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THE IMPACT OF GREEN HUMAN RESOURCE MANAGEMENT ON EMPLOYEE PERFORMANCE MEDIATED BY KNOWLEDGE MANAGEMENT AND USE OF ARTIFICIAL INTELLIGENCE

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Abstract
This study aims to analyze the effect of *Green Human Resource Management* (GHRM) on employee performance with the mediation of *Knowledge Management* (KM) and the use of *Artificial Intelligence* (AI). This study was conducted at the Department of Transportation of West Sumatra Province with 217 respondents. The analysis method uses *Structural Equation Modeling Partial Least Square* (SEM-PLS). The results showed that *Green Training* significantly influenced KM and AI usage, and had an indirect effect on employee performance through these two mediators. In contrast, *Green Development* has no significant effect on KM, AI usage, or employee performance, either directly or indirectly. This finding confirms the importance of environmentally oriented training integrated with digital and managerial strategies to drive performance improvement. This study implies that the success of GHRM in driving employee performance depends on the organization's success in managing knowledge and technology sustainably.

Indroduction

Green Human Resource Management (GHRM), where Human Resource Management (HRM) is a crucial aspect of management that focuses on the most important asset in an organization, namely the workforce (Amjad et al. 2021) . GHRM is the application of HRM policies that aim to support the sustainable utilization of resources in the business world and prioritize environmental principles, which ultimately contribute to increasing employee motivation and satisfaction. *Green Human Resource Management* (GHRM) includes one of the main aspects called *green performance and appraisal methodologies* (Malik et al. 2021) . This concept refers to the extent to which individuals participate in behaviors, actions, and activities related to sustainability as well as the achievement of results in a given period (Ardiza, Nawangsari, and Sutawidjaya 2021; Mansoor et al. 2021) . Thus, it can help improve employee performance, balance the company's environmental and economic goals, and promote sustainable development (Zhu et al. 2021) . GHRM is an aspect of HRM in environmental management. Some academics emphasize the importance of implementing appropriate Green Human Resouce Management practices to encourage Employee Performance (Ardiza, Nawangsari, and Sutawidjaya 2021) (Zahrani 2024) (Faeni 2024) . Some of the dimensions incorporated in Green Human Resource Management are Green Training and green development.

Green training according to (Andoh et al. 2025) is a series of training / development activities aimed at strengthening pro-environmental culture and behavior in the organization, and is able to enlarge the positive effects of green knowledge shared by employees. Meanwhile, according to (Alqudah and Yusof 2024) the main objective is to empower employees to contribute to environmental management and improve the environmental performance of the organization through behavior change and awareness raising. From the opinions of these experts, it can show that green training is not just a matter of improving technical skills, but rather shaping work culture and behavior that supports environmental sustainability. Research conducted by (Sharma and Dhamija 2025) on the effect of green training on employee performance found that green training has a positive effect on employee performance (Nisa, Auliah, and Gopar 2024) ; (Sharma and Dhamija 2025) . This shows that the more frequently

and effectively environmental training is provided, the higher the motivation and work efficiency of employees. The results of this study are not in line with research conducted by (Nisa, Auliah, and Gopar 2024) .

Furthermore, green development also has an influence on employee performance, this is evidenced by research conducted by (Mekdad, Jayasuria, and Hossin 2025) ; (Bashar et al. 2024) ; (Syahrian, Angelina, and Wienaldi 2024) . Green development according to (Mvuyisi and Mbukanma 2023) is an economic development model that aims to harmonize economic growth with environmental protection, operate within the carrying capacity of the ecosystem, and use technology and innovation to achieve a balance between *green growth*, *green wealth*, and *green welfare*. Another opinion by (Ahmed et al. 2024) states that development is a planned and systematic activity aimed at building and increasing the capacity of employees to carry out their work roles more effectively, making them more motivated, satisfied, and confident.

Knowledge Management (KM) can be defined as a strategic process that involves the creation, storage, sharing, and application of knowledge in organizations to improve performance and innovation (Siddhartha Paul Tiwari 2022) . KM is becoming a critical asset that contributes to competitive advantage, enabling organizations to respond more effectively to environmental changes. By managing knowledge systematically, organizations can increase employee empowerment and support better informed decision making (Abualoush et al. 2024) . Previous researchers found that there is a significant impact if the management in the organization increases the knowledge management of employees, it will improve the performance of employees and even the organization itself (T. M. Nguyen and Malik 2022; Chintya OC 2023) ;

