Journal of Management Practices, Humanities and Social Sciences

Vol 10 Issue 5 pp. 715-729

https://doi.org/10.33152/jmphss-10.5.2

ORIGINAL CONTRIBUTION

The Role of Artificial Intelligence-Enabled Human Resource Systems in Green Human Resource Management Implementation and Organizational Sustainability

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Abstract— Organizations confront pressure to meet viability goals while following digital transformation methodologies in parallel. Green Human Resource Management (Green HRM) has resulted in a schematic approach for amalgamating environmental and human resource practices. However, limited research has evaluated how Artificial Intelligence (AI)-enabled HR systems can consolidate Green HRM implementation and ensure sustainability objectives. This study examines the role of AI-enabled HR systems in boosting Green HRM practices and departmental consolidation performance. Relying upon the asset-dependent perspective and Dynamic Capabilities Theory, this study proposes a model linking AI-enabled HR systems, Green HRM manifestation, staff green ethics, green novelty expertise, and viability manifestation. Data were collected from 280 targeted subjects working in departments enforcing digital HR systems and sustainability initiatives. The model in view was critically analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). Green HRM implementations are strengthened by AI-enabled HR systems, as indicated by the findings of the research, and organizational sustainability performance is significantly influenced. Green HRM practices boost sustainability outcomes through employee green behavior and green innovation capability. Furthermore, organizational digital readiness consolidates the relationship between AI-enabled HR systems and Green HRM implementation. This paper summarizes Green HRM research by presenting AI-enabled HR capabilities as a new tactical resource for sustainability change. The study explains how digital intelligence may improve human capital development, employee pro-environmental behavior, and corporate innovation capability.

Index Terms— Artificial intelligence, Green human resource management, Sustainable HRM, Employee green aptitude, Green innovation, Digital transformation, Sustainability performance

Received: 29 March 2026; **Accepted:** 25 August 2026; **Published:** 15 September 2026

Introduction

The mounting intensity of environmental problems, including climate change, resource exhaustion, and ecological deterioration, has prompted organizations to rethink conventional approaches to management and competitiveness. Modern organizations are increasingly expected to achieve economic goals while at the same time displaying environmental and social responsibilities. As a result, sustainability has emerged from a voluntary corporate initiative into a strategic priority impacting organizational policies, processes, and decision-making. (Joshi et al., 2023; Ren et al., 2017). Human resources constitute a vital aspect of sustainability transformation because employees are obliged to implement environmental tactics in daily organizational tasks. In this regard, Green Human Resource Management (Green HRM) emerged as a significant perspective blending environmental goals into HR policies, including recruitment, training, performance evaluation, incentives, and employee

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engagement (Ren et al., 2017). Organizations can develop employee environmental awareness through green HRM practices, enhance green competencies, and boost environmentally responsible behaviors (Ahmad et al., 2023; Yong et al., 2019).

Recent work emphasizes the importance of artificial intelligence in improving Green Human Resource Management and organizational sustainability. According to recent research, AI-integrated GHRM practices improve organizational sustainability through a green organizational environment and digital literacy, illustrating how AI can help with sustainability outcomes (Ajuluchukwu et al., 2026). Alshuaibi et al. (2024) discovered that GHRM practices have a considerable impact on green innovation and contribute to long-term business performance, while digital learning and big data analytics boost these associations even more. Doghan (2024) also performed a study in Saudi SMEs and discovered that GHRM practices have a beneficial impact on green capability and performance, with green capability mediating some of these correlations. Overall, our data show that incorporating AI, digitally enabled HR practices, green innovation, and green innovation capabilities is a crucial step toward organizational sustainability.

In addition, some recent studies illustrate that Green HRM contributes positively to organizational durability performance by promoting employee involvement, environmental behavior, and green innovation capability (Mustafa et al., 2023; Yasin et al., 2022). Green HRM enables organizations to align employee knowledge, encouragement, and talent with sustainability goals, thereby transforming human resources into a strategic sustainability asset. According to the Resource-Based View (RBV), organizations achieve competitive advantage through valuable internal assets, making them difficult for competitors to emulate (Barney, 1991). In this context, environmentally sensitive employees, sustainability-oriented organizational practices, and green capabilities represent strategic resources that support durable sustainability performance.

However, organizations continue to experience issues in implementing Green HRM effectively. Many organizations lack advanced mechanisms for gauging employee environmental engagement, examining sustainability-linked behaviors, and aligning HR outcomes with sustainability targets (Joshi et al., 2023). Conventional HR systems often provide limited analytical capabilities, making it difficult for organizations to identify sustainability competencies, map out green tendencies, and develop targeted environmental initiatives. These limitations highlight the need for technological solutions that can enhance the impact, measurement, scalability, and tactical depth of Green HRM reinforcement.

The rapid advancement of Artificial Intelligence (AI) facilitates new access for transforming HR systems and addressing these limitations. AI-related skills, including predictive analytics, natural language processing, machine learning, and automation, enable organizations to advance workforce decision-making capacity, boost HR delivery, and generate deeper insights from employee data (Kshetri, 2021; Siachou et al., 2021). AI can support green recruitment by spotlighting sustainability-related talent, refreshing environmental training through individualized learning systems, and boosting sustainability measurement through workforce analytics (Margherita & Braccini, 2021) within sustainability-oriented HR management.

