

Article info

Received on: 17.07.2026

Accepted on: 18.08.2026

Published on: 20.08.2026

doi: <https://doi.org/JPS10.52688/937522>

Research Article

The Impact of Using Artificial Intelligence on Achieving Sustainable Performance Through the Mediating Role of Digital Human Resource Management and Green Practices: A Field Study

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ABSTRACT

The use of artificial intelligence (AI) has emerged as an innovative tool that enables organizations to improve operational effectiveness, accelerate digital evolution, and drive long-term success. This study investigates the impact of Artificial Intelligence (AI) on Sustainable Performance using the lenses of Digital Human Resource Management (DHRM) and Green Human Resource Management (GHRM) practices. A theoretical structure that integrates AI, DHRM, GHRM, and Sustainability Efficiency was developed and practically assessed through Structural Equation Modeling (SEM). A structured questionnaire was used to gather data from 120 workers at Iraqi mobile telecommunications businesses (Atheer Telecom and Asiacell). SPSS and AMOS were used to assess reliability, construct validity, confirmatory factor analysis (CFA), and route analysis. The results demonstrated that Artificial Intelligence significantly enhances Sustainable Performance ($\beta = 0.751$, $t = 12.768$, $p < 0.001$, $R^2 = 0.580$), Digital Human Resource Management ($\beta = 0.903$, $t = 20.835$, $p < 0.001$, $R^2 = 0.759$), and Green Human Resource Management practices ($\beta = 0.851$, $t = 14.149$, $p < 0.001$, $R^2 = 0.592$). Furthermore, Digital Human Resource Management positively affected Sustainable Performance ($\beta = 0.794$, $t = 14.371$, $p < 0.001$, $R^2 = 0.636$), while Green Human Resource Management practices also exerted a significant positive effect ($\beta = 0.691$, $t = 13.561$, $p < 0.001$, $R^2 = 0.609$). After introducing mediators, the direct effect of Artificial Intelligence on Sustainable Performance became statistically insignificant ($\beta = 0.231$, $t = 1.883$, $p = 0.060$). However, the indirect effects through Digital Human Resource Management ($\beta = 0.342$) and Green Human Resource Management practices ($\beta = 0.253$) remained significant, indicating complete mediation. These results show that Artificial Intelligence's contribution to friendly Performance is largely accomplished via the digital transformation of human resource management and the adoption of environmentally friendly HR practices. The work presents useful theoretical and managerial implications for firms seeking long-term competitive advantage via AI-driven human resource innovation.

Keywords: Artificial AI; digital human resource management; green human resource management; sustainable effectiveness; fundamental equation models; and digital transformation.

INTRODUCTION

AI (artificial intelligence) has shown to be a transformational technology capable of causing profound changes in today's environment. AI has immense potential to transform the way people live and work, from automating mundane and time-consuming chores to improving and expanding human skills. AI has emerged as one of the most prominent technologies throughout the Fourth Industrial Revolution and digital transformation, with applications covering a wide range of disciplines. Among them, Human Resource Management (HRM) is one of the sectors most severely impacted by AI, although receiving little attention.

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Human resource management has historically emphasized human connection and interpersonal communication. Organizations are increasingly utilizing AI's unique capabilities to better HR services. AI adoption is no longer just an opportunity; it has become an organizational imperative. Human resource experts are currently aiming to maximize the combination of human intelligence with artificial intelligence in order to develop more efficient, user-friendly, and flexible work environments that enable workers to dedicate more attention to strategic activities and performance improvement.

As firms continue to adapt to the needs of Industry 4.0 and move to intelligent enterprises, they must also address changing consumer expectations and growing environmental concerns. As a consequence, Green Human Resource Management (GHRM) has garnered a great deal of attention from firms looking to decrease their ecological footprint, boost operational efficiency, and adopt cleaner production processes. Artificial intelligence has evolved as a critical strategic tool for achieving company objectives whereas satisfying internal and external stakeholders. It enhances employee performance, increases engagement, and strengthens environmental commitment.

Furthermore, the emergence of sustainability has created a new concept of performance in organizations that blends responsibility for the environment, social obligation, and financial success. Sustainable performance necessitates that companies accomplish environmental, social, and financial goals at the same time without sacrificing any of them. Today, firms urgently need to realize the strategic relevance of these factors, which have become vital components of current business settings globally rather than notions isolated to certain regions or sectors.