The use of Artificial Intelligence, according to (Putra, 2024), can be defined as the ability of computers or systems to mimic or perform tasks that require human intelligence. This is not to describe the technical definition of AI (such as machine learning), but rather the leadership behaviors that drive the adoption and use of AI in organizations. Intelligence means having knowledge plus experience, reasoning (how to make decisions and take action), good morals. (melanie 2024) Artificial Intelligence (AI) has the goal of creating computers that can think smarter and make machines more useful. According to (Stuart 2024) Artificial Intelligence comes from the English "Artificial Intelligence" or abbreviated AI, namely Intelligence is an adjective meaning intelligent, while Artificial means artificial. From the above definition, it can be concluded that a person has a lot of knowledge, but if he cannot implement it in practice, then he cannot be classified into Intelligence. for example, promoting AI technology, demonstrating support, and taking AI-based change initiatives (Syahrian, Angelina, and Wienaldi 2024) . A study conducted by (Elegunde & Osagie, 2020) revealed that artificial intelligence affects performance in Nigerian banks, with machine-assisted tasks facilitating operations in those banks. This aligns with other studies that show the influence of artificial intelligence on employee performance (Alshammary and Ali 2024) ; (Almuayad and Chen 2024) ; (Chen et al. 2024) **.**

Based on the abovementioned gap, further research is needed under "The Impact of Green Human Resource Management on Employee Performance Mediated by Knowledge Management and Artificial Intelligence".

LITERATURE REVIEW AND HYPOTHESIS

Green training is part of Green Human Resource Development (GHRD), which is a learning activity that aims to build an organization's knowledge and social responsibility towards the environment (Deshpande and Srivastava 2023) . Green training is specialized training designed to deal with environmental issues in the context of company operations,

preparing employees to manage various environmental issues in their daily work, (Danirmala 2022) . Meanwhile, according to (T. N. Nguyen et al. 2024) green training is an environmentally oriented HRM practice, namely specific training aimed at increasing employee capabilities to carry out environmentally friendly practices in the context of organizational operations. The program includes the development of environment-related knowledge, skills, and attitudes. The goal is for employees to be able to apply environmental practices in their daily work, and encourage the improvement of the organization's environmental performance.

H1 : Green Training has an influence on Knowledge Management

Green Development can be defined as (Raihan et al. 2023) An approach to economic development that is oriented towards environmental sustainability, where economic growth is directed, in order to achieve net-zero emission targets. Green development is not just a matter of technology or infrastructure, but also the *development of human resources* to be able to play a strategic role in maintaining environmental sustainability, (Vardarlıer and Türk 2022) . Meanwhile, according to (Jerez-Jerez 2025) development here is not just about economic growth or profit, but the development of the organization in a more sustainable direction, both in terms of environmental, social, and internal ways of working. Development refers to sustainable and innovative development in the tourism sector. Knowledge management acts as a foundation, providing materials (information & experience), while organizational learning transforms these materials into actions, innovations, and strategies that support sustainable development (Martínez-Martínez and Juan-Gabriel 2023) .

H2 : Green Development has an influence on Knowledge Management

Green training is an environmentally oriented HRM practice, namely specific training aimed at increasing employee capabilities to carry out environmentally friendly practices in the context of organizational operations, (T. N. Nguyen et al. 2024) . The program includes the development of environment-related knowledge, skills, and attitudes. The goal is for employees to be able to apply environmental practices in their daily work, and drive improvements in the organization's environmental performance. *green training* refers to a training approach that is sustainable, environmentally friendly, and resource efficient (Mateus et al. 2025) . The use of artificial intelligence helps design precise and data-driven training programs, which reduces overtraining and energy waste (e.g. unnecessary use of tools or facilities), (Mateus et al. 2025) .

H3 : Green Training has an influence on the Use of Artificial Intelligence

Green development is defined as the process of organizational development that focuses on environmental and social sustainability with the help of technology. In other words, organizations develop not only for profit, but also protect the environment and social welfare, (Mateus et al. 2025) . The relationship between development and the use of artificial intelligence is that artificial intelligence is the main motor in professional, educational, and technological development in various fields of science. The use of Artificial Intelligence not only increases the efficiency and effectiveness of decision making, but also requires an increase in the capacity of human resources, academic curriculum, and technological adaptation at the organizational level. (Abulibdeh, Zaidan, and Abulibdeh 2024)

H4 : Green Development has an influence on the Use of Artificial Intelligence

Green Training according to (Sharma and Dhamija 2025) benefits to help employees acquire important skills for environmental conservation and knowledge to face environmental challenges. A series of activities aimed at increasing understanding of environmental issues,

fostering awareness and positive attitudes towards environmental conservation, and forming skills to reduce waste and save energy (Saleem, Mateou, and Malik 2024) . Green training has been shown to significantly improve employee performance through enhanced skills, motivation, and active participation in sustainable activities. Without adequate green training, despite green leadership and empowerment, employees' environmental performance will not be optimized. Green training is a strategic component in HRM to achieve overall green performance targets, (Pham et al. 2020) .
H5 : Green Training has an influence on Employee Performance