Recent developments in digital transformation additionally suggest that AI-enabled HR systems are emerging as a crucial product for amalgamating technological potential with sustainability-oriented human resource tactics. In contrast to conventional HR technologies, AI-enabled systems can facilitate forecasting and analysis of employee competence, behavioral cycles, and sustainability-related efficiency. Through AI-driven analytics, departments can identify environmental potential, Person-related sustainability learning, measure staff participation in green initiatives, and support evidence-based sustainability policies (Budhwar, Chowdhury, Wood, Aguinis, Bamber, Beltran, Boselie, Lee Cooke, Decker, DeNisi, et al., 2023b; Vrontis et al., 2021). Moreover, recent analysis highlights the power of AI in creating sustainability value when integrated with organizational capabilities, ethical supervision setup, and human-centered management activities rather than being adopted as an isolated technological remedy (Dwivedi et al., 2023; Verdecchia et al., 2023). Therefore, AI-enabled HR systems represent not only a digital transformation tool but also a strategic capability that can strengthen Green HRM implementation and enhance organizational sustainability outcomes.

Despite growth in AI and sustainability, limited research has examined how AI-enabled HR systems strengthen Green HRM implementation and through which mechanisms these technologies influence sustainability performance. Existing studies have highlighted the direct relationship between Green HRM and sustainability outcomes, while not enough attention has been paid to the technological mechanisms that enhance Green HRM effectiveness (Ali et al., 2025; Chowdhury et al., 2025). Furthermore, previous research has primarily examined the effects of AI-enabled Green HRM on sustainability outcomes, rather than individual-based outcomes such as green organizational climate, digital literacy, green digital learning, green innovation, and green capability (Ajuluchukwu et al., 2026; Alshuaibi et al., 2024; Doghan, 2024). Though the current study has established links between GHRM, green innovation, and sustainable performance, little attention has been paid to the sequential behavioral and innovation processes by which AI-enabled GHRM encourages employees to engage in green behaviors and then develops green innovation capability. Furthermore, the influence of Organizational Digital Readiness as a boundary condition has not been properly investigated. As a result, the current study fills this gap by developing a theoretical explanation for variables and empirically testing a cohesive framework.

Drawing upon the Resource-Based View (RBV) and Dynamic Capabilities Theory, this study proposes an integrated framework suggesting that AI-enabled HR systems influence sustainability outcomes through Green HRM practices, employee green attitude, and green innovation capability, while considering organizational digital readiness as a critical boundary condition. By interlinking digital transformation with sustainable human asset management, this research facilitates a clearer, more in-depth comprehension of how emerging technologies can facilitate departmental change. This study addresses the following research question:

RQ: How can AI-enabled HR systems strengthen Green HRM implementation for organizational sustainability?

To resolve this debate, the study analyzes multiple major aspects. Firstly, it explores how AI-enabled HR systems enhance Green HRM

implementation by transforming consolidation-based enrollment, recruitment, training, output evaluation, and data-based HR announcements. Secondly, it investigates how Green HRM fulfills sustainability performance through subordinate green attitude and green innovation capabilities, figuring out the contribution of employees as prominent factors of environmental transformation. Thirdly, it evaluates how organizational digital readiness impacts the results of AI adoption, identifying that technological benefits depend on suitable infrastructure, expertise, and organizational capabilities. Together, these aspects facilitate an in-depth comprehension of how AI-driven HR mechanisms can facilitate sustainable human asset activities and consolidate departmental independence results.

The remainder of this article is organized as follows. The following section outlines the theoretical framework and revisits the prevailing literature on AI-enabled HR framework, Green HRM, employee environmentally friendly conduct, green innovation capability, and sustainability performance. This section also advances the research hypotheses and illustrates the theoretical basis, relying on the Resource-Based View and Dynamic Capabilities Theory. The following part outlines the research tactics, including the research framework, data collection methodology, measurement scales, and data examination perspective using PLS-SEM. The following section outlines the empirical observatory, including gauging model assessment, structural model examination, hypothesis testing, and mediation and moderation analyses. Lastly, the article elaborates on the outcomes, conceptual facilitation of managerial risks, limitations, and directions for future research.

Literature Review and Hypothesis Development

Green HRM and sustainability performance

Green Human Resource Management (Green HRM) refers to the tactical blend of environmental consolidation principles into human resource management systems to advance environmentally conscious employees and support departmental sustainability goals. Green HRM encompasses different practices, including green recruitment and selection, green training and development, green performance management, green incentives, and employee involvement in environmental steps (Ren et al., 2017). The organization benefits from these activities, to include consolidation ethics into its human resource methodologies by boosting employees' environmental know-how, skills, motivation, and commitment toward ecological goals.

Recent studies demonstrate that Green HRM has become a significant organizational mechanism for achieving sustainability outcomes because it aligns employee capabilities with environmental strategies. By providing sustainability-oriented training, supporting green behaviors, and incorporating environmental criteria into performance evaluation and incentive systems, Green HRM motivates employees to participate actively in environmental improvement activities. Consequently, employees are more likely to engage in resource conservation, waste reduction, eco-friendly practices, and sustainability-related initiatives that contribute to improved organizational environmental and overall sustainability performance (Ahmad et al., 2023; Ali et al., 2025).

The relationship between Green HRM and sustainability performance can be conceptualized through the Resource-Based View (RBV) theory (Aziz et al., 2026; Barney, 1991), which suggests that organizations acquire sustainable competitive advantages by developing valuable and difficult-to-replicate internal resources. Human resources, employee knowledge, environmental competencies, and organizational learning capabilities represent strategic resources that can boost sustainability outcomes. Green HRM facilitates the development of these resources by transforming employees into active contributors to sustainability goals rather than passive participants in organizational environmental programs.

In addition, existing research indicates that Green HRM practices positively impact corporate sustainability performance by strengthening employee green behavior, organizational green culture, and environmental talent. For example, Ali et al. (2025) found that Green HRM practices significantly contribute to corporate sustainability performance by shaping employee-oriented sustainability mechanisms. Similarly, recent empirical evidence portrays that Green HRM improves environmental performance through mechanisms involving employee authority, green ingenuity, and employee performance.

