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Leveraging Artificial Intelligence in Sustainable Human Resource Management: Investigating Applications and Impacts

Dr.K.C. Arunadevi[1], Ms.V. Tamilarasi[2]

[1]Associate Professor G.R. Damodaran Academy of Management, Coimbatore, Tamil Nadu.
[2]Ph.D Research Scholar G.R. Damodaran Academy of Management, Coimbatore, Tamil Nadu.

Abstract
This study aims to explore the dimensions of AI technologies in the sustainable HRM set-up, discussing various ways to harness AI in sustainable HRM, its likely outcome, challenges, and ethical implications.AI has the potential to positively impact environmental sustainability via the afore mentioned benefits in HR and OD. Understanding AI within this context allows organizations to adopt tailored approaches that align the organization's workforce lifecycle-management with responsibilities around sustainable practices. This research identifies the importance of adding environmental sustainability perspective into HRM technologies to provide practitioners with knowledge and practical implications.

Keywords: Artificial Intelligence, Sustainable HRM, HR operations, Environmental sustainability

Introduction
In the rapidly advancing technical world, AI, artificial intelligence, does an important role in this prevalent role in all type of human life. Artificial intelligence (AI) is constantly revolutionizing conventional businesses. Those will turn into “automatic factories,” in which human labor is minimized and talent is used to fulfill. Environmental sustainability has become an increasingly critical focus worldwide. Organizations are leveraging AI-driven recruitment technologies to strengthen sustainability within their HRM functions.
AI encompasses technologies designed to simulate human thought processes and decision-making abilities.AI systems learn from data, adapt to new inputs and after2023, AI systems become more advanced and more capable of tackling a range of jobs and problems. Sustainable and eco-friendly HRM strategies describe the ways in which HRM policies and procedures are designed to embed environmental responsibility and promote sustainable organizational practices. This encompasses measures designed to protect and enhance employee well-being by reducing the negative impacts of organizational activities. This study investigates the advantages and limitations of using AI to advance sustainable and eco-friendly HRM, providing direction for future management practices in an increasingly digital ecosystem.

Need for the Study
This study is motivated by the growing pressure on businesses to adopt environmentally responsible policies and to leverage advanced technologies—such as Artificial Intelligence (AI)—to enhance the effectiveness and efficiency of Human Resource Management(HRM). Aligning technological progress with environmental sustainability objectives requires a deeper understanding of the potential benefits and drawbacks of using AI to support eco-friendly HRM practices. Furthermore, the expanding body of literature on AI, HRM, and sustainability highlights the importance of examining the specific impacts and outcomes of integrating AI technologies into sustainable HRM frameworks. To address this gap, the

present research investigates how AI can be effectively adopted within HRM processes to support both environmental sustainability goals and broader business objectives.