Green Development according to (Faeni 2024) , An organizational development process through the application of human resource management practices (HR) oriented towards environmental and social sustainability. Green development also has an influence on employee performance, this is evidenced by research conducted by (Mekdad, Jayasuria, and Hossin 2025) ; (Bashar et al. 2024) ; (Syahrian, Angelina, and Wienaldi 2024) . Green development according to (Mvuyisi and Mbukanma 2023) is an economic development model that aims to harmonize economic growth with environmental protection, operate within the carrying capacity of the ecosystem, and use technology and innovation to achieve a balance between *green growth*, *green wealth*, and *green welfare*. Another opinion by (Ahmed et al. 2024) states that development is a planned and systematic activity aimed at building and increasing the capacity of employees to carry out their work roles more effectively, making them more motivated, satisfied, and confident.
H6 : Green Development has an influence on Employee Performance

Knowledge Management according to (Safar, Ramlawati, and Saleh 2023) as the management of organizational knowledge to create value and competitive advantage results or excellent performance. Furthermore, (Sahoo, Kumar, and Upadhyay 2023) explains that knowledge management is seen as important because its implementation provides benefits in the fields of operations and services, reminds personal competence, maintains the availability of knowledge and innovation and product development. knowledge owned by employees remains and becomes a company asset even though they have physically left the company and through knowledge management the company can learn quickly so that it is adaptive to changes that occur, (Elidjen 2024) .
H7 : Knowledge Management has an influence on Employee Performance

Artificial Intelligence according to (Chen et al. 2024) is useful in helping organizations to retain valuable knowledge, even when employees leave the company . This shows that *Artificial Intelligent* is very important to be applied in an organization or company, (Alshammary and Ali 2024) .No wonder the company must have employees who carry out tasks by implementing *Artificial Intelligent* to improve work and have an impact on Employee Performance, (Elegunde & Osagie, 2020) . So that by increasing *Artificial Intelligence* will be able to improve employee performance, (Ogutu et al. 2023) . Studies conducted by (Wijayati et al. 2022) show a positive and significant impact of AI on employee performance. This is also supported by several researchers who have also found the impact of AI on employee performance (Tong et al. 2021)
H8 : The use of Artificial Intelligence has an influence on Employee Performance

Green training increases knowledge acquisition, which is the absorption of new knowledge related to green innovation (Barba-Aragón and Jiménez-Jiménez 2024) . When knowledge acquisition is effective, employees are then able to translate it into concrete actions,

developing new ideas that reduce waste, energy efficiency, or the application of green technology, which then improves overall company performance (Chowdhury 2024) . Thus, the relationship between green training and employee performance is not direct, but through a knowledge management mechanism. Without knowledge absorption, green training will not be strong enough to drive real productive and innovative change (Yhonanda Harsono 2023) .
H9 : Green Training has an influence on Employee Performance through Knowledge Management

Green development according to (Mvuyisi and Mbukanma 2023) is an economic development model that aims to harmonize economic growth with environmental protection, operate within the carrying capacity of the ecosystem, and use technology and innovation to achieve a balance between *green growth*, *green wealth*, and *green welfare*. Another opinion by (Ahmed et al. 2024) states that development is a planned and systematic activity aimed at building and increasing the capacity of employees to carry out their work roles more effectively, making them more motivated, satisfied, and confident.
H10 : Green Development has an influence on Employee Performance through the Use of Artificial Management

Green training according to (Andoh et al. 2025) is a series of training / development activities aimed at strengthening pro-environmental culture and behavior in the organization, and being able to enlarge the positive effects of green knowledge shared by employees. Meanwhile, according to (Alqudah and Yusof 2024) the main objective is to empower employees to contribute to environmental management and improve the environmental performance of the organization through behavior change and awareness raising. From the opinions of these experts, it can show that green training is not just a matter of improving technical skills, but rather shaping work culture and behavior that supports environmental sustainability. Research conducted by (Sharma and Dhamija 2025) on the effect of green training on employee performance found that green training has a positive effect on employee performance (Nisa, Auliah, and Gopar 2024) ; (Sharma and Dhamija 2025) . This shows that the more frequently and effectively environmental training is provided, the higher the motivation and work efficiency of employees. The results of this study are not in line with research conducted by (Nisa, Auliah, and Gopar 2024) . Green training does not stop at information transfer, but triggers the development of a knowledge management system: acquisition, sharing, and application of green knowledge in the organization. This GKM process encourages employee green behavior, which ultimately contributes greatly to corporate sustainability.
H11 : Green Training has an influence on Employee Performance through Knowledge Management