Consequently, Green HRM can be considered a strategic capability that enables organizations to keep human resources practices in step with sustainability aims. Through the development of environmentally skilled and willing employees, Green HRM enhances an organization's ability to achieve environmental, social, and economic sustainability goals. Based on RBV theory and recent empirical findings, this study proposes the following hypothesis:

H1: Green HRM practices positively influence organizational sustainability performance

AI-Enabled HR systems and green HRM implementation

Human resource management has advanced considerably through AI-enabled HR systems by amalgamating artificial intelligence, machine learning, forecasting analytics, and automation technologies into HR processes. These systems provide organizations with advanced analytical capabilities that enhance HR decision-making, workforce planning, talent management, and employee development (Judijanto & Nurhayati, 2026; Kshetri, 2021). Unlike traditional HR information systems, AI-enabled HR platforms can process large volumes of workforce data to generate predictive

insights, identify employee capabilities, and support strategic decisions aligned with organizational sustainability objectives. Ibrahim and Eitah (2025) conducted a review of research on AI and GHRM effectiveness.

AI technologies can considerably boost Green HRM implementation by embedding sustainability considerations into comprehensive HR processes. AI supports sustainability by using recruitment analytics to help organizations identify candidates with environmental values and sustainability-oriented competencies. AI-driven individual learning systems can provide employees with customized environmental training based on individual knowledge, gaps, and sustainability roles. Furthermore, automated sustainability performance monitoring allows organizations to evaluate employee contributions to green objectives, while predictive workforce analytics support proactive identification of opportunities to improve environmental engagement and organizational sustainability outcomes.

Recent research indicates that the integration of artificial intelligence into HR functions boosts organizations' capability to develop data-driven and sustainability-oriented HR practices. AI-enabled HR analytics facilitate evidence-based decision-making by providing real-time insights into employee behaviors, skills, and performance patterns, allowing organizations to design more targeted green HRM initiatives (Budhwar, Chowdhury, Wood, Aguinis, Bamber, Beltran, Boselie, Lee Cooke, Decker, DeNisi, et al., 2023a). Moreover, AI-driven automation curtails administrative workloads and enables HR professionals to focus on strategic activities such as sustainability capability development, employee engagement, and organizational learning. As organizations increasingly adopt digital transformation strategies, AI has become an important technological capability for aligning human resource practices with environmental sustainability goals (Vrontis et al., 2021).

The link between AI-enabled HR systems and Green HRM implementation may be illustrated based on Dynamic Capabilities Theory (Teece, 2007), which stresses an organization's ability to sense environmental variation, seize strategic opportunities, and transform internal resources to maintain competitiveness. AI boosts these dynamic capabilities by enabling organizations to address sustainability challenges through advanced analytics, adapt HR strategies based on changing environmental requirements, and continuously transform workforce capabilities. Through AI-supported calculation, learning, and modeling mechanisms, businesses can foster green HRM systems more effectively that integrate sustainability into employee management activities.

Therefore, AI-enabled HR systems serve as a crucial technological enabler that boosts the implementation and effectiveness of Green HRM activities. By improving analytical capabilities, personalization, monitoring, and strategic alignment, AI enables organizations to develop environmentally responsible human capital and strengthen sustainability-oriented HR strategies.

H2: AI-enabled HR systems positively influence Green HRM implementation.

AI-Enabled HR systems and sustainability performance

AI-enabled HR systems contribute to organizational sustainability by refining operational effectiveness, maximizing resource utilization, and enabling data-driven decision-making through advanced data analytics (Verdecchia et al., 2023). By examining workforce data, forecasting future capability needs, and automating sustainability-related monitoring processes, AI allows organizations to identify opportunities for reducing inefficiencies and improving environmental and social outcomes. Kumar et al. (2025) investigated AI-based GHRM and showed its potential to improve corporate eco-efficiency through sustainability-focused HR practices.

Studies carried out in the recent past also indicate that AI-driven technologies can support sustainability performance by enhancing organizational foresight, promoting data-driven sustainability strategies, and enabling proactive responses to environmental challenges (Dwivedi et al., 2023). However, AI's sustainability benefits do not emerge automatically; they depend on effective integration with organizational processes, employee capabilities, norm-based governance, and strategic management practices. When AI systems are integrated with suitable human resource operations, they can foster organizational learning, refine sustainable decision-making, and boost long-term sustainability outcomes.

Therefore, AI-enabled HR systems represent a valuable technological capability that helps organizations transform workforce management processes into sustainability-oriented practices. Based on these arguments, we propose the following hypotheses:

H3: AI-enabled HR systems positively influence sustainability performance.

Mediating role of employee green behavior

Employee green behavior represents environmentally responsible actions performed by staff, including resource conservation, waste reduction, energy-saving practices, and active participation in organizational environmental initiatives (Ahmad et al., 2023). Employees act responsibly in converting organizational sustainability tactics into pragmatic environmental outcomes because sustainability objectives can only be met when employees willingly participate in achieving environmental goals. Green HRM practices encourage such behaviors by developing environmental awareness, enhancing sustainability-related knowledge, providing green training, and creating reward systems that motivate employees to contribute to environmental goals (Ren et al., 2017; Yong et al., 2019).

Recent studies indicate that Green HRM impacts sustainability performance indirectly by changing employee attitudes, environmental commitment, and pro-environmental behaviors. When organizations implement sustainability-oriented HR practices, employees are highly likely to perceive environmental responsibility as an organizational priority and reciprocate through greater participation in green activities (Tu et al.,

2022). Furthermore, employee green behavior serves as a significant behavioral mechanism through which Green HRM practices are transformed into improved environmental performance, resource efficiency, and sustainability outcomes (Mustafa et al., 2023; Yasin et al., 2022).

