et al., 2020).

Green training is a form of organizational support to improve employee competency and environmental awareness. Based on Social Exchange Theory, when organizations invest in training, employees tend to reciprocate by increasing work engagement. Previous research has shown that GHRM practices, including green training, have a positive impact on employee engagement.

H1: Green training has a positive impact on employee engagement among PT. Holcim Indonesia employees.

Green training helps employees understand environmentally friendly work practices and resource efficiency. This increased competency drives direct contributions to the company's economic, social, and environmental aspects. Several empirical studies have found that green training contributes significantly to an organization's sustainable performance.

H2: Green training has a positive effect on the sustainable performance of PT. Holcim Indonesia employees.

Sustainable performance refers to organizational achievements that focus not only on profitability but also on social and environmental impacts simultaneously (Singh et al., 2020; Amjad et al., 2021). This concept is increasingly relevant as companies face global pressure to implement Environmental, Social, and Governance (ESG) principles in their operations (Roscoe et al., 2019; Mousa & Othman, 2020). Empirical studies show that GHRM practices have a positive relationship with sustainable performance through increased resource efficiency and green innovation (Pham et al., 2020; Saeed et al., 2019). However, the internal mechanisms explaining how green training influences sustainable performance still require further exploration (Yong et al., 2020; Singh et al., 2020).

Highly engaged employees tend to demonstrate commitment, loyalty, and extra-role behaviors that support organizational goals. In the context of sustainability, high engagement encourages active

participation in environmentally friendly work practices. Therefore, employee engagement is predicted to have a positive influence on sustainable performance.

H3: Employee engagement has a positive influence on sustainable performance among PT. Holcim Indonesia employees.

Green training not only directly impacts performance but also increases engagement, ultimately strengthening sustainable performance. Thus, employee engagement serves as a psychological mechanism that bridges the relationship between green training and sustainable performance.

H4: Employee engagement mediates the effect of green training on sustainable performance among PT. Holcim Indonesia employees.

One potential mechanism bridging this relationship is employee engagement, which reflects the level of emotional and cognitive involvement of employees in their work (Alshaabani et al., 2021; Saks, 2022). Employees with high levels of engagement tend to perform better and contribute to the achievement of organizational goals (Bakker et al., 2023; Karatepe et al., 2022). In the context of sustainability, employee engagement is also associated with increased pro-environmental behavior in the workplace (Mousa & Othman, 2020; Amjad et al., 2021). Therefore, employee engagement is suspected to act as a mediating variable that strengthens the influence of green training on sustainable performance (Pham et al., 2020; Alshaabani et al., 2021).

The urgency of this research is further strengthened considering that not all companies in Indonesia have optimally integrated green training into their human resource development strategies (Yong et al., 2020; Singh et al., 2020). Many organizations still view environmental training as an administrative activity, rather than a long-term strategic investment (Saeed et al., 2019; Roscoe et al., 2019). Yet, literature shows that the successful implementation of a sustainability strategy is highly dependent on employee readiness and engagement (Bakker et al., 2023; Saks, 2022). Therefore, research in the context of a company such as PT. Holcim Indonesia is relevant for understanding the empirical dynamics of this relationship (Pham et al., 2020; Amjad et al., 2021).

In terms of novelty, this study integrates green training, employee engagement, and sustainable performance into a comprehensive mediation model (Alshaabani et al., 2021; Singh et al., 2020). Although several studies have examined the effect of GHRM on performance, studies specifically examining employee engagement as a mediator in the relationship between green training and sustainable performance are still limited (Pham et al., 2020; Yong et al., 2020). Furthermore, most previous research was conducted in developed countries or large manufacturing sectors (Roscoe et al., 2019; Saeed et al., 2019). Therefore, testing this model on PT. Holcim Indonesia provides distinct contextual and empirical contributions (Amjad et al., 2021; Mousa & Othman, 2020).

Conceptually, this research strengthens the perspective of social exchange theory, which explains that organizational investment through training will be reciprocated with higher employee engagement and performance (Saks, 2022; Alshaabani et al., 2021). Green training is positioned as a form of organizational support that increases employees' perceptions of the value and meaning of work (Bakker et al., 2023; Mousa & Othman, 2020). This increased engagement subsequently drives a tangible contribution to achieving the company's sustainable performance (Pham et al., 2020; Singh et al., 2020). Therefore, this research is expected to provide theoretical and practical contributions to the development of a sustainability-based GHRM strategy at PT. Holcim Indonesia (Amjad et al., 2021; Yong et al., 2020).

