

Role of Artificial Intelligence in Green Human Resource Management: An Integrated Framework for Sustainable People Management

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Abstract

This paper examines the rapidly developing relationship between Artificial Intelligence (AI) and Green Human Resource Management (GHRM). As organizations pursue environmental objectives while digitizing their HR systems, AI is increasingly being considered for recruitment, learning, performance assessment, employee engagement and workforce analytics. The paper argues that the sustainability contribution of AI cannot be inferred from automation alone. A critical review of foundational GHRM scholarship and recent AI-HRM, AI-GHRM and Green-AI research is used to identify the principal applications, benefits, risks and unresolved questions. The review indicates that AI can make green HR practices more targeted, continuous and evidence-informed, but outcomes depend on employee digital capability, green organizational climate and responsible governance. The paper therefore proposes an integrated framework in which AI capability strengthens GHRM practices; digital literacy, green climate and responsible AI governance influence implementation; employee green behaviour provides the behavioural pathway; and environmental and organizational sustainability form the principal outcomes. The review also highlights the environmental cost of AI itself, requiring organizations to consider both the benefits of AI-enabled sustainability and the footprint of the technology used. Eighteen recent studies are critically compared, revealing gaps in measurement, causal evidence, Indian-context research, responsible-AI integration and objective environmental indicators. Nine propositions are offered for future empirical testing.

Keywords: Artificial Intelligence; Green Human Resource Management; Sustainable HRM; Employee Green Behaviour; Digital Literacy; Green Organizational Climate; Responsible AI; Organizational Sustainability; Green AI.

1. Introduction

Environmental responsibility is increasingly embedded in organizational decision making. Although sustainability policies may be designed at the strategic level, their practical effect depends heavily on employees: people select materials, operate equipment, follow procedures, conserve resources, participate in improvement programmes and generate new ideas. HRM therefore has a direct role in converting environmental commitments into workforce capability and routine behaviour.

GHRM emerged from this recognition by incorporating environmental considerations into recruitment, training, performance management, rewards and employee involvement. Foundational work established HRM as a bridge between people management and environmental management

(Jackson et al., 2011; Renwick et al., 2013). Dumont et al. (2017) subsequently showed that green HR practices can influence workplace green behaviour through psychological green climate and employee green values. Recent reviews continue to identify green recruitment, training, performance management and rewards as important sustainability levers (Miah et al., 2024; Lawter & Garnjost, 2025).

AI introduces a second transformation. Machine learning, predictive analytics, natural language processing, recommendation systems and conversational tools are changing recruitment, learning, evaluation and employee support. Recent reviews describe rapid growth in AI-HRM research, while dedicated AI-GHRM studies increasingly examine green recruitment, environmental training and performance management (Khan et al., 2025; Alherimi et al., 2025).

However, digitalization is not synonymous with sustainability. An automated selection system may be efficient but biased; a learning platform may personalize training without changing behaviour; performance analytics may improve visibility while creating surveillance concerns. AI also consumes computing resources. Green-AI research shows that the environmental footprint of AI itself must be considered (Verdecchia et al., 2023). The appropriate research question is therefore not simply whether AI can be used in GHRM, but when and how it creates net sustainable value. This paper adopts a socio-technical view and integrates recent evidence into a framework connecting AI capability, GHRM, enabling conditions, employee green behaviour and sustainability performance. It also identifies research gaps and proposes testable relationships for future studies.

2. Problem Statement

Research on AI-HRM and GHRM is expanding, yet their intersection remains fragmented. Studies differ in definitions, outcomes, sectors and methods, and many rely on employee perceptions rather than objective environmental measures. AI is sometimes treated as a tool, sometimes as a mediator and sometimes as a strategic capability. This inconsistency makes it difficult for organizations to determine whether AI-enabled HR actually improves sustainability. A stronger model must explain the behavioural and organizational mechanisms that connect technology with environmental outcomes while also accounting for fairness, privacy and the ecological cost of AI.

3. Objectives of the Study

- Examine the emerging relationship between AI and GHRM.
- Identify AI applications across major green HR functions.
- Critically synthesize recent research on AI-enabled GHRM and sustainability.
- Assess digital literacy, green climate and responsible AI governance as enabling conditions.
- Identify theoretical, methodological and contextual gaps.
- Develop an integrated framework and propositions for future empirical research.

4. Review Approach and Scope

A critical narrative review was undertaken, prioritizing recent peer-reviewed research from 2024–2026 and retaining foundational GHRM studies for theoretical grounding. Literature was grouped into recruitment, green learning, performance management, rewards and engagement, digital

capability and climate, and sustainability analytics and governance. Recent systematic reviews were used to map the field, while empirical studies were assessed for context, mechanism, measurement and limitations. The review is interpretive and does not claim meta-analytic effect sizes or causal estimates.