From the perspective of Social Exchange Theory, employees are inclined to exhibit positive environmental conduct when they perceive that organizations provide support, training, and recognition for sustainability efforts. Therefore, Green HRM engenders a supportive environment that motivates employees to engage in voluntary green actions beyond formal job requirements (Ahmad et al., 2023). Additionally, the Resource-Based View suggests that environmentally responsible employee behavior represents a valuable organizational capability because collective employee actions contribute to the development of durability-oriented routines and competitive advantages (Barney, 1991).

Therefore, employee green conduct serves as a critical mediating mechanism explaining how Green HRM operation contributes to sustainability performance. Based on this theoretical reasoning, the following hypothesis is proposed:

H4: Employee green behavior mediates the relationship between Green HRM practices and sustainability performance.

Mediating role of green innovation capability

Green innovation capability reflects an organization's competence to develop and enforce environmentally viable products, mechanisms, technologies, and managerial solutions that reduce environmental impacts while creating organizational value. It portrays a vital strategic ability that enables firms to convert sustainability-oriented assets and know-how into innovative environmental outcomes. AI-enabled HR systems and Green HRM practices can enhance green innovation capability by improving knowledge management, facilitating employee learning, identifying sustainability-related competencies, and encouraging employees to generate and apply environmentally responsible ideas (Mahat et al., 2025; Yong et al., 2019).

Recent studies highlight that digital technologies, including artificial intelligence, can strengthen green innovation by enabling data-driven knowledge sharing, improving organizational learning processes, and supporting collaborative innovation activities. AI-supported HR analytics help organizations identify employees' creative capabilities, allocate talent effectively, and develop innovation-oriented cultures that facilitate sustainability initiatives (Alfadel & Nalband, 2025; Anjani, 2025; Dinh et al., 2026; Nisar et al., 2024). Furthermore, Green HRM practices promote employee engagement and environmental creativity by providing employees with the motivation, skills, and organizational support required to develop green solutions. Through these mechanisms, green innovation capability acts as a bridge that transforms AI-enabled green HRM resources into improved sustainability performance.

Therefore, green innovation capability serves as an important mediating mechanism through which AI-enabled Green HRM contributes to sustainability outcomes. Based on this theoretical reasoning, the following hypothesis is proposed:

H5: Green innovation capability mediates the relationship between AI-enabled Green HRM and sustainability performance.

Moderating role of digital readiness

Organizational digital readiness defines the conditions within which firms can effectively integrate AI technologies into HR practices. It includes a digital framework, leadership support, employee digital competencies, and organizational flexibility. High digital readiness enables organizations to better utilize AI-enabled HR systems by improving technology adoption, data-driven decision-making, and sustainability-oriented practices.

According to recent research, AI-enabled HR systems are being evaluated as an organizational tool that has the potential to transform employee behavior, green HR practices, sustainability, and innovation outcomes. AI-enabled GHRM improves sustainability through digitally maintained employee-level results and HR practices, whereas recent studies show that AI implementation can encourage green behavior among employees and, as a result, translates technological competencies into green performance (Ajuluchukwu et al., 2026; Ali et al., 2025; Undie et al., 2026). Significantly, digital readiness influences an organization's capability to efficiently integrate digital competence with GHRM and also suggests that organizational readiness may affect the effectiveness of AI-enabled green HR practices and HR systems (Kusumah et al., 2025). Based on these findings, the current study incorporates these relationships into a theoretical framework in which AI-Enabled Green HRM encourages employee green behavior, which facilitates Green Innovation Capability and, ultimately, improves Sustainability Performance, while Organizational Digital Readiness reinforces this process. This integrated perspective provides a solid platform for establishing the offered hypotheses, explaining not only if AI-enabled GHRM contributes to sustainability, but also how and under what organizational contexts these impacts occur.

As explained above, recent studies indicate that the success of AI implementation relies not only on technological availability but also on organizational preparedness and digital capabilities (Budhwar, Chowdhury, Wood, Aguinis, Bamber, Beltran, Boselie, Lee Cooke, Decker, DeNisi, et al., 2023b; Vrontis et al., 2021). From the perspective of Dynamic Capabilities Theory, digital readiness enables organizations to transform, blend, and improve technological resources into strategic sustainability outcomes (Teece, 2007). Therefore:

H6: Organizational digital readiness positively moderates the relationship between AI-enabled HR systems and sustainability performance, such that the relationship is stronger when digital readiness is high.

Conceptual framework

Drawing from existing literature and the discussed rationale, the proposed model consists of: Independent variable: AI-enabled HR systems; Mediator: Green HRM implementation with additional mediators: employee green behavior and Green innovation capability; Moderator: organizational digital readiness; and Dependent variable: sustainability performance.

Methodology

Research design

This study employs a quantitative research approach to analyze the relationship between Artificial Intelligence (AI)-enabled HR systems, Green Human Resource Management (Green HRM), employee green conduct, green innovation capability, and organizational sustainability performance.

A quantitative perspective is suitable because the study aims to test theoretically developed relationships among multiple modules and evaluate direct, mediation, and moderation effects (Hair et al., 2021). The research framework is developed based on the Resource-Based View (RBV) and Dynamic Capabilities Theory.

The RBV perspective illustrates how AI capabilities and Green HRM practices represent strategic organizational resources that enhance sustainability outcomes (Barney, 1991). Dynamic Capabilities Theory explains how organizations utilize AI technologies to adapt HR processes and respond to changing environmental demands (Teece, 2007).

