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Implementation of Artificial Intelligence for Green Human Resource Management

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Abstract

The development of technology, particularly in the field of Artificial Intelligence (AI), has had a profound impact on various aspects of organizational management, including Human Resource Management (HRM). This study aims to examine the application of Artificial Intelligence in HR that is oriented towards environmentally friendly principles. This study employs a qualitative approach with a case study method, where data collection techniques are carried out through in-depth interviews with all parties directly involved in human resource management at Company X, namely one company owner and 13 employees. The study's results indicate that Company X has effectively implemented AI technology in its human resource management. The application of this technology is not intended to replace the role of humans in HR, but to support and improve work efficiency. The AI software used enables companies to monitor employee activities and productivity more efficiently and in greater detail. The entire process in human resource management, from recruitment to employee management, is still carried out by involving humans. The use of this technology has also been shown to minimize human error and lighten the conventional workload of the HRD department, making work more time-saving and efficient. The theoretical implications of this study's findings suggest that integrating AI in HR can strengthen modern management theory, which emphasizes the importance of efficiency, effectiveness, and sustainability in organizational management.

Keywords: Artificial Intelligence; Green Human Resource; Human Resource Management; Management.

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I. Introduction

Nowadays, many jobs that use human resources are being replaced by technology. To keep up with the developments of the times, the world of technology continues to innovate (Nikmah et al., 2023). The presence of Artificial Intelligence (AI) in everyday life is a form of innovation in the technology itself. AI can be used to enhance efficiency in Human Resources Management (HRM) by implementing a Human Resource Management System. AI was created to be able to imitate human behavior and thinking, so that AI can carry out various tasks that can only be done by humans (Astutik et al., 2023; Siahaan et al., 2020). Initially, the HR function was primarily administrative, but with the assistance of Artificial Intelligence, it has evolved into a strategic function. HR no longer functions solely as a workforce manager, but as a strategic function related to efficiency and innovation, aimed at achieving organizational goals. Nowadays, the use of technology for managing human resources should be accompanied by promoting environmental sustainability, as with the government's goal of implementing zero emissions.

The use of AI in human resource management starts from the recruitment, training, and development process, to compensation, so that it can have an impact on the management of green human resources because the presence of AI can minimize the impact of environmental damage (Nurcahyani et al., 2024). Figure 1 shows that AI has great potential to support various HR functions, such as recruitment processes, workforce planning, and other functions (Sewang et al., 2024).

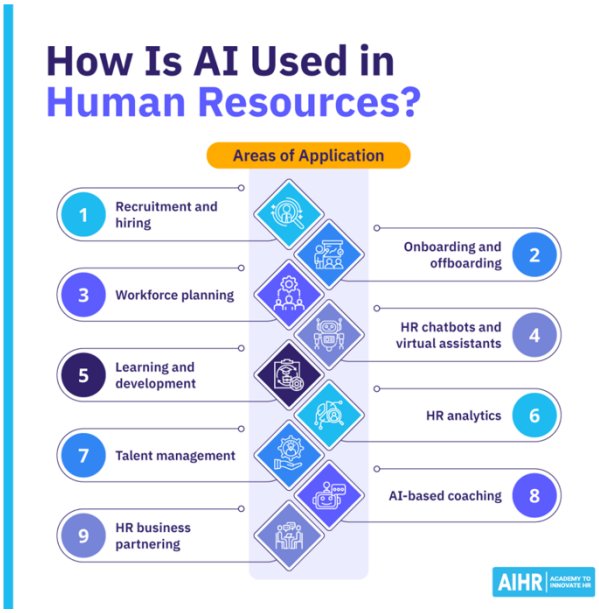

Figure 1. Use of Artificial Intelligence in Human Resources

Figure 1 above illustrates the benefits of using AI in companies, especially in human resource management. AI is a system that can interpret external data, learn patterns from the data, and use the learning results flexibly to achieve certain goals (Haenlein & Kaplan, 2019). Currently, organizations and companies, especially modern corporations, face various challenges and obstacles that can be overcome through the application of AI and the GHRM concept. Company X is a company engaged in website creation services, information systems, applications (apps), and digital marketing. This company aims to integrate AI into its human resource management to reduce high labor costs and address the issue of high employee turnover rates. This company then aims to focus more on creating a Green Human Resource Management approach. Then, currently, there is a lot of fear in society that states that human resources will be replaced by technology (Putra et al., 2023).

Researchers want to see to what extent AI can be applied to GHRM in a company in Indonesia, see whether technology will replace humans and whether technology will replace HRM processes and review the implementation of AI comprehensively to support GHRM (recruitment to compensation) in companies in Indonesia so that companies in Indonesia can use this article as a reference material to see

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the strategic implementation of AI in supporting HR practices to achieve organizational goals, namely effective and efficient. Based on the description, the author is interested in conducting a study entitled "Implementation of Artificial Intelligence for Green Human Resource Management."