5. Theoretical Foundations

5.1 Green Human Resource Management

GHRM aligns people-management systems with environmental objectives. Its strategic value is strongest when recruitment, development, appraisal, rewards and participation reinforce a common environmental direction. The approach established by Jackson et al. (2011) and Renwick et al. (2013) remains relevant because it explains how HR can become part of environmental management rather than an administrative support function.

5.2 Resource-Based View

AI software is increasingly accessible and therefore may not itself be a durable source of advantage. The more difficult-to-copy capability lies in combining AI with environmental expertise, quality data, employee digital skills, managerial judgement and organizational routines. AI-enabled GHRM is consequently treated as a composite technological and human capability.

5.3 Ability–Motivation–Opportunity Perspective

AI-supported learning can build ability; green feedback and rewards can influence motivation; and digital participation tools can create opportunities for employees to contribute to sustainability. The AMO perspective therefore helps explain why AI adoption should be evaluated through employee behaviour rather than technology use alone.

5.4 Socio-Technical Perspective

AI-HRM systems combine technical infrastructure with people, culture and governance. Recent research on AI-augmented HRM identifies implementation tensions involving accountability, employee consequences and human oversight (Anshima et al., 2026). This makes the socio-technical perspective especially appropriate for GHRM, where trust and organizational legitimacy matter alongside efficiency.

6. Critical Literature Review

Table 1 deliberately compares contribution and limitation so that recent findings are not presented as universally established effects.

Study	Design / Context	Main Contribution	Critical Assessment
Jia & Hou (2024)	Survey; 470 employees, China	AI-driven sustainable HRM linked with engagement and performance.	Environmental outcomes were secondary; causal direction requires stronger designs.
Bujold et al. (2024)	Responsible-AI review	Fairness, accountability, transparency and	Ethical foundation; environmental sustainability is not the main outcome.

		privacy are central to AI-HRM.	
Miah et al. (2024)	GHRM systematic review	Synthesizes links between GHRM and organizational sustainability.	AI is largely absent from the explanatory model.
Arora et al. (2024)	GHRM systematic review	Maps green recruitment, training, performance and rewards.	Digital transformation remains underdeveloped.
Wójcik (2024)	Conceptual analysis	Algorithmic discrimination can weaken sustainable HRM.	Important risk perspective; limited empirical validation.
Masood et al. (2024)	Conceptual AI-GHRM paper	Identifies opportunities and implementation challenges.	Requires stronger empirical testing.
Alherimi et al. (2025)	PRISMA review; 53 papers	Maps AI technologies and GHRM applications.	Confirms fragmentation and limited maturity of the field.
Hussin et al. (2025)	Systematic review	Highlights adoption, readiness, ethics, leadership and infrastructure.	Limited causal evidence.
Ibrahim & Abu Eitah (2025)	Literature review	Reports generally positive implications for GHRM effectiveness.	Evidence base is heterogeneous.
Mahat et al. (2025)	Survey; 400 bank employees, Nepal	AI positioned in the GHRM–sustainable workplace relationship.	Sector-specific and cross-sectional.
Lawter & Garnjost (2025)	PRISMA review; 180 studies	Connects GHRM with environmental, social and firm outcomes.	AI is not the principal mechanism.

Anshima et al. (2025)	Indian review; 57 studies	Maps Indian GHRM antecedents, mediators and outcomes.	Explicit AI-GHRM evidence remains limited.
Ajuluchukwu et al. (2026)	Cross-sectional; 3,600 professionals	Links AI eco-feedback and green training with sustainability through digital literacy and green climate.	Large sample but limited causal inference.
Saiyed et al. (2026)	PLS-SEM and machine learning	AI-enabled and gamified GHRM associated with environmental engagement.	Replication is needed across sectors.
Singh & Sinha (2026)	Systematic review; 35 papers	Connects AI-driven GHRM with circular-economy transition.	Needs more direct empirical testing.
Dinh et al. (2026a)	Hotel-sector empirical study	Connects AI, GHRM, green behaviour and sustainable performance.	Hospitality context limits generalization.
Dinh et al. (2026b)	Hotel-sector empirical study	Links AI/GHRM with CSR, low-carbon behaviour and performance.	Context-specific evidence.
Verdecchia et al. (2023)	Green-AI systematic review; 98 studies	Shows that AI itself has an environmental footprint.	Provides a necessary boundary condition for AI-for-Green claims.

Table 1. Critical synthesis of selected recent AI-GHRM and sustainability research.