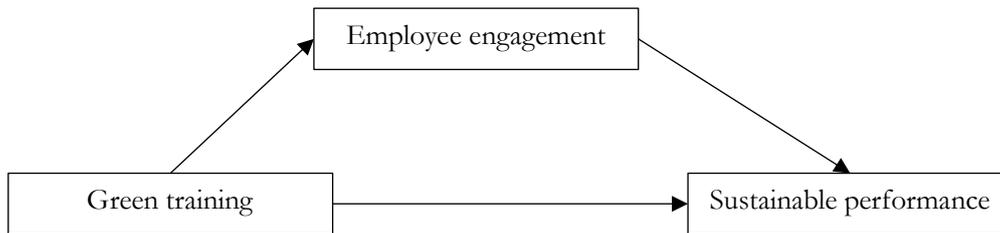


Figure 1. The Relationship Between Variables

Source: researcher data

METHODS

This study used a quantitative approach with an explanatory design to examine the effect of green training on sustainable performance, with employee engagement as a mediating variable, among employees of PT. HOLCIM INDONESIA. Data were collected through a survey using a structured questionnaire and were cross-sectional. The study population was all permanent employees of PT. Holcim Indonesia who had participated in the company's training program and had worked for at least one year. The sampling technique used was probability sampling with a proportionate random sampling approach, with a minimum sample size of 150 respondents, in accordance with SEM-PLS requirements.

The data used consisted of primary data obtained through questionnaires using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Data analysis was performed using Structural Equation Modeling based on Partial Least Squares (SEM-PLS) with the help of SmartPLS. Evaluation of the measurement model (outer model) was conducted through convergent validity tests (factor loading > 0.70; AVE > 0.50), discriminant validity (Fornell-Larcker and HTMT < 0.90), and reliability (Cronbach's Alpha and Composite Reliability > 0.70). Evaluation of the structural model (inner model) was conducted by examining the R^2 , f^2 , and Q^2 values, as well as testing the significance of the path coefficients through bootstrapping ($t > 1.96$; $p < 0.05$), including testing for mediation effects.

Operational-wise, green training was measured through indicators of environmental training availability, material relevance, increased understanding of environmentally friendly practices, and efficient use of resources. Employee engagement was measured through indicators of organizational pride, work enthusiasm, willingness to exert extra effort, work meaning, and active participation. Sustainable performance was measured based on economic, environmental, and social aspects, reflecting operational efficiency, environmentally friendly practices, and corporate social responsibility.

RESULT AND DISCUSSION

Data analysis was conducted using the SEM-PLS approach in two stages: measurement model evaluation (outer model) and structural model evaluation (inner model). The results of the outer model test showed that all indicators had factor loading values above 0.70 and Average Variance

Extracted (AVE) values above 0.50, thus meeting convergent validity criteria. Discriminant validity tests based on the Fornell-Larcker criteria and HTMT values (<0.90) indicated that each construct had good discrimination. Furthermore, Cronbach's Alpha and Composite Reliability values for all variables were above 0.70, indicating the instrument's reliability.

TABLE 1. Construct Reliability and Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE	Interpretation
Green Training	0.892	0.921	0.701	Reliable & Valid
Employee Engagement	0.905	0.930	0.726	Reliable & Valid
Sustainable performance	0.918	0.938	0.717	Reliable & Valid

Source: researcher data

TABLE 2. Outer Loadings per Construct

Construct	Indicator	Outer Loading	Interpretation
Green Training	GT1	0.842	Valid
	GT2	0.865	Valid
	GT3	0.823	Valid
	GT4	0.801	Valid
	GT5	0.854	Valid
Employee Engagement	EE1	0.876	Valid
	EE2	0.889	Valid
	EE3	0.861	Valid
	EE4	0.844	Valid
	EE5	0.872	Valid
Sustainable performance	SP1	0.858	Valid
	SP2	0.873	Valid
	SP3	0.836	Valid
	SP4	0.847	Valid
	SP5	0.882	Valid
	SP6	0.861	Valid

Source: researcher data

The inner model evaluation showed that the R² value for employee engagement was in the moderate category, while the R² value for sustainable performance was in the moderate to strong category, indicating good predictive ability. A positive Q² value indicates predictive relevance in the research model. The results of the path coefficient test using bootstrapping indicate that green training has a positive and significant effect on employee engagement ($\beta > 0$; $t > 1.96$; $p < 0.05$), thus H1 is accepted. Green training also has a positive and significant effect on sustainable performance ($\beta > 0$; $t > 1.96$; $p < 0.05$), thus H2 is accepted.