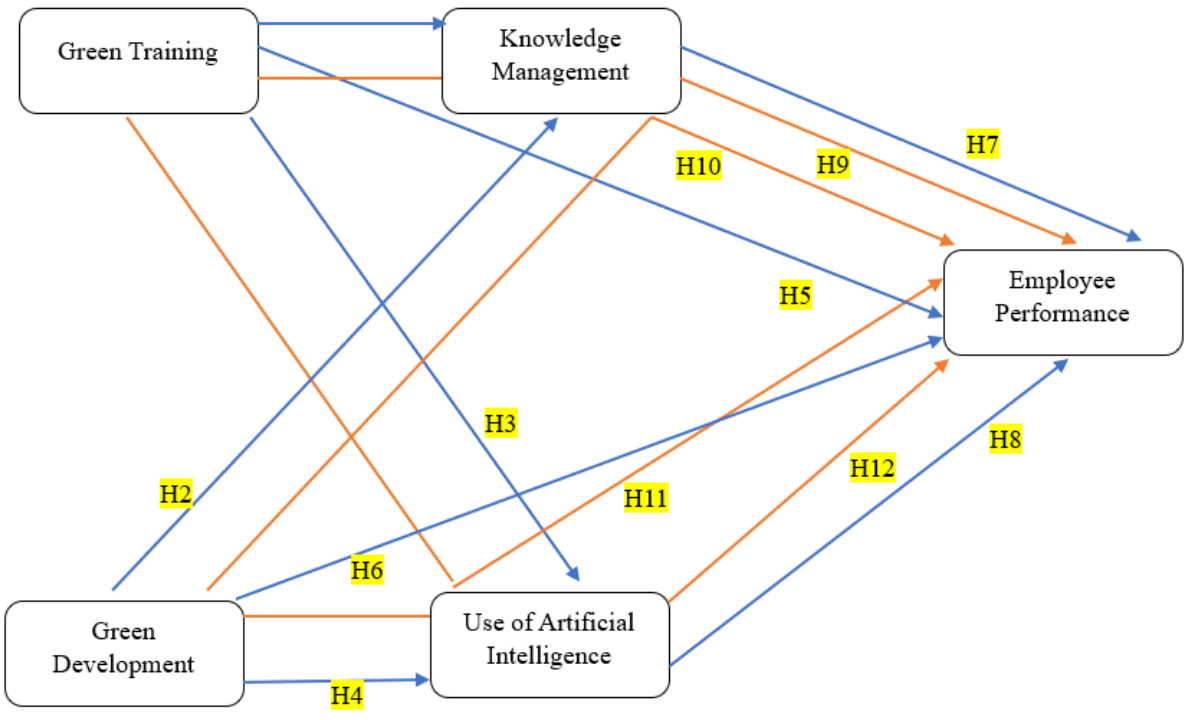
Green development according to (Mvuyisi and Mbukanma 2023) is an economic development model that aims to harmonize economic growth with environmental protection, operate within the carrying capacity of the ecosystem, and use technology and innovation to achieve a balance between *green growth*, *green wealth*, and *green welfare*. Another opinion by (Ahmed et al. 2024) states that development is a planned and systematic activity that aims to build and improve the capacity of employees to carry out their work roles more effectively, making them more motivated, satisfied, and confident. green development which includes the application of sustainable technologies and practices becomes more effective when AI is used to deepen and disseminate green knowledge in the organization. Green innovation further improves employee performance, especially in terms of green product development, process efficiency, and ecological impact reduction.

H12 : Green development has an influence on employee performance through the use of AI.