7. AI Applications in GHRM

7.1 Green Recruitment and Selection

AI can screen and match candidates against sustainability-related competencies and can reduce some paper and travel requirements. Yet algorithmic screening may reproduce historical bias. Sustainable recruitment therefore requires transparent criteria, bias testing, human review and a mechanism for candidates to challenge outcomes.

7.2 Green Training and Development

Adaptive AI learning can tailor environmental content to job roles, identify knowledge gaps and deliver immediate feedback. Its real value should be assessed through behavioural transfer rather

than completion rates alone. Alherimi et al. (2025) identify training as a major AI-GHRM application.

7.3 Green Performance Management

AI can consolidate environmental indicators and provide frequent feedback on green performance. Potential indicators include resource conservation, waste reduction and participation in environmental programmes. Excessive monitoring, however, can create surveillance concerns; transparency and proportionality are essential.

7.4 Green Rewards and Recognition

AI can organize evidence of sustainability contributions and support recognition. Managers should retain responsibility for contextual judgement, while algorithmic reward recommendations should remain explainable and auditable.

7.5 Green Employee Engagement

Dashboards, conversational systems, idea platforms and gamification can make environmental information more accessible. Their strongest value occurs when employees can act, propose improvements and monitor results, rather than simply receive automated reminders.

7.6 Sustainability HR Analytics

AI can connect workforce data with sustainability indicators, helping organizations evaluate training, environmental competencies and participation. Data minimization, privacy and access controls are essential because analytical capability does not justify unlimited employee-data collection.

8. Digital Literacy

AI-enabled GHRM depends on employee capability. Digital literacy includes the ability to operate AI tools, interpret outputs, recognize uncertainty and question automated recommendations. Recent evidence suggests that digital literacy can help transmit AI-enabled GHRM effects to sustainability (Ajuluchukwu et al., 2026). Organizations should therefore develop AI capability and environmental competence together.

9. Green Organizational Climate

Employees respond not only to formal policies but also to shared signals about what management genuinely values. Green organizational climate captures this shared perception. Dumont et al. (2017) demonstrated its importance for workplace green behaviour, and recent AI-GHRM research suggests that climate can help explain differences in sustainability outcomes. Technology can provide information; climate influences whether employees act on it.

10. Employee Green Behaviour

Employee green behaviour is the behavioural bridge between HR systems and environmental outcomes. It includes conserving resources, reducing waste, complying with environmental procedures, joining green initiatives and generating eco-innovative ideas. AI can support these behaviours through learning, feedback and recognition, but cannot replace credible leadership or feasible work practices.

11. Organizational Sustainability Performance

Sustainability performance should be assessed through more than employee perceptions. Energy use, waste, emissions where measurable, resource efficiency, green innovation and responsible workplace practices provide stronger outcome indicators. Recent GHRM reviews reinforce the connection between integrated green HR systems and sustainability performance (Lawter & Garnjost, 2025).

12. The AI Sustainability Paradox

AI may reduce paper, travel and some administrative resource use while increasing electricity, storage and computing requirements. Green-AI research demonstrates that AI has its own ecological footprint (Verdecchia et al., 2023). AI-GHRM research should therefore evaluate net environmental impact rather than assuming that digital transformation is automatically green.

13. Research Gaps

Gap	Current Limitation	Future Direction
Conceptual fragmentation	AI is treated as tool, mediator or capability.	Test an integrated capability–GHRM–behaviour–sustainability model.
Weak environmental measurement	Perceptions dominate many studies.	Combine survey data with objective environmental indicators.
Cross-sectional designs	One-time surveys limit causal inference.	Use longitudinal, multi-wave or experimental methods.
Indian evidence gap	Explicit AI-GHRM evidence is still emerging in India.	Test the framework across Indian sectors and firm sizes.
Mechanism gap	Human and cultural mechanisms are inconsistently modeled.	Test digital literacy, green climate and green behaviour.
Responsible-AI gap	Ethics is often separated from sustainability.	Integrate fairness, privacy, transparency and accountability.
Green-AI gap	AI environmental cost is rarely measured.	Include computational and infrastructure footprint.
Measurement gap	No universal AI-GHRM scale exists.	Develop and validate a multidimensional instrument.

Table 2. Research gaps and directions.

14. Proposed Conceptual Framework

The proposed model positions AI capability as an enabling resource rather than a direct guarantee of sustainability. AI is expected to strengthen GHRM practices. Digital literacy and green organizational climate create conditions for effective use, while responsible AI governance protects

trust and fairness. Employee green behaviour is the principal behavioural pathway toward sustainability performance.

AI Capability	AI-enabled GHRM	Enabling Conditions	Behavioural Mechanism	Sustainability Outcomes
Automation Analytics Prediction Personalization	Green recruitment Green learning Green performance Green rewards Engagement HR analytics	Digital literacy Green climate Responsible AI governance	Green knowledge Participation Green behaviour	Environmental performance Resource efficiency Green innovation Sustainable performance

Figure 1. Integrated conceptual framework for AI-enabled GHRM.