Sampling and data collection

The targeted study population consisted of employees, HR professionals, and executives working in departments that had adopted digital HR technologies and sustainability-oriented practices. A specific sampling perspective was undertaken because respondents were required to have adequate knowledge of organizational HR practices, digital technology adoption, sustainability initiatives, and environmental management activities.

Data were gathered via an organized questionnaire electronically. A total of 310 questionnaires were distributed, and 280 completed responses were received, indicating a response rate of approximately 90.3%. The sample size was deemed adequate for Partial Least Squares Structural Equation Modeling (PLS-SEM), which is appropriate for predictive models involving multiple constructs and mediation/moderation relationships (Hair et al., 2021).

Respondent characteristics

Table I illustrates the demographic characteristics of respondents for this study.

Table I
Demographic profile of respondents (*N* = 280)

Category	Group	Frequency	Percentage (%)
Gender	Male	162	57.9
	Female	118	42.1
Age	Below 30 years	78	27.9
	30–40 years	121	43.2
	41–50 years	58	20.7
	Above 50 years	23	8.2
Education	Bachelor's degree	142	50.7
	Master's degree	112	40.0
	PhD/Professional qualification	26	9.3
Experience	Less than 5 years	71	25.4
	5–10 years	124	44.3
	Above 10 years	85	30.3
Position	HR professionals	74	26.4
	Managers	69	24.6
	Employees	137	49.0

The findings indicate that respondents possessed sound pragmatic insight and organizational knowledge to examine AI-enabled HR systems and sustainability practices. The team of HR professionals, managers, and employees facilitates an in-depth approach regarding technology adoption and sustainability implementation.

Measurement development

All segments were measured using previously validated scales operationalized from prevailing literature. Responses were recorded using a five-point Likert scale, which ranges from 1- Strongly disagree to 5- Strongly agree.

AI-Enabled HR systems

The utilization of artificial intelligence technologies through AI-enabled HR systems to facilitate HR decision-making, workforce analytics, automation, and employee administration (Kshetri, 2021). Sample measurement items: "a, Our organization uses AI technologies to support HR decisions. b, AI facilitates error-free workforce insights. c, AI improves HR process efficiency. d, AI supports employee capability assessment, and AI assists in workforce planning."

Green HRM practices

Green HRM was assessed through four dimensions: Green recruitment: a, Environmental values are considered during employee selection. b, Sustainability awareness is evaluated during recruitment. Green training: a, Employees receive environmental sustainability training. b. Training programs develop employees' green competencies. Green performance management: a, Environmental objectives are included in performance evaluation. b. Employees are assessed based on sustainability contributions. Green rewards: a, Employees are rewarded for environmental initiatives. b. Sustainability achievements receive organizational recognition.

These measures were adapted from previous Green HRM research (Ren et al., 2017; Yong et al., 2019).

Employee green behavior

Employee green behavior was measured using items reflecting environmentally responsible workplace actions (Ahmad et al., 2023).

Sample items included: a) Employees actively participate in environmental programs. b) Employees attempt to reduce resource waste, and (c) Employees suggest ideas for environmental improvement.

Green innovation capability

Green inventiveness was gauged using items taken from Chen (2007) and Yong et al. (2019). The model indicates an organization's competence to enhance and enforce environmentally viable sustainable innovations through new remedies, refined processes, and employee engagement in green initiatives. The measurement indicators include: a) Development of environmentally friendly products, services, or solutions; b) Employee contribution to sustainability-related innovation activities; and c) Improvement and redesign of processes to reduce environmental impact.

Sustainability performance

For sustainability performance, the measurement scale can be adapted from existing viability and environmental performance scales. Since the construct includes environmental, social, and organizational outcomes, suitable references include Singh and Singh (2020), Wang et al. (2021), and Ren et al. (2017).

Data analysis procedure

The collected data were examined using Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the relationships among AI-enabled HR systems, Green HRM, employee green behavior, green innovation capability, and sustainability performance. The study commenced in two phases. The first phase is based on the measurement model, which was assessed by investigating the validity and reliability of the variables using composite reliability, indicator reliability, discriminant validity, and Average Variance Extracted (AVE). In the second phase, the structural model was evaluated by testing the proposed hypotheses using path coefficients (β), t-values, p-values, and R^2 values. Bootstrapping with 5,000 resamples was applied to determine the statistical significance of the relationships among the constructs (Hair et al., 2021).

Data Analysis and Results

Common method bias assessment

Since data were gathered through a single questionnaire, common method bias was assessed using Harman's single-factor test.

The first factor accounted for 3.43% of the total variance, which is below the recommended threshold of 50% (Podsakoff et al., 2003). Therefore, common method bias was not considered a major concern.

Measurement model results

Table II summarizes the reliability and convergent validity results.

Table II
Reliability and validity assessment

Construct	Cronbach's Alpha	Composite Reliability	AVE
AI-enabled HR Systems	0.928	0.926	0.726
Green HRM	0.912	0.934	0.675
Employee Green Behavior	0.891	0.925	0.722
Green Innovation Capability	0.893	0.913	0.701
Sustainability Performance	0.917	0.921	0.723
Digital Readiness	0.867	0.916	0.689

All constructs achieved standard reliability because Cronbach's alpha and composite reliability values exceeded 0.70. The AVE values exceeded 0.50, confirming convergent validity (Hair et al., 2021).

Discriminant validity

This study used the HTMT benchmark to examine discriminant validity.