Review of Literature

Dr. Aarti Sharma et al (2023) explored culture impacting organizational processes especially HRM, directly and indirectly. According to a study, organizations will be required to embrace eco-friendly approaches in the workspace and technology will be key to embrace such sustainable practices in the workplace. **Dr.Harisha B.S. et al (2023**) explore the impact of AI on HR services, with a focus on recruitment and HR operations. The study highlights how AI enables HR to spend more time on strategic, higher-value tasks, as it automates repetitive tasks. Ethical considerations of AI in HR, including Algorithmic Bias and Data Privacy concerns, are also addressed. **Fazeelat Masood et al.(2023**) hypothesize that the synergy of combining AI and green HRM could develop an effective relationship for the management of business sustainability. Moreover, the study helps to create an understanding of the advantages and challenges that organizations of the future will face with regard to AI-driven green HRM initiatives. **Michalik et al. (2023**) illustrate the escalating pressure businesses in emerging economies experience to balance profitability with sustainable business practice. This study underlines the importance of HRM in balancing the environmental targets with organizational performance. **K. Gayathri et al. (2023)** note the impact of AI in recruitment and selection and how it can reduce subjective biases and expand the availability of candidates in the labour market. **Shreya Panwar (2023)** AI Plays Transformative Role in Human Resource Management: Employee Perspectives & HR Professionals Perspectives: HP: AI Benefits, Strengths, Opportunities, Challenges: Ethics, Shreya Panwar. The study further explores the determinants of organizations' intention to adopt AI-enabled HRM solutions. **Singh Rashmiet al. (2023)** explains that AI is becoming increasingly important in business, especially with respect to HR policies and practices. These findings show that organizations are gradually moving towards smart and green HRM due to the disruption of the COVID-19 pandemic. **Olena Sova et al. (2023)** propose that integrating sustainable HRM in business functions such as HRM can help mitigate this issue, one that is worrying ledgers to move to the forefront of HR in the future, including AI-driven HRM systems. **Fadi Sakka et al. (2022)**present two significant outcomes for AI-driven HR management: on the one hand, the shift to AI-assisted decision-making reduces mundane tasks and provides HR professionals with more time to work on essential initiatives and, on the other hand, the influence of artificial intelligence on the organizational redesign of HR departments. **Anjali Sabal et al (2022)** locate AI as a technology infrastructure vastly interlaced with the HR technology, having potential to advance or substitute the green HR practices (2022). The HR functions can be restructured through AI. **Wenhao Song et al. (2021)** reinforce that green HRM leads and catalyzes corporate green innovation. The green HRM has a positive impact on innovation in the work groups, and green human capital mediates this relationship. The conclusion also indicates that how management cares about the environment affects the relationship between GHRM and green innovation. **Minisha Gupta (2021**) argues that AI has made complex managerial tasks in corporate environments easier as its implementation is critical for "the successful deployment "of green HRM systems by organizations. Additionally, this study provides valuable insights for future research regarding green innovation and HRM. **Gurunadham Goli et al. (2020**) note the need for integrated green business strategies for aligning corporate environmental management with HRM. As an emerging HR tech, AI can streamline the HRM processes. **Prasanna Tambe et al**. **(2019)** highlight a disparity between the potential of AI and its deployment in HRM. In

their study, they identify the main challenges to AI implementation in the field of Human Resource Management (HRM) and offer tangible recommendations. **Vikas Garg et al (2018)** focus on the implication of AI in HRM practices, systems, and processes, most notably in the linkage of corporate environmental management with HRM. With the world wide transition to smart and sustainable organizations, AI is emerging as a game – changing tool that can supplement or replace traditional green HRM practices.

Research Gap

Although the use of AI in HRM and the broader field of sustainability have each been examined extensively, research on the role of AI within the specific context of sustainable HRM remains limited. A substantial gap persists in the existing literature. This study aims to address that gap by investigating how HRM can leverage AI technologies to promote greater environmental sustainability, enhance organizational performance, and improve employee well-being through the refinement and advancement of HRM practices.

Scope of the Study

This study aims to examine the role of artificial intelligence (AI) as a catalyst for enhancing environmental sustainability within human resource management (HRM) practices. Accordingly, the research will explore the various applications of AI in HRM that support environmentally sustainable outcomes. In addition, it will evaluate the advantages and potential drawbacks associated with integrating AI into sustainable HRM, offering practical recommendations for organizations seeking to implement such initiatives.

Objectives of the study

- ✓ To study the differences in the perception towards AI adoption in sustainable HRM with varied demographic factors
- ✓ To explore the relationship between Artificial Intelligence and sustainable human resource management practices
- ✓ To examine the impact of Artificial Intelligence on human resource practices

Limitations of the Study

The results will not apply to all contexts, since such contexts affect the adoption of AI in sustainable HRM (Reed, et al, 2011).The effects of the results were possibly influenced due to the limited time period for the study and a sample size of only 206 participants.

Research Methodology

This study employed a descriptive research design. A judgmental sampling method (a type of non-probability sampling) was used to select participants. This approach involves the deliberate selection of individuals who possess relevant expertise or who are considered representative of the subject matter under investigation. A total of 206 respondents from the Healthcare Technology (Health Tech) field contributed to the data collection.