METHODS

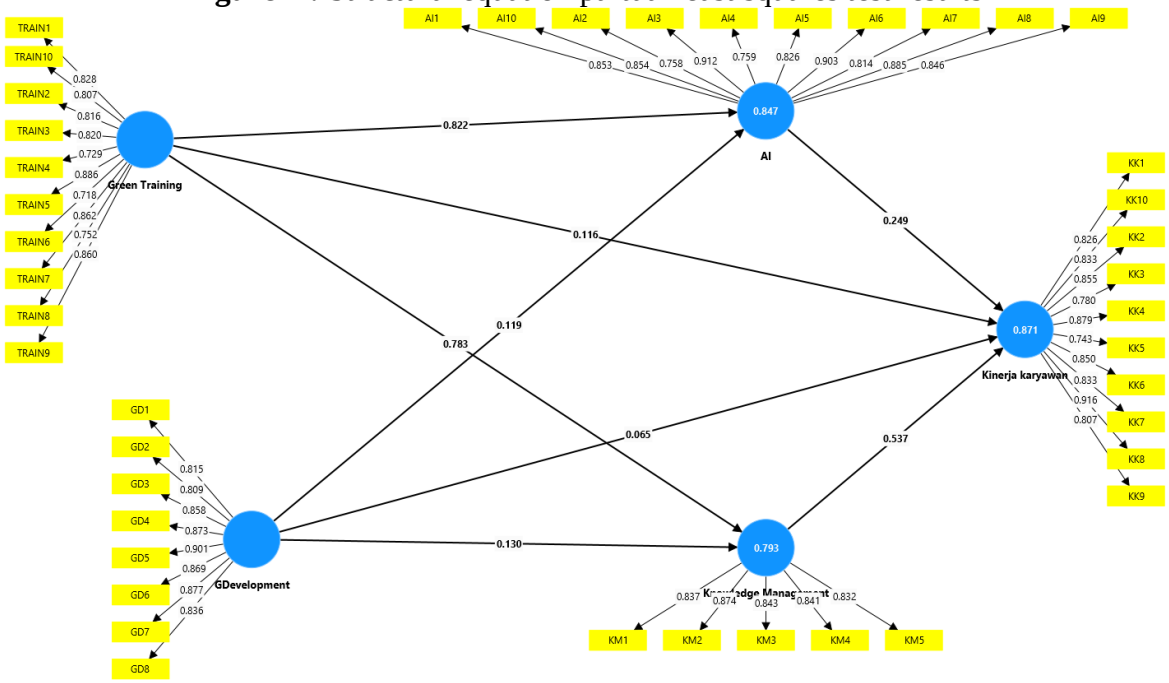
This study will be conducted at the Transportation Agency of West Sumatra, Indonesia. The population of this study consists of 477 employees at the Transportation Agency of West Sumatra, comprising seven cities in West Sumatra. The sample was determined using the Slovin formula. Thus, the total sample size for this study is 217 people. Based on the above formula, the maximum sample size for this study is 217 respondents who are employees of the Transportation Department of West Sumatra, and the distribution of questionnaires will be determined by the proportion of branches. The measurement scale used is the Likert scale, where the response options on the five-point scale include "Strongly Agree," "Agree," "Neutral," "Disagree," "Strongly Disagree," and "Strongly Disagree," each of which is assigned a numerical value from 5 to 1. The data analysis technique uses structural equation modeling (SEM) using the partial least square (PLS) program. Research dimensions and indicators are in Appendix A1. SEM PLS TEST consists of inner model test, outer model test, convergent validity test, discriminant validity test, reliability test, determination coefficient test, F test, t test, path coefficient and mediation test.

Figure 1: Conceptual Framework



Research Results

Figure 2 : Structural equation partual least squares test results



Source: Data processed by authors, 2025

Table 1 : Evaluate the R-Square value

Variables	R-square	Adjusted R-square
Knowledge Management	0.793	0.791
Artificial Intelligence Usage	0.847	0.846
Employee performance	0.871	0.869

Source: Data processed by authors, 2025

Convergent Validity (Outer Loadings)

The results of the structural model analysis with the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach show that all indicators used in this study have met the convergent validity criteria. Convergent validity is shown through the *outer loading* value of each indicator on its construct. Based on the results of data processing, all indicators have a loading value above 0.70, which means that each indicator is able to represent the latent construct well.

Furthermore, the R-square (R^2) value displayed in the model provides an overview of the strength of the influence of the independent construct on the dependent construct. The AI construct has an R^2 value of 0.847, which indicates that the variation in AI can be explained by 84.7% by the Green Training construct. Similarly, Knowledge Management has an R^2 value of 0.793, which means that most of the variation can be explained by the Development construct. The Employee Performance construct has an R^2 value of 0.871, indicating that about 87.1% of the variation in employee performance can be explained by the AI, Knowledge Management, Green Training, and Development constructs simultaneously.

These values indicate that the model has a high explanatory power of the main constructs in the study.
The relationship between constructs in this model is also represented by the *path coefficient* value, which illustrates the strength of the direct influence between latent variables. The effect of Green Training on AI was noted to be quite strong with a coefficient value of 0.822. Development also has a strong influence on Knowledge Management with a coefficient of 0.783. Meanwhile, the effect of Knowledge Management on Employee Performance is also significant with a value of 0.537. However, the direct effect of Green Training on Employee Performance (0.116) and Development on Employee Performance (0.065) is low, so it can be interpreted that the effect of these two variables on employee performance is more mediated by other variables such as AI and Knowledge Management.
Overall, the results of this validity test indicate that the constructs and indicators used in the study have met the statistical requirements necessary for the feasibility of the measurement model. Convergent validity is well achieved, and the relationships between constructs in the model strengthen the theoretical assumptions proposed in the conceptual framework. These findings support the continuation to the hypothesis testing stage and more in-depth structural model testing.