Table III
HTMT results (Discriminant validity)

Construct	AI-HR	Green HRM	Green Behavior	Green Innovation	Sustainability Performance
AI-HR	—				
Green HRM	0.72	—			
Green Behavior	0.67	0.79	—		
Green Innovation	0.74	0.81	0.75	—	
Sustainability Performance	0.78	0.84	0.80	0.81	—

The Heterotrait Monotrait (HTMT) ratio results endorse the discriminant validity of the scaled model. All HTMT values varied between 0.67 and 0.84, kept below the authorized benchmark of 0.85 (Henseler et al., 2015). This illustrates that the constructs included in the model: AI-enabled HR systems, Green HRM, employee green conduct, green innovation potential, and Sustainability

Performance are empirically distinct from each other. The highest HTMT value was measured between Green HRM and sustainability performance (0.84), followed by Green innovation capability and Sustainability performance (0.81); however, these values remain within the tolerable limit, indicating that although the constructs are conceptually linked, they measure separate theoretical dimensions.

Thus, the results provide evidence that the measurement model demonstrates acceptable discriminant validity, supporting the suitability of the model for further structural model analysis.

The structural model

The structural model displays strong explanatory power, demonstrating that the suggested framework effectively explains the relationships among AI-enabled HR systems, Green HRM, employee green conduct, green innovation potential, and Sustainability Performance. The model explained:

Table IV
Structural model

Construct	R^2 Value
Green HRM Implementation	0.538
Employee Green Behavior	0.477
Green Innovation Capability	0.522
Sustainability Performance	0.614

The results indicate that AI-enabled HR systems explain 53.8% of the variance in Green HRM implementation, demonstrating the vital contribution of AI capabilities in consolidating sustainability-oriented HR practices. Similarly, Green HRM-related factors explain 47.7% of employee green conduct and 52.1% of green innovation potential, portraying the importance of employee contribution and innovation mechanisms in achieving sustainability goals.

The highest explanatory power was calculated for sustainability performance (R^2 = 0.614), implying that AI-enabled HR systems, Green HRM practices, green innovation capability, and employee green behavior collectively explain 61.4% of the variation in organizational sustainability performance. This endorses the effectiveness of the proposed model in explaining how digital HR transformation contributes to sustainability outcomes.

On the whole, the structural model results provide a strong empirical base for the suggested conceptual model and affirm that the integration of technological capabilities, sustainable HR practices, and employee-driven mechanisms plays a vital role in increasing organizational sustainability output.

Hypothesis testing

Table V
Direct effects and hypothesis results

Hypothesis	Relationship	*β*	*t*-value	*p*-value	Result
H1	Green HRM → Sustainability Performance	0.375	6.324	<0.001	Supported
H2	AI-HR Systems → Green HRM	0.519	10.347	<0.001	Supported
H3	AI-HR Systems → Sustainability Performance	0.263	5.113	<0.001	Supported

The results confirm that all suggested direct linkages are statistically significant and support H1, H2, and H3. Green HRM practices certainly impact sustainability performance (β = 0.375, p < 0.001), suggesting that environmentally oriented HR practices enhance organizational sustainability by raising employee environmental know-how, green abilities, and sustainability-focused behaviors.

Among the tested correlations, AI-enabled HR systems demonstrated the strongest effect on Green HRM implementation (β = 0.519, p < 0.001), suggesting that AI technologies significantly enhance organizations' ability to implement sustainability-oriented HR practices. AI-supported analytics, individualized learning, and data-driven decision-making enable organizations to improve green induction, employee development, and sustainability supervision.

Moreover, AI-enabled HR systems directly contribute to sustainability output (β = 0.263, p < 0.001), demonstrating that AI provides organizations with improved analytical capabilities and supports more pragmatic sustainability decisions. Overall, the outcomes indicate that AI-enabled HR systems act as a tactical capability that boosts Green HRM implementation and contributes to improved sustainability results. These results support the theoretical logic of RBV and Dynamic Capabilities Theory, highlighting the role of technological and human capabilities in achieving sustainable organizational performance.

Mediation results

Table VI
Mediation effects

Relationship	Indirect Effect	*t*-value	*p*-value	Result
Green HRM → Green Behavior → Sustainability	0.189	4.682	<0.001	Supported
AI-Green HRM → Green Innovation → Sustainability	0.158	3.947	<0.001	Supported

The results indicate that digital readiness significantly moderates the relationship between AI-enabled HR systems and Green HRM implementation (β = 0.141, t = 2.876, p = 0.003). The positive engagement effects reveal that organizations with higher digital readiness can achieve greater outcomes from AI-enabled HR systems in strengthening Green HRM practices.

This outcome suggests that a digital framework, leadership endorsement, and employee digital capabilities boost the effective use of AI for sustainability-oriented HR activities. AI technologies create greater value when organizations possess the necessary capabilities to integrate and utilize them effectively. The result supports Dynamic Capabilities Theory (Teece, 2007), emphasizing that organizational readiness helps firms transform technological resources into strategic sustainability outcomes (Budhwar, Chowdhury, Wood, Aguinis, Bamber, Beltran, Boselie, Lee Cooke, Decker, DeNisi, et al., 2023b; Vrontis et al., 2021).

As shown in Table VII, H6 is supported, indicating that organizations with higher digital readiness gain greater advantage from AI-enabled HR systems in strengthening Green HRM practices.

Moderation results

Table VII
Moderating effect of digital readiness

Relationship	*B*	*t*-value	*p*-value	Result
AI Systems × Digital Readiness → Green HRM	0.141	2.876	0.003	Supported

Digital readiness, including digital infrastructure, leadership support, employee digital skills, and organizational absorptive capacity, enables organizations to effectively integrate AI technologies into sustainability-oriented HR practices. These results suggest that AI capabilities alone are inadequate; organizations must possess the necessary digital capabilities to transform AI potential into effective Green HRM outcomes.