RESEARCH PROBLEM

The applications for artificial intelligence are expanding so rapidly that organizations trying to find a balance between the needs of long-term performance with technological progress face big problems. Meanwhile, organizations are becoming more digital and the need to understand the impact of AI on human resource management in a digital world is increasing. There is increasing pressure on organizations to be environmentally friendly and to perform well in the long term. “There are still a lot of institutions that don’t have comprehensive policies and well-thought-out plans for how to be sustainable, while at the same time trying to take advantage of the opportunities that artificial intelligence offers. Hence, the main research question of this study attempts to answer the following: To what extent the use of artificial intelligence affects the long-term success of organizations by changing Digital Human Resource Management (DHRM) and Green Human Resource Management (GHRM) practices in companies in the research area?

RESEARCH OBJECTIVES

The objective of this study is to:

1. To examine the direct effect of artificial intelligence on sustainable performance.
2. To investigate the influence of Digital Human Resource Management and Green Human Resource Management practices on sustainable performance.
3. To determine the effect of artificial intelligence on Digital Human Resource Management and Green Human Resource Management practices.
4. To examine the indirect effect of artificial intelligence on sustainable performance through the mediating roles of Digital Human Resource Management and Green Human Resource Management.

The conceptual framework illustrating AI as the independent variable, DHRM and GHRM as mediating variables, Sustainable Performance as the dependent variable, and hypotheses H1–H6 (see Fig. 1).

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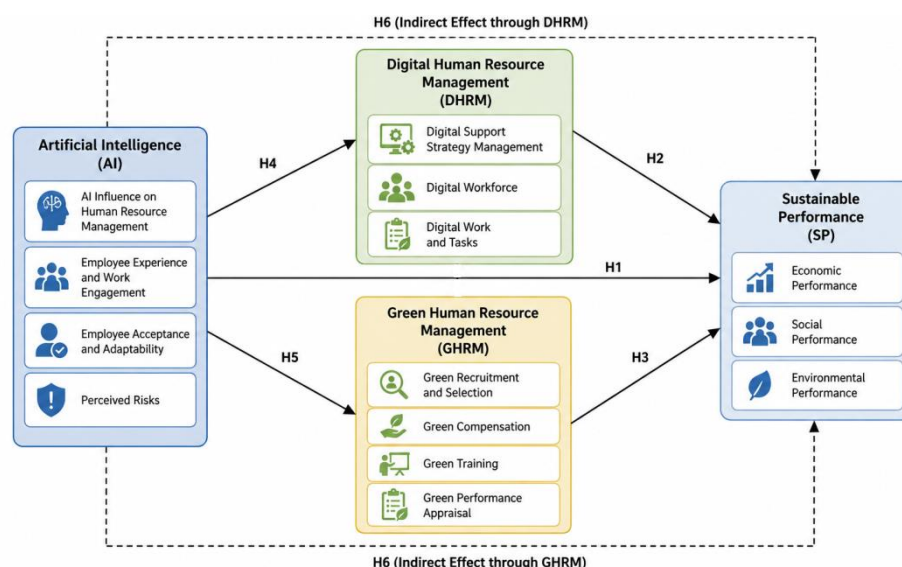


Fig. 1. Proposed conceptual research model illustrating the hypothesized relationships among Artificial Intelligence (AI), Digital Human Resource Management (DHRM), Green Human Resource Management (GHRM), and Sustainable Performance (SP)

PROPOSED RESEARCH MODEL

The proposed conceptual model consists of the following variables:

1. Independent Variable

- a. Artificial Intelligence (AI)

2. Mediating Variables

- a. Digital Human Resource Management (DHRM)
- b. Green Human Resource Management Practices (GHRM)

3. Dependent Variable

- a. Sustainable Performance

RESEARCH HYPOTHESES

The study proposes the following hypotheses:

H1: Artificial Intelligence has a statistically significant effect on Sustainable Performance.

H2: Digital Human Resource Management has a statistically significant effect on Sustainable Performance.

H3: Green Human Resource Management practices have a statistically significant effect on Sustainable Performance.

H4: Artificial Intelligence has a statistically significant effect on Digital Human Resource Management.

H5: Artificial Intelligence has a statistically significant effect on Green Human Resource Management practices.

H6: AI is statistically likely to have an indirect effect on sustainable performance through the mediating roles of digital human resource management and green human resource management.

SIGNIFICANCE OF THE STUDY

THEORETICAL SIGNIFICANCE

A comprehensive review of the previous studies on Artificial Intelligence, Digital Human Resource