Table 2: Result for Inner Weights

No.	Explanation	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistic (|O/STDEV|)	P values
1	Green Training -> Knowledge Management	0.783	0.774	0.086	9.110	0.000
2	Green Development -> Knowledge Management	0.130	0.139	0.086	1.514	0.130
3	Green Training -> AI Usage	0.822	0.811	0.072	11.443	0.000
4	Green Development -> AI Usage	0.119	0.130	0.076	1.561	0.119
5	Green Training -> Employee performance	0.116	0.107	0.097	1.203	0.229
6	Knowledge Management -> Employee performance	0.537	0.542	0.097	5.562	0.000
7	Green Development -> Employee performance	0.065	0.073	0.055	1.183	0.237
8	AI usage -> Employee performance	0.249	0.244	0.100	2.502	0.012
9	Green Training -> Knowledge Management ->	0.420	0.422	0.097	4.344	0.000

	Employee performance					
10	Green Development -> Knowledge Management -> Employee performance	0.070	0.073	0.046	1.522	0.128
11	Green Training -> AI -> Employee performance	0.205	0.199	0.084	2.441	0.015
12	Green Development -> AI -> Employee performance	0.030	0.032	0.024	1.237	0.216

Source: Data processed by authors, 2025

Discussion

The results of this study reveal a significant relationship between several variables in the context of green training, green development, knowledge management, the use of artificial intelligence, and employee performance. Which can be interpreted as follows:

H1 : **Green Training has an influence on Knowledge Management**

Based on statistical analysis, it was found that Green Training has a significant influence on Knowledge Management, which indicates that an increase in environmentally based training can encourage more effective knowledge management practices in organizations.

Green Training not only transfers technical skills, but also instills environmental values, social responsibility, and awareness of the importance of sustainability (Andoh et al., 2014). 2025) . This mindset encourages employees to be more open to continuous learning and active knowledge sharing, the core of Knowledge Management practices. Environmental and sustainability topics are dynamic, so relevant training encourages employees to continuously update their knowledge and skills. This creates a continuous learning cycle that supports a more active Knowledge Management system. Employees who receive green training tend to have a higher sense of belonging to the organization's long-term vision. This encourages them to better maintain, document, and disseminate knowledge to benefit the organization in a sustainable manner.

The results of this study are in line with research conducted by previous studies where green training has an influence on knowledge management (Safitri, Sari, and Charli 2025) , this is also contrary to research conducted by (Lee et al. 2020) that green training has not been strong in influencing knowledge management.

H2 : **Green Development has no influence on Knowledge Management**

Green Development is part of the organization's sustainability initiatives, the results of statistical analysis show that Green Development has no significant effect on Knowledge Management. This finding indicates that environmentally oriented organizational development efforts have not directly encouraged the learning process, storage, or dissemination of knowledge in the organization.

Green Development according to (Faeni 2024) , An organizational development process through the application of human resource management practices (HRM) oriented towards environmental and social sustainability. It could be that organizations have not linked green development initiatives with knowledge management strategies. Without such integration, the benefits of sustainable development do not automatically contribute to

knowledge sharing or learning organization practices. This insignificance does not mean that green development is not important, but rather indicates that its influence on knowledge management is still not strong directly, or requires additional approaches to make its impact more pronounced in the organization's knowledge management system.

The results of this study indicate that the effect of green development on knowledge management is not strong enough, so it is not in line with the findings of (Yang and Li 2023) , Conversely, these findings support the results of research from (Alioune 2024) ; (Abbas and Sağsan 2019) which indicate that green development has not made a strong or consistent contribution to improving knowledge management in the organizational context.

H3 : **Green Training has an influence on the Use of Artificial Intelligence**

Based on statistical analysis, it was found that green training has a significant influence on the use of artificial intelligence. This finding indicates that sustainability-focused training not only shapes environmental awareness among employees, but also contributes to the readiness and application of artificial intelligence-based technologies in organizations.

Green-oriented training generally emphasizes efficiency, waste reduction, and resource optimization, values that align with AI implementation goals such as automation and business process improvement. Employees who are accustomed to a sustainability mindset tend to be more adaptive to innovative technologies. Green training often includes an understanding of green technology, environmental information systems, or digitization of work processes. This indirectly improves employees' digital literacy, which is an important prerequisite for effective utilization of AI. Training also includes all efforts made to improve employee performance through improving skills and knowledge by participating in training and learning (Setzer, Li, and Khan 2024) .

The results of this study are in line with research conducted by previous studies where green training has an influence on the use of artificial intelligence (Xu et al. 2024) ; (Zhu et al. 2021) (Washif et al. 2024) , this is also contrary to research conducted by (Sampatsing et al. 2025) that green training has not been strong in influencing the use of artificial intelligence.

H4 : **Green Development has no influence on the Use of Artificial Intelligence**

Based on the results of statistical analysis, it was found that Green Development does not have a significant influence on Artificial Intelligence in the organizational context. This finding indicates that environmentally sound development efforts, although important in promoting long-term sustainability, have not directly encouraged the application or development of artificial intelligence technology in the organizational environment. One possible reason for this is that the main focus of Green Development tends to be on physical or infrastructure aspects, such as the use of renewable energy, eco-friendly building design, or operational efficiency, which do not always directly align with digitization initiatives or the adoption of AI-based technologies. In addition, Green Development is often done as a separate project that has not been integrated into the organization's overall digital transformation strategy. Lack of employee engagement in the Green Development process can also limit its impact on technology readiness. Therefore, while Green Development brings strategic benefits in the context of sustainability, its impact on AI still seems insignificant, at least in the short term or without the support of an integrated innovation policy.