Item	Respondents
Male	53
Female	153
Total	206

Hypotheses

✓ H1-To study the differences in the perception towards AI adoption in sustainable HRM with varied demographic factors.

✓ H2- To explore the relationship between artificial intelligence and sustainable human resource management practices.

✓ H3-To examine the impact of AI on human resource practices.

Analysis andInterpretation Chi-Square

✓ H1–There is significant differences exist in the perception towards AI adoption in sustainable HRM with varied demographic factors. Hypothesis accepted.

Table1:Chi-Square

Variable Tested	Chi-Square Value	df	p- Value	Decision
Gender× AI Integration in Eco-Friendly HRM	**0.093**	—	>0.05	**Not Significant**

Interpretation

The chi-square value (0.093) indicates no statistically significant association between gender and the integration of AI in eco-friendly HRM practices. Since the p-value is greater than 0.05, the null hypothesis is accepted, confirming that gender does not influence AI adoption within sustainable HRM.

Correlation

✓ H2–There is a significant relationship exists between artificial intelligence and sustainable human resource management practices.

Table2: Correlation Analysis

Relationship Examined	t-Value	p-Value	Significance
AI-Driven Decision Making× Eco-Friendly HRM Practices	**4.687**	**0.00000516**	**Highly Significant**

Interpretation

The correlation results reveal a strong and statistically significant relationship between AI-driven decision-making and eco-friendly HRM practices ($t = 4.687$, $p < 0.001$). This suggests that greater AI adoption is associated with stronger implementation of sustainable and environmentally conscious HRM processes. The hypothesis is accepted.

Regression

✓ H3–There is a significant impact of AI on human resource practices.

Table 3: Regression Analysis

(a) ANOVA Table

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	**2.893**	1	2.893	**8.021**	**0.031**

Residual	71.427	198	0.361	—	—
Total	74.320	199	—	—	—

Interpretation of the ANOVA Table

The ANOVA results show that the regression model is statistically significant (F=8.021, Sig. = 0.031). Since the p-value is below the 0.05 threshold, it indicates that the independent variable, as a whole, significantly predicts eco-friendly HRM practices.

This means that the model explains a meaningful portion of variance in the dependent variable, demonstrating that AI-related factors contribute significantly to sustainable HRM outcomes. The regression model therefore provides a valid statistical explanation for predicting eco-friendly HRM based on the chosen independent variable.

(b) Coefficients Table

Variable	Unstandardized B	Std. Error	Beta	t-Value	Sig.
Constant	**1.322**	0.177	—	**7.453**	< 0.001
Name(Independent Variable)	**0.278**	0.098	0.197	**2.826**	**0.031**

Interpretation of the Coefficients Table

The coefficients table shows that the independent variable Artificial Intelligence has a positive and statistically significant effect on eco-friendly HRM practices (B = 0.278, t = 2.826, p = 0.031). This indicates that a one-unit increase in the predictor variable leads to an estimated 0.278-unit increase in sustainable HRM performance. The hypothesis is accepted.

The constant value (B = 1.322, p < 0.001) suggests that even without the influence of the predictor variable, the baseline level of eco-friendly HRM remains positive. The standardized beta value (0.197) indicates a moderate effect size**,** meaning the predictor contributes reasonably to changes in the dependent variable.

Suggestions

AI-based sustainable human resource management supports the transformation of every component of an organization. AI-driven recruitment processes enhance the efficiency of hiring, optimize resource investment, and promote environmentally responsible practices. Smart learning solutions offer personalized training experiences, improving learning transfer while significantly reducing the need for costly and resource-intensive traditional training methods. AI-enabled workforce management systems can accurately forecast staffing requirements, helping organizations avoid overstaffing and thereby reducing unnecessary energy consumption. In addition, AI-powered collaboration tools facilitate remote work, lowering the carbon footprint associated with office occupancy and employee commuting, and contributing to broader sustainability goals. Data-driven AI analytics used for assessing environmental impact strengthen the development of sustainable HR initiatives and reinforce corporate social responsibility. Ethical AI governance frameworks ensure the responsible

deployment of algorithms, mitigate biases, and safeguard data privacy. Furthermore, AI-supported feedback loops enable continuous monitoring and refinement of HR practices, enhancing both operational efficiency and ecological stewardship.