15. Research Propositions

- P1. Organizational AI capability is positively associated with GHRM adoption.
- P2. AI-enabled GHRM is positively associated with employee green behaviour.
- P3. AI-supported green learning is positively associated with sustainability knowledge and digital capability.
- P4. Digital literacy mediates the relationship between AI-enabled GHRM and employee green behaviour.
- P5. Green organizational climate mediates the relationship between AI-enabled GHRM and employee green behaviour.
- P6. Employee green behaviour is positively associated with sustainability performance.
- P7. Employee green behaviour mediates the relationship between AI-enabled GHRM and sustainability performance.
- P8. Responsible AI governance strengthens the positive effects of AI-enabled GHRM.
- P9. The net sustainability value of AI-enabled GHRM depends on the environmental efficiency of the AI infrastructure.

16. Discussion

Recent evidence supports the idea that AI can extend the reach of GHRM, but the relationship is conditional rather than automatic. Jia and Hou (2024) connect AI-driven sustainable HRM with engagement and performance; Mahat et al. (2025) examine AI within the GHRM–sustainable workplace relationship; and Ajuluchukwu et al. (2026) highlight digital literacy and green climate as mechanisms. Together, these studies support a capability perspective in which technology creates possibilities and people and context determine whether those possibilities become behaviour.

Responsible AI should be treated as part of sustainable GHRM. Bias, privacy, transparency and accountability affect the social legitimacy of AI-HRM systems (Bujold et al., 2024; Naoum et al., 2026). An AI system that saves resources but systematically disadvantages employees cannot reasonably be described as fully sustainable.

Measurement remains a major weakness. Future research should link HR interventions with concrete environmental indicators rather than relying only on perceptions. Longitudinal and multi-source designs would provide stronger evidence about whether AI-enabled GHRM produces persistent environmental improvement.

The environmental footprint of AI must be included in future models. The sustainability question is not simply whether HR becomes digital, but whether the overall system creates a positive environmental balance.

17. Managerial Implications

- Start with measurable environmental objectives before selecting AI tools.
- Build AI literacy and environmental competence together.
- Use transparent and auditable criteria in AI-supported recruitment.
- Make green learning adaptive, continuous and role-specific.
- Use performance analytics without disproportionate surveillance.
- Keep AI-assisted rewards explainable and subject to human review.
- Create digital channels for employee green ideas and participation.
- Establish governance for fairness, privacy, transparency and accountability.
- Measure the ecological footprint of AI systems.
- Connect HR sustainability indicators with organizational ESG and environmental measures.

18. Relevance to Indian Organizations

India is a particularly relevant setting because digital transformation and sustainability pressures are developing together. A review of 57 Indian GHRM studies identifies policy requirements, organizational capabilities, employee empowerment and environmental knowledge as important influences (Anshima et al., 2025). Yet organizations differ in digital maturity and environmental exposure. IT firms may emphasize digital recruitment and learning; manufacturing firms can link HR practices to energy, waste and emissions; banking and service organizations can examine paperless processes and employee environmental behaviour. Sectoral comparison would therefore be valuable.

19. Scope for Future Research

- Develop and validate an AI-enabled GHRM measurement scale.
- Use longitudinal and multi-source designs.
- Combine employee measures with objective environmental data.
- Test the framework across Indian IT, manufacturing, banking and service organizations.
- Examine digital literacy and green climate as mechanisms.
- Study trust, surveillance and algorithmic transparency as moderators.
- Connect AI-GHRM with green innovation and circular economy.
- Measure AI energy and resource requirements.
- Compare AI-enabled GHRM with conventional digital HR.
- Conduct cross-country research.

20. Limitations

This is a conceptual review and does not report original empirical testing. The AI-GHRM field is young, terminology is inconsistent and much evidence remains cross-sectional. Rapid technological change may also make particular applications obsolete quickly. The propositions should therefore be treated as a research agenda rather than confirmed causal relationships.

21. Conclusion

AI can make GHRM more adaptive, analytical and continuous across recruitment, learning, performance management, engagement and workforce analytics. Yet technological adoption alone does not establish sustainability. The stronger interpretation is that AI provides a capability that must be combined with employee digital literacy, green organizational climate, responsible governance and credible environmental objectives. Employee green behaviour then provides the behavioural pathway through which HR interventions can influence sustainability performance. At the same time, the environmental footprint of AI itself must be evaluated. AI-enabled GHRM should ultimately be judged by the net value it creates for employees, organizations and the environment.

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