The results of this study are not in line with the findings of several previous studies which state that green development has an influence on the use of artificial intelligence (AI),

as revealed by (A. A. Yassin Alzyoud 2022; Sopali et al. 2023; Nisar et al. 2021) , which states that green development has an influence on the use of artificial intelligence (AI). However, this finding also contradicts the results of studies (Sampatsing et al. 2025) ; (Yin, Cai, and Huang 2022) , which show that green development has not had a strong influence on AI implementation, especially in the context of organizations and sustainability practices. This suggests that context dynamics and mediating variables influence the relationship between green development and effective AI utilization.

H5 : **Green Training has no influence on Employee Performance**

Based on the results of statistical analysis, it was found that Green Training has no significant influence on employee performance. This finding suggests that although environmentally-oriented training has an important value in building sustainability awareness, it has not had a direct impact on improving individual productivity or work results in the short term. This could be due to several factors, including the content of training that emphasizes aspects of ecological values and awareness rather than technical skills or core competencies that are directly related to performance targets. In addition, there may also be a gap between training materials and practical applications in the workplace, so that the knowledge gained from Green Training is not fully implemented in daily activities. It is also possible that employees do not see a strong link between sustainability and their direct job responsibilities, so they are not motivated to apply the training results to improve performance. Therefore, to produce a more tangible impact on performance, Green Training needs to be designed in a more applicable manner and integrated with an assessment system and work culture that supports overall behavior change.

The results of this study are not in line with several previous studies which state that green training has a positive effect on employee performance, as found by (Teguh Wahyono and Fadhlal Nugraha 2023; Sharma and Dhamija 2025; Chowdhury 2024) , Instead, this result supports the findings of (I. Purba, Wiranatha, and Sulistyaningsih 2024) ; which shows that green training has not had a significant effect on improving employee performance. This difference in results can be caused by variations in organizational context, training intensity, and the role of mediating variables such as motivation or green competence.

H6 : **Green Development has an influence on Employee Performance**

Based on the results of statistical analysis, it was found that Green Training has a significant influence on employee performance. This finding shows that training that focuses on sustainability issues and environmental awareness not only has an impact on increasing ecological knowledge, but is also able to encourage employees to work more productively, responsibly and efficiently. Green training shapes a mindset that is more aware of the long-term impact of every work activity, so employees tend to be more conscientious in using resources, more disciplined with procedures, and more collaborative in achieving sustainable organizational goals. In addition, this training can also foster a sense of belonging to organizational values, increase intrinsic motivation, and build a more innovative and adaptive work culture. In other words, Green Training not only creates alignment between individual and organizational goals, but also contributes significantly to improving employee performance in carrying out their duties and responsibilities.

The results of this study are in line with several previous studies which show that green development has an influence on employee performance, as stated by (Faeni 2024; Mire, Sabwami, and Ayora 2024; Sopali et al. 2023) , this is also contrary to research conducted by (S. D. Purba, Wiranatha, and Sulistyaningsih 2024) ; (Prasetyo et al. 2021)

which states that green development has not had a strong influence on improving employee performance.

H7 : **Knowledge Management has no influence on Employee Performance**

Based on the results of statistical analysis, it was found that Knowledge Management has no significant effect on employee performance. This finding indicates that although knowledge management plays an important role in information management and organizational learning, its implementation has not been able to have a direct impact on improving individual performance. One possible cause is that the Knowledge Management process in the organization has not run optimally or is only administrative without being followed by effective knowledge transfer to employees at the operational level. In addition, employees may not feel the real benefits of the existing knowledge management system, either due to lack of access to relevant information, lack of knowledge sharing culture, or because the system is not integrated with performance measurement and targets. This can also happen if the organization emphasizes the documentation aspect of knowledge rather than the establishment of a work environment that supports collaboration, active learning, and innovation. Thus, although theoretically Knowledge Management has the potential to drive performance, in practice it requires a more adaptive, participatory, and directly connected implementation strategy to the daily work needs of employees so that its influence can be felt in real terms.

The results of this study are not in line with several previous studies which state that knowledge management has an influence on employee performance (Faeni 2024; Lee et al. 2020; Ode and Ayavoo 2020) this is also contrary to research conducted by (Arief Wibowo 2021) which states that knowledge management does not have a strong influence on employee performance.

H8 : The use of Artificial Intelligence has an influence on Employee Performance

Based on the results of statistical analysis, it was found that Artificial Intelligence (AI) has a significant influence on employee performance. This finding reflects that the application of artificial intelligence-based technology in the work environment is able to support the effectiveness and efficiency of individual performance. AI plays a role in accelerating the decision-making process, automating routine tasks, and providing relevant and real-time information, so that employees can focus on strategic and value-added work. In addition, AI also supports a more objective and data-driven performance monitoring and evaluation system, which in turn drives improved work accuracy and productivity. The application of AI in various functions such as project management, customer service, and human resource management, helps create a more adaptive and responsive work environment. Therefore, AI integration not only strengthens an organization's operational capabilities, but also noticeably improves the quality and work output of the employees involved in the process.