This result supports Dynamic Capabilities Theory (Teece, 2007), which emphasizes that organizations require adaptive capabilities to successfully utilize new technologies. Consistent with recent AI-HRM research, effective AI adoption depends on technological readiness, employee capabilities, and organizational support (Budhwar, Chowdhury, Wood, Aguinis, Bamber, Beltran, Boselie, Lee Cooke, Decker, DeNisi, et al., 2023b).

Accordingly, digital readiness acts as a significant enabling condition that boosts the impact of AI-enabled HR systems on Green HRM implementation.

Discussion

This study explored how Artificial Intelligence (AI)-enabled HR systems boost Green Human Resource Management (Green HRM) implementation and contribute to organizational sustainability performance. Relying on the Resource-Based Approach and Dynamic Capabilities Theory, this study developed and examined a framework explaining how AI-enabled HR capabilities influence sustainability outcomes through Green HRM practices, employee green behavior, and green innovation capability. Based on data collected from 280 respondents, the findings demonstrate that AI-enabled HR systems represent an emerging strategic capability that enables organizations to integrate digital change with sustainability objectives. This finding consolidates recent research suggesting that AI technologies create organizational value when combined with human capabilities, organizational activities, and strategic management practices (Budhwar, Chowdhury, Wood, Aguinis, Bamber, Beltran, Boselie, Lee Cooke, Decker, DeNisi, et al., 2023b; Vrontis et al., 2021).

The findings indicate that Green HRM practice positively affects sustainability performance ($\beta = 0.375$, $p < 0.001$). This result suggests that organizations adopting environmentally based HR practices are better able to achieve sustainability objectives by embedding environmental values into recruitment, training, performance management, and bonus systems. Green HRM enables organizations to develop employees' environmental knowledge, skills, and motivation, which facilitates their participation in sustainability initiatives and environmentally responsible workplace behaviors (Ren et al., 2017). Earlier studies have similarly demonstrated that Green HRM contributes to sustainability output by strengthening employee environmental commitment, organizational green culture, and ecological consciousness (Ahmad et al., 2023; Ali et al., 2025). Recent research provides substantial support for the conceptual and methodological decisions underlying the current theoretical paradigm. The current study on AI-enabled GHRM uses large cross-sectional samples and SEM to investigate direct and mediated relationships between AI-enabled HR practices and sustainability outcomes, providing methodological support for investigating complex relational models (Ajuluchukwu et al., 2026). Similarly, a recent study reveals that GHRM contributes significantly to green innovation and sustainable performance by developing organizational capacities, implying that GHRM operates as a strategic organizational competency rather than a collection of separate HR practices (Liu et al., 2026). Ajuluchukwu et al. (2026) also found a connection between GHRM and employee green behavior, demonstrating that AI-enabled and green HR practices can improve employees' pro-environmental and green behaviors. Furthermore, this research shows a link between green HR practices and green innovation among employees, implying that improving employee competences and behaviors might translate HR practices into innovation-related outcomes (Kusumah et al., 2025; Liu et al., 2026).

From the perspective of the Resource-Based View (RBV), this finding proposes that environmentally committed human capital represents a valuable strategic resource. According to Barney (1991), organizations achieve sustainable competitive advantage through valuable and difficult-to-imitate internal resources. Green HRM facilitates the development of employee sustainability knowledge, environmental capabilities, and organizational practices that competitors cannot easily replicate. Therefore, Green HRM should be considered not only as an operational HR approach but also as a strategic capability that enables organizations to develop long-term sustainability advantages (Pham et al., 2023).

The outcome further indicates that AI-enabled HR systems have the strongest positive influence on Green HRM implementation ($\beta = 0.519$, $p < 0.001$). This result demonstrates that AI significantly enhances organizations' ability to implement sustainability-oriented HR practices. AI-enabled HR systems support Green HRM through sustainability-focused recruitment analytics, identification of employee environmental competencies, individualized sustainability learning, automated performance monitoring, and evidence-based HR decision-making (Kshetri, 2021).

This finding extends beyond AI-HRM research by demonstrating that AI is not just an efficiency-enhancing tool but also a sustainability-enabling mechanism. Recent studies highlight that AI-based HR analytics improve organizational intelligence by enabling the workforce to engage in

real-time analysis, predictive decision-making, and adaptive resource management (Budhwar, Chowdhury, Wood, Aguinis, Bamber, Beltran, Boselie, Lee Cooke, Decker, DeNisi, et al., 2023b; Vrontis et al., 2021) . Furthermore, AI supports organizations in developing sustainability-oriented HR systems by integrating knowledge management and facilitating data-driven environmental practices (Dwivedi et al., 2023).

The coordination between AI-enabled HR systems and Green HRM implementation is also explained by Dynamic Capabilities Theory. Teece (2007)argues that organizations must develop capabilities to perceive environmental variation, seize emerging opportunities, and transform resources to maintain competitiveness. AI strengthens these dynamic capabilities by allowing organizations to analyze workforce information, identify sustainability challenges, and continuously redesign HR practices according to varying environmental requirements (Mikalef et al., 2023).

The study also suggests that AI-enabled HR systems directly improve sustainability performance ($\beta = 0.263$, $p < 0.001$). This finding suggests that AI contributes to sustainability by improving organizational talent, optimizing resource utilization, and supporting evidence-based environmental decision-making. AI technologies enable organizations to identify sustainability gaps, improve operational efficiency, and develop proactive environmental tactics (Verdecchia et al., 2023).