In addition to the phenomenon of AI utilization by companies, researchers have also identified research gaps that could be leveraged as opportunities for further study. Based on previous research studies, the topic of AI implementation in GHRM has not been thoroughly explored. Most studies focus more on topics such as green marketing and green finance (Jatobá et al., 2023; Olazo & Evaristo, 2025). In addition, several existing studies have not specifically discussed the contribution of each type of AI to GHRM (Ali et al., 2025). Thus, it can be concluded that until now there has been no research that comprehensively examines the implementation of AI to support the entire GHRM process from recruitment to compensation, especially in the context of companies in Indonesia (DuBois & Dubois, 2012). Therefore, this research has a high level of urgency and relevance that necessitates its timely completion. This study aims to analyze the application of artificial intelligence in realizing environmentally friendly human resource management. The findings of this study have significant theoretical implications, specifically demonstrating that the integration of AI in human resource management can enhance modern management theory, which emphasizes the importance of efficiency, effectiveness, and sustainability in organizational management.

II. Method

This study employs a qualitative approach, utilizing a case study method. Qualitative research is a type of research that aims to understand social phenomena or human behavior in depth and holistically by exploring the meanings, experiences, and views of informants in their natural context (Sugiyono, 2019). Data collection techniques are carried out through in-depth interviews with all parties directly involved in human resource management at Company X, specifically with the company owner and 13 employees. Interviews are conducted in a structured manner using a previously prepared question guide. The stages of qualitative research are illustrated in Figure 2 below.

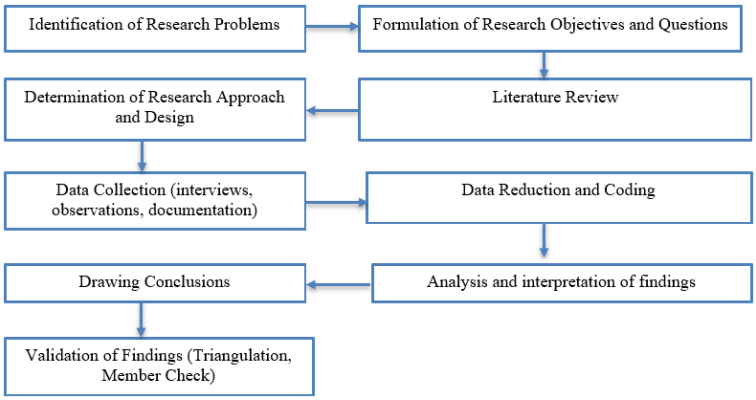

Figure 2. Use of Artificial Intelligence in Human Resources

III. Results and Discussion

The results of this study indicate that the application of AI provides significant benefits to companies, especially in supporting sustainability-oriented human resource management practices. AI is effectively utilized in various aspects, including environmentally friendly recruitment and selection processes, green-based employee training and development, sustainable performance management and assessment, and reward and compensation systems that support efficiency and sustainability.

1. Implementation of AI on GHRM

The application of artificial intelligence AI in supporting human resource management practices that are oriented towards sustainability or environmentally friendly principles has become one of the

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important strategies in increasing operational efficiency while supporting the company's environmental goals. The application of AI in the context of GHRM encompasses a wide range of functions, including environmentally friendly recruitment processes that utilize expert systems, natural language processing, robotics, sensory systems, computer vision, and game-playing. The implementation of Artificial Intelligence in Green Human Resource Management is presented in Table 1.

Table 1. Implementation of AI on GHRM

Indicator	Statement	Score	Category
Green recruitment and selection using AI Indicator	Applying AI to Green recruitment using expert systems	4	Good
	Applying AI to Green recruitment using natural language processing	3.9	Good
	Applying AI to Green recruitment using Robotics & Sensory Systems	3.8	Good
	Applying AI to Green recruitment using Computer Vision	3.8	Good
	Applying AI to Green recruitment using Game Playing	3	Less
		4.62	**Good**

Based on Table 1, it is stated that Company X has successfully implemented Artificial Intelligence for Green Recruitment and Selection, achieving an average total score of 4.62. So far, the company has implemented AI in Green Recruitment and Selection by utilizing an expert system with a score of 4, natural language processing with a score of 3.9, and robotics and sensory systems with a score of 3.8. The company still needs to improve the implementation of AI in Green recruitment by utilizing game-playing techniques. Based on the results of interviews with the Owner and two employees, the company has not utilized AI game playing in its recruitment process. AI Game Playing can later be implemented by analyzing the steps taken by applicants in the game, such as how to manage waste in the company environment, and planning environmental sustainability projects (Gupta et al., 2025; Hajkowicz et al., 2023; Masood et al., 2023; Obaid et al., 2020).