The findings of this study are consistent with a number of previous studies that indicate that the use of artificial intelligence contributes significantly to improving employee performance (Tong 2021; Priyanka 2024; Fan 2025) , this is also contrary to research conducted by (Kassa and Worku 2025) ; (Shaikh et al. 2023) which reports that the effect of artificial intelligence on employee performance is still limited and not consistently significant.

H9 : Green Training has an influence on Employee Performance through Knowledge Management

Based on the results of statistical analysis, it was found that Green Training has a significant influence on employee performance through the mediating role of Knowledge Management. This finding shows that training that focuses on sustainability issues not only has a direct impact on increasing environmental awareness, but also indirectly encourages improved performance through better knowledge management. Green training encourages a culture of continuous learning, facilitates the knowledge sharing process, and improves employees' ability to access, store, and apply relevant information to support their work. Through an effective Knowledge Management mechanism, the results of training do not stop at conceptual understanding, but are translated into more efficient, innovative and adaptive work practices. Thus, Knowledge Management serves as a bridge that connects competency improvement from Green Training with optimal performance outcomes, reinforcing the importance of integration between sustainability-based training and knowledge management strategies in human resource development.

H10 : Green Development has no influence on Employee Performance through the Use of Artificial Management.

Based on the results of statistical analysis, it was found that Green Training has no significant effect on employee performance through Knowledge Management. This finding suggests that although Green Training can improve environmental understanding and awareness among employees, the process has not been effectively mediated by the knowledge management system in supporting performance improvement. This could be due to the lack of integration between sustainability training and existing Knowledge Management mechanisms within the organization. In some cases, training may only be informative and not enough to encourage knowledge sharing, documentation, or strategic utilization of knowledge. In addition, the possibility that employees do not directly relate training materials to daily performance improvement can also be an obstacle in optimizing the function of Knowledge Management as a mediating channel. Thus, although Green Training and Knowledge Management each have an important role, these results confirm the need for a more integrated approach so that both can support each other and have a significant impact on improving employee performance.

H11 : Green Training has an influence on Employee Performance through Knowledge Management

Based on the results of statistical analysis, it was found that Green Training has a significant influence on employee performance through the use of Artificial Intelligence. This finding indicates that training that focuses on sustainability issues not only increases environmental awareness among employees, but also encourages the use of artificial intelligence-based technology as a means to support performance improvement. Green Training can shape an adaptive mindset to technological change, including in accepting and optimizing the use of Artificial Intelligence in daily work activities. In this case, AI serves as a tool to speed up processes, improve accuracy, and provide more relevant and real-time information, allowing employees to work more efficiently and productively. Thus, the mediating role of Artificial Intelligence strengthens the influence of Green Training on performance, as AI becomes a catalyst that transforms sustainability insights into measurable and results-oriented actions. This finding confirms the importance of training design that not only touches on the value aspect, but is also equipped with technological capabilities so that its impact on work performance can be maximized.

H12 : Green Development has no influence on Employee Performance through the Use of Artificial Management

Based on the results of statistical analysis, it was found that Green Development does not have a significant influence on employee performance through the use of Artificial Intelligence. This finding suggests that sustainability-oriented development efforts, such as energy efficiency, green building design, or waste management, have not been effectively integrated with the use of artificial intelligence technology in supporting human resource performance. This is likely due to the nature of Green Development which focuses more on the physical and structural aspects of the organization, thus not directly influencing employees' behavior or digital skills in using AI technologies. In addition, the lack of employee involvement in the Green Development planning and implementation process may reduce their awareness and understanding of AI's potential as a tool to improve work productivity. The disconnect between green development initiatives and digital transformation strategies also contributed to the absence of a significant mediating effect. Thus, these results suggest the importance of a more integrated approach between sustainable development policies and smart technology adoption to maximize the impact on employee performance.

Conclusion

This study reveals that Green Training plays an important role in driving Knowledge Management and the use of Artificial Intelligence (AI) within organizations, which in turn contributes significantly to improved employee performance. This positive effect is also reinforced through the mediation path, where Green Training improves performance indirectly through knowledge management and AI utilization. In contrast, Green Development, although part of the organization's sustainability strategy, has not shown a significant influence on knowledge management, AI usage, or employee performance, either directly or through mediation.

This finding emphasizes the importance of a holistic and integrated approach between sustainability training and digital and managerial strategies for the results to have a real impact on human resource performance. The limited influence of green development indicates the need to reposition green development strategies to be not only structural, but also support the transformation of work culture and organizational technology.

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