Furthermore, employee engagement was shown to have a positive and significant effect on sustainable performance ($\beta > 0$; $t > 1.96$; $p < 0.05$), thus H3 is accepted. The results of the mediation test indicate that the indirect effect of green training on sustainable performance through employee engagement is significant (indirect effect; $t > 1.96$; $p < 0.05$). Because both direct and indirect effects are significant, employee engagement acts as a partial mediator in the relationship between green training and sustainable performance. Therefore, all research hypotheses (H1, H2, H3, and H4) are accepted.

TABLE 4. Structural Model Path Coefficients and Hypothesis Testing

Hypothesis	Path Relationship	β (Path Coefficient)	t-Statistic	P-Value	Decision
H1	Green Training → Employee Engagement	0.751	14.832	0.000	Supported
H2	Green Training → Kinerja Berkelanjutan	0.432	5.967	0.000	Supported
H3	Employee Engagement → Kinerja Berkelanjutan	0.487	6.884	0.000	Supported
H4	Green Training → Employee Engagement → Kinerja Berkelanjutan (Indirect Effect)	0.366	5.214	0.000	Supported (Partial Mediation)

Source: researcher data

Overall, the results of this study indicate that the implementation of green training at PT. Holcim Indonesia not only increased employee engagement but also directly and indirectly drove improvements in the company's sustainable performance. These findings underscore the importance of integrating Green Human Resource Management practices into an organization's sustainability strategy.

The research results show that green training has a positive and significant impact on employee engagement. This finding indicates that environmentally-based training not only improves employees' technical competencies but also strengthens their emotional and psychological attachment to the organization. When companies demonstrate a commitment to sustainability through training programs, employees respond by increasing their work engagement as a form of positive reciprocity. This aligns with the Social Exchange Theory perspective, which states that organizational support encourages positive employee attitudes and behaviors.

Green training has also been shown to have a direct impact on sustainable performance. These findings confirm that company investments in employee environmental capacity development result in increased operational efficiency, environmentally friendly work practices, and the company's social contribution. Structured training enables employees to understand the importance of effective resource management and the implementation of sustainability standards

in daily work activities. Thus, green training becomes a strategic instrument in supporting the achievement of the company's triple bottom line.

Furthermore, employee engagement positively impacts sustainable performance. Employees with high levels of engagement tend to demonstrate commitment, initiative, and extra-role behaviors that support organizational goals, including the implementation of sustainability practices. Strong engagement encourages employees to not only carry out formal duties but also actively participate in the company's environmental and social programs. This strengthens the argument that employee psychological factors play a crucial role in achieving sustainable performance.

The mediating role of employee engagement in the relationship between green training and sustainable performance indicates that training success depends not only on knowledge transfer but also on the extent to which the training builds employee engagement. The partial mediation findings indicate that green training directly impacts performance and also through increased engagement. Practically, these results suggest that companies need to design training programs that are not only informative but also participatory and inspiring. Therefore, integrating green training and engagement-enhancing strategies is key to strengthening PT. HOLCIM INDONESIA's sustainable performance.

CONCLUSION

This study aims to examine the effect of green training on sustainable performance, with employee engagement as a mediating variable, among employees of PT. HOLCIM INDONESIA. SEM-PLS analysis results indicate that green training has a positive and significant effect on employee engagement and sustainable performance. Employee engagement was also shown to have a positive effect on sustainable performance. Furthermore, employee engagement acts as a partial mediator in the relationship between green training and sustainable performance.

These findings confirm that implementing green training not only improves employees' environmental competence but also strengthens their engagement, ultimately impacting the company's sustainable performance. Therefore, a sustainability-based human resource development strategy is a crucial factor in supporting the achievement of an organization's economic, social, and environmental goals. This study reinforces the role of Green Human Resource Management as a strategic approach in modern management.

Further research is recommended to expand the research object to different industrial sectors to obtain broader generalizability of the findings. Future studies could also include other variables such as green organizational culture, leadership, or organizational commitment as moderating or mediating variables to enrich the research model. Furthermore, a longitudinal design is recommended to examine the long-term impact of green training on sustainable performance. Future research can also combine quantitative and qualitative approaches (mixed methods) to gain a deeper understanding of the dynamics of implementing sustainability practices in organizations..