2. Implementation of AI for Green Training and Development

The application of artificial intelligence AI in supporting the training and development of environmentally friendly human resources (green training and development) is one of the innovative approaches taken by companies to improve the quality of human resources while maintaining environmental sustainability. Further details regarding the form of implementation of artificial intelligence in green training and development are presented systematically in Table 2.

Table 2. Implementation of AI for Green Training and Development

Indicator	Statement	Score	Category
Green Training and Development using AI Indicator	Applying AI to Green Training and Development by using an expert system	3.8	Good
	Applying AI to Green Training and Development using natural language processing	3.8	Good
	Applying AI to Green Training and Development using Robotics & Sensory Systems	3.7	Good

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Table 2—Continuation

Indicator	Statement	Score	Category
	Applying AI to Green Training and Development using Computer Vision	3.9	Good
	Applying AI to Green Training and Development using Game Playing	3.8	Good
		4.75	**Good**

Based on Table 2, Company X has successfully implemented Artificial Intelligence for Green Training and Development, as evidenced by an average score of 4.75. So far, the company has carried out training and development processes using AI and also prioritizes environmental sustainability values, expert training and development, using natural language processing, using Robotics and Sensory Systems for security, developing software or applications, developing IT projects, using Game Playing for coding training, software simulation, security training and environmentally friendly software development.

3. Implementation of AI for Green Performance Management and Appraisal Green Performance

The application of artificial intelligence AI in supporting environmentally-conscious employee performance management and assessment, also known as Green Performance Management and Appraisal, is one of the modern strategies that companies are starting to adopt to increase efficiency while supporting sustainability goals. Further information on the concrete form of AI implementation in green performance management and assessment can be found in Table 3 below.

Table 3. Implementation of AI for Green Performance Management and Appraisal Green Performance

Indicator	Statement	Score	Category
Green Performance Management and Appraisal: Green Performance Management using AI Indicator	Applying AI to Green Performance Management and Appraisal Green Performance using an expert system	3.5	Good
	Applying AI to Green Performance Management and Appraisal using natural language processing	3.5	Good
	Applying AI to Green Performance Management and Appraisal using Robotics & Sensory Systems	2.8	Less
	Applying AI to Green Performance Management and Appraisal Green Performance using Computer Vision	3.6	Good
	Applying AI to Green Performance Management and Appraisal Green Performance using Game Playing	2.6	Less
		4	**Good**

Based on Table 3, it is stated that Company X has successfully implemented Artificial Intelligence for Green Performance Management and Appraisal of Green Performance. However, improvements are still needed in the application of AI for Green Performance Management and Appraisal Green Performance, particularly in the use of robotics and sensory systems, as well as in the application of AI in Green Performance Management and Appraisal Green Performance using Game-Playing Techniques. Work assessment and evaluation using robotics and sensory systems can be conducted using a performance monitoring robot that prioritizes environmental values to monitor employee performance. Work assessment and evaluation using Game Playing evaluates work strategies combined with environmental

management that employees have carried out by running games (Kirchner-Krath et al., 2024; Liang et al., 2023; Pham et al., 2024; Putra et al., 2023; Putranti et al., 2024).

4. Implementation of AI for Green Reward and Compensation

The application of artificial intelligence AI in the reward and compensation system oriented to the principle of sustainability, known as Green Reward and Compensation, is one of the important innovations in modern human resource management practices. The implementation of Artificial Intelligence for Green Reward and Compensation is illustrated in Table 4.

Table 4. Implementation of AI for Green Reward and Compensation

Indicator	Statement	Score	Category
Green Reward and Compensation using AI Indicator	Applying AI to Green Reward and Compensation using expert systems	3.4	Good
	Applying AI to Green Reward and Compensation using natural language processing	3.4	Good
	Applying AI to Green Reward and Compensation using Robotics & Sensory Systems	3.3	Good
	Applying AI to Green Reward and Compensation using Computer Vision	3.7	Good
	Applying AI to Green Reward and Compensation using Game Playing	2.7	Less
		4.12	**Good**

Based on Table 4, it is stated that the Implementation of Artificial Intelligence for Green Reward and Compensation at Company X has been carried out well, with a score of 4.12. So far, the company has implemented AI in Green Reward and Compensation using expert systems, natural language processing, robotics, and Sensory Systems (calculation of employee salaries and attendance), as well as computer vision. However, what needs to be improved is implementing AI in Green Reward and Compensation by using Game Playing, for example, using the Green Token Game, the better the employee's performance and protecting the environment, the more green tokens can be exchanged for bonuses (Wang & Sun, 2011). Company X has successfully implemented Artificial Intelligence for Green Human Resource Management. Due to the success of Company X, it should be able to be implemented by other companies both domestically and abroad. By using AI in the GHRM process, companies can produce greater efficiency, lower costs, better employee engagement and retention, helping organizations to reduce carbon impacts (Deepika R & Dr KarpagamV, 2016).