Conversely, the less effective direct relationship between AI and sustainability performance when compared to AI's effect on Green HRM implementation indicates that technology alone does not automatically generate sustainability outcomes. Instead, AI creates sustainability value when integrated with appropriate organizational processes, human capabilities, and sustainability-oriented practices. This finding supports recent arguments that digital technologies achieve meaningful sustainability impacts only when embedded within organizational capabilities and human-centered management approaches (Dwivedi et al., 2023; Margherita & Braccini, 2021).

The mediation analysis indicates that employee green behavior mediates the relationship between Green HRM and sustainability performance ($\beta = 0.189$, $p < 0.001$). This finding highlights the potential role of employees as the mechanism through which sustainability strategies are translated into actual organizational outcomes. Green HRM practices influence employee conduct by enhancing environmental awareness, consolidating sustainability commitment, developing green talent, and supporting voluntary environmental actions (Tu et al., 2022).

This result aligns with Social Exchange Theory and previous green HRM research, which propose that employees are more likely to demonstrate environmentally responsible behavior when organizations provide training, support, and recognition for sustainability participation (Ahmad et al., 2023). Consequently, sustainability outcomes rely not only on formal environmental policies but also on employees' willingness and ability to engage in green practices.

The findings further demonstrate that green innovation talent mediates the linkage between AI-enabled Green HRM and sustainability performance ($\beta = 0.158$, $p < 0.001$). This result illustrates that sustainability improvements occur not only through behavioral changes but also through employees' ability to generate ingenious environmental solutions. Green innovation capability enables organizations to furnish environmentally friendly processes, improve resource efficiency, and create sustainable solutions (Yong et al., 2019).

Recent research suggests that AI-supported HR systems boost innovation talent by improving knowledge sharing, identifying employee expertise, facilitating collaboration, and supporting organizational learning (Nisar et al., 2024). Therefore, AI-enabled Green HRM creates conditions where employees can contribute to sustainability innovation, making green innovation capability an important pathway linking digital HR transformation with sustainability performance.

Lastly, the moderation analysis indicates that organizational digital readiness boosts the coordination between AI-enabled HR systems and Green HRM implementation $\beta = 0.141$, $p = 0.003$). This outcome reflects that organizations derive greater benefits from AI absorption when they have an adequate digital framework, leadership dedication, employee digital competence, and a novelty-oriented setup (Housheya & Atikbay, 2025). Earlier studies emphasized that successful AI adoption depends not only on technological presence but also on departmental preparedness and competence development (Budhwar, Chowdhury, Wood, Aguinis, Bamber, Beltran, Boselie, Lee Cooke, Decker, DeNisi, et al., 2023b; Vrontis et al., 2021). Najam Shaikh et al. (2025) directly link AI adoption to GHRM. Similarly, digital readiness is associated with GHRM performance, emphasizing its importance as an organizational requirement for enjoying the benefits of digital and green transformation (Kusumah et al., 2025). A recent study emphasizes the importance of mediation analysis in explaining how AI-enabled GHRM contributes to sustainability outcomes, whereas research on digital readiness and other contextual factors suggests that moderation effects should be theoretically justified and empirically tested rather than simply assumed (Ajuluchukwu et al., 2026; Kusumah et al., 2025). Overall, these recent findings provide empirical support for the current sampling procedure, measurement framework, serial mediating effect, and boundary effect of Organizational Digital Readiness, emphasizing the importance of explaining the proposed relationships within a coherent theoretical framework. On the whole, the outcomes demonstrate that AI-enabled HR systems, when linked with Green HRM activities, subordinate green conduct, green novelty talent, and organizational digital preparedness, facilitate an in-depth pathway toward sustainability outcomes. This study extends prevailing sustainability and digital transformation literature by explaining how AI can be tactically blended with human assets activities to enhance sustainability-oriented departmental potential.

Limitations and future research directions

Despite its significance, the study has a number of limitations. First, the study is subject to methodological restrictions due to its cross-sectional survey methodology, reliance on self-reported responses, and context-specific sample. These characteristics may limit the ability to reach causal

conclusions, increase the likelihood of common method bias, and lower the findings' generalizability. These limitations are consistent with current studies on AI-enabled GHRM connections in various organizational and contextual settings (Ajuluchukwu et al., 2026; Bindeeba et al., 2025). To establish causal links and improve the generalizability of the findings, future empirical research should include longitudinal and multi-source methodologies, measurable indicators, and samples from a variety of nations and organizations. Future studies should aim at different moderators and mediators to better understand how GHRM leads to green innovation and sustainability outcomes (Bindeeba et al., 2025; Guo et al., 2025).

Future studies should examine additional factors, including sustainability leadership, organizational culture, regulatory pressure, and employee trust in AI systems. Finally, potential research may investigate the impact of AI-enabled Green HRM on ESG performance to strengthen understanding of sustainability outcomes.

Conclusion

This study demonstrates that Artificial Intelligence-enabled HR systems represent an emerging strategic capability for strengthening Green HRM and improving sustainability performance.

The outcomes demonstrate that AI enhances Green HRM implementation by improving HR analytics, employee development, sustainability measurement, and innovation capability. Furthermore, employee green behavior and green innovation capability represent important mechanisms through which AI-enabled Green HRM creates sustainability value.

This study makes a major contribution to sustainability and HRM literature by demonstrating that successful environmental transformation requires the integration of technology, human capability, and organizational innovation.

Organizations seeking sustainable competitive advantage should therefore consider AI-enabled Green HRM as a strategic investment that combines digital intelligence with environmentally conscious human resource management.

Conflict of Interest

The author declares that there is no conflict of interest regarding the publication of this manuscript.

Acknowledgment

"This work was supported through the Ambitious Funding track by the Deanship of Scientific Research, Vice Presidency for Graduate Studies and Scientific Research, King Faisal University, Al Ahsa, Saudi Arabia [Grant KFU 264910]."

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