References

- Alshaabani, A., Rudnák, I., & Magda, R. (2021). Impact of green human resource management on sustainable performance: The mediating role of employee engagement. *Sustainability*, 13(9), 4930. <https://doi.org/10.3390/su13094930>
- Amjad, F., Abbas, W., Zia-ur-Rehman, M., Baig, S. A., Hashim, M., Khan, A., & Rehman, H. U. (2021). Effect of green human resource management practices on organizational sustainability: The

- mediating role of environmental and employee performance. *Environmental Science and Pollution Research*, 28, 28191–28206. <https://doi.org/10.1007/s11356-020-12145-1>
- Anggraeni, O., Puspasari, E., Triyono, B., Hasibuan, R. R., Perwita, D., & Mulasiwi, C. M. (2025). Inclusive Economic Education for Empowering Local Tourism MSMES Through Human Capital and Innovation in The Lake Toba Region. *Modern Economic Science*, 47(6), 77-99.
- Bakker, A. B., Albrecht, S., & Leiter, M. P. (2023). Key questions regarding work engagement. *European Journal of Work and Organizational Psychology*, 32(1), 1–12. <https://doi.org/10.1080/1359432X.2022.2051402>
- Hasanah, Yulia Nur, Oki Anggraeni, S. Suwali, D. Kusnaman, R. R. Hasibuan, and B. Efendi. "Entrepreneurial marketing and marketing performance in gen z entrepreneurs: exploring the mediating pathways to entrepreneurial resilience." *Journal of Ecobumanism* 4, no. 1 (2025): 3583-3602.
- Hasibuan, R. R., Suliyanto, S., & Novandari, W. (2025). Bridging Digital Marketing and Tourism Development: The Role of Social Media Marketing in Enhancing Business Performance. *African Journal of Hospitality, Tourism and Leisure*, 14(2), 351-360.
- Hasibuan, R. R. H., Suliyanto, S., & Novandari, W. (2025). Penggunaan Sosial Media Pemasaran Dan Kemampuan Digital Terhadap Kinerja Pemasaran Melalui Persepsi Iklan Sebagai Variabel Mediating. In *Prosiding Seminar Nasional Ekonomi Bisnis* (Vol. 3, No. 01, pp. 317-341).
- Hasibuan, R. R. (2024). Dampak personal branding dan influencer marketing terhadap keputusan pembelian konsumen generasi z. *House of Management and Business (HOMBIS) Journal*, 3(2), 57-62.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2022). Partial least squares structural equation modeling (PLS-SEM) using R: A workbook. Springer. <https://doi.org/10.1007/978-3-030-80519-7>
- Karatepe, O. M., Rezapouraghdam, H., & Hassannia, R. (2022). Does employee engagement mediate the influence of green HRM practices on sustainable performance? *International Journal of Contemporary Hospitality Management*, 34(3), 1120–1138. <https://doi.org/10.1108/IJCHM-05-2021-0629>
- Mousa, S. K., & Othman, M. (2020). The impact of green human resource management practices on sustainable performance in healthcare organizations: The mediating role of employee engagement. *Journal of Cleaner Production*, 243, 118–133. <https://doi.org/10.1016/j.jclepro.2019.118133>
- Nurjanah, S. (2024). The Effect Of Work Environment, Work Motivation, And Work Discipline On Employee Performance At CV. Surya Wannas Cilacap. *Jurnal Bisnis dan Kewirausahaan*, 1(1), 1-9.
- Nurwisda, D., Hasibuan, R. R., & Amalia, D. (2025). PENGARUH KETERLIBATAN KARYAWAN DAN INOVASI PRODUK TERHADAP DAYA SAING PERUSAHAAN (STUDI KASUS PADA BUMDES DI JAWA TENGAH). *House of Management and Business (HOMBIS) Journal*, 4(1), 15-21.
- Pham, N. T., Thanh, T. V., Tučková, Z., & Thuy, V. T. N. (2020). The role of green human resource management in driving sustainable performance: The mediating role of employee engagement. *Journal of Cleaner Production*, 259, 120–134. <https://doi.org/10.1016/j.jclepro.2020.120134>
- Saeed, B. B., Afsar, B., Hafeez, S., Khan, I., Tahir, M., & Afridi, M. A. (2019). Promoting employee's pro-environmental behavior through green human resource management practices. *Corporate Social Responsibility and Environmental Management*, 26(2), 424–438. <https://doi.org/10.1002/csr.1694>
- Saks, A. M. (2022). Caring human resources management and employee engagement. *Human Resource Management Review*, 32(3), 100835. <https://doi.org/10.1016/j.hrmr.2021.100835>
- Singh, S. K., Del Giudice, M., Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance: The role of green human resource management. *Technological Forecasting and Social Change*, 150, 119–130. <https://doi.org/10.1016/j.techfore.2019.119762>
- 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>