5. Interview Results

5.1. Will technology replace humans in Human Resource?

AI has become important in all areas, especially in human resource management. Environmental pollution control in societies can now be handled by human resource management. Today, there is an IT-based startup in Indonesia called Staffinc Jobs. The company offers an AI platform that enables the management of employees in various ways, including job search, recruitment, and project management. Staffinc Jobs has partnered with over 1 million employees and helped more than 150 companies digitize every step of their HRM operations to optimal business efficiency. Then big companies in the United States and Europe, such as Chevron, Nestle, and Starbucks, are also increasingly relying on artificial intelligence (AI) technology to monitor and evaluate employee internal communications. This is a sign of a shift towards the use of AI in human resource management (Istanti, 2025; Purwaamijaya & Prasetyo, 2022).

Companies such as Walmart, Delta Air Lines, T-Mobile, AstraZeneca, Chevron, Starbucks, and

Nestlé have partnered with Aware, a seven-year-old luxury company based in Columbus, Ohio. They utilize AI to match employees with projects based on their expertise and preferences. Technology doesn't replace humans in Human Resources Management. This AI software allows companies to monitor employee activity and productivity more efficiently and in more detail. With this technology, companies can identify patterns of behavior that enhance work efficiency and improve employee overall performance.

5.2. Does AI change the way human resource management works from recruiting to managing people?

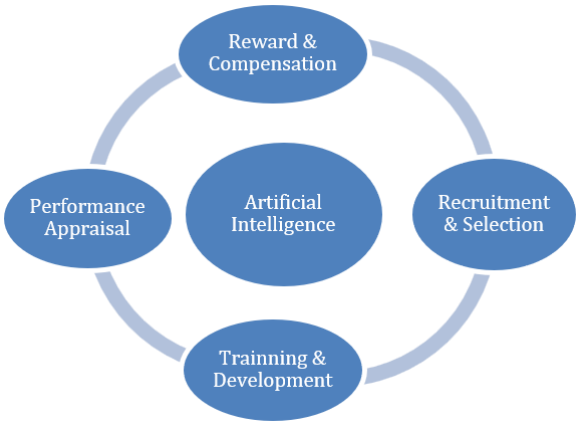

Figure 3. Artificial Intelligence in the Human Resource Management

Based on the model in Figure 3 above, it is evident that AI is highly beneficial in various aspects of green resource management.

1. Recruitment: AI helps companies select candidates based on the required profile, which saves time.
2. Training and Development: AI can help provide training and development that is tailored, efficient, and aligned with employee skill needs.
3. Evaluating Performance: Data analysis that helps evaluate employee performance on a daily basis.
4. Reward and Compensation: AI can help provide rewards and compensation practically and automatically.

AI does not replace HRM processes from recruitment to management. By using technology, human error can be minimized (Apriliana et al., 2024; Wang & Sun, 2011). In addition, the use of technology can reduce and enhance conventional HRD work, thus saving time and increasing efficiency. The use of technology also helps reduce waste in the workplace by saving paper and minimizing pollution, as processes can be completed with the aid of technology. Automation has taken over most of the HRD jobs. Nowadays, many companies are trying to understand how to improve their performance through environmental standards and are starting to install a variety of environmentally friendly technologies.

IV. Conclusion

Overall, Company X has successfully implemented AI technology optimally in its GHRM practices. This is reflected in the application of various AI components, such as expert systems, natural language processing, computer vision, and gaming, which are used in an integrated manner across all stages of sustainability-based human resource management. While AI has high capabilities in managing various HR processes, this technology is not intended to completely replace human roles. Instead, AI serves as a tool to simplify routine and repetitive work, allowing human resources to focus more on strategic, creative, and decision-making aspects. The application of AI has also been shown to reduce the administrative workload in conventional HR functions, resulting in more efficient and time-saving

work processes. This research has significant implications for both practical and theoretical developments in sustainability-based human resource management. The successful implementation of AI can serve as a model for other companies, especially in Indonesia, seeking to integrate technology to improve the efficiency and effectiveness of their HR functions. Practically, these findings demonstrate that AI can not only reduce administrative burdens but also enable HR teams to focus more on strategic roles that add value to the company. Thus, companies can create a more productive, innovative, and sustainable work environment. On the theoretical side, this study provides insights into how AI can complement (not replace) human resource management systems. Therefore, further research is recommended to explore the broader application of AI in GHRM, particularly across various types of companies in Indonesia, to produce more general and applicable results. Long-term implications include the potential for AI to contribute to digital transformation in the HR sector, which can support corporate growth and competitiveness in this digital era.

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Declaration

The author conducted research and wrote all chapters in this article. This research and writing were conducted to examine the application of AI in GHRM, with no financial interests or kinship relationship with the company.

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