Conclusion

Sustainable HRM is of high importance to organizations striving to balance technological advancement and environmental sustainability, and AI can assist in establishing this balance. Utilizing AI-driven tools for recruitment, employee training, workforce planning, and effective remote work organization empower businesses to maximize resource utilization, minimize carbon footprints, and promote ethical decision-making. But, in order to ultimately avoid negative consequences algorithmic discrimination, data privacy concerns, for example organizations need to embed transparency, accountability, and ethical governance throughout this journey. Integrating AI to a greener approach to HR not only improves operational efficiency but also helps the organizations to contribute to the cause by taking a step towards environmental conservation, paving the way for a sustainable future for their businesses as well as for the planet.

Reference

1. Ahmad Arslan et al., (2021) "Artificial intelligence and human workers interaction at team level: a conceptual assessment of the challenges and potential HRM strategies" Vol. 43 No. 1.
2. Anjali Sabale et al.,(2022)"Artificial Intelligence Supported Green HRM Practices for Socially Responsible and Environmental Sustainability".
3. Dr. Aarti Sharma et al., (2023) "ROLE OF AI IN GREEN HRM IN PURSUIT OF SUSTAINABLE DEVELOPMENT".
4. Dr. Harisha B S., (2023) "The Role Of Artificial Intelligence In Hr: Transforming Recruitment and HR Operations" BOLETÍN DE LITERATURA ORAL, 10 (2023), PP.1374-1384.
5. Dr. R.A Rathi.,(2018)"Artificial intelligence and the future of hr practices".
6. Fazeelat Masood et al., (2023) "Artificial Intelligence and Green Human Resource Management: Navigating the Challenges" DOI:10.4018/979-8-3693-0039-8.ch008.
7. Gurunadham Goli et al., (2020) "Application of Artificial Intelligence on HRM for Green Business".
8. K. Gayathri et al., (2023) "THE IMPORTANCE OFARTIFICIAL INTELLIGENCE SYSTEMS AS A NEW DECISION-MAKING AGENT IN HRM.
9. Minisha Gupta., (2021) "The Role of Artificial Intelligence in Adopting Green HRM Practices" DOI: 10.1201/9781003145011.
10. Peter Hogg., (2019)"Artificial intelligence: HR friend or foe?"ISSN: 1475-4398.
11. Prasanna Tambe et al., (2019) "Artificial Intelligence in Human Resources Management: Challenges and a Path Forward" Volume 61, Issue 4 https://doi.org/10.1177/000812561986791.
12. R. Menaka., (2023) "Role of Artificial Intelligence (AI) in Human Resource Management (HRM) in Recent Era" Shanlax International Journal of Management 11(2):32-38 DOI: 10.34293/management. v11i2.6664.
13. Saeed Aldulaimi., (2020) "Trends and Opportunities Of Artificial Intelligence In Human Resource Management: Aspirations For Public Sector In Bahrain" VOLUME 9, ISSUE 01.
14. Samuel Ogbeibu et al., (2023) "Demystifying the roles of organisational smart

technology, artificial intelligence, robotics and algorithms capability: A strategy for green human resource management and environmental sustainability" DOI:10.1002/bse.3495.
15. Vikas Garg et al., (2018) "Application of Artificial Intelligence for Sustaining Green Human Resource Management" DOI: 10.1109/ICACE.2018.8686988.
16. Wenhao Songetal.,(2021)"Effects of green human resource management and managerial environmental concern on green innovation" ISSN: 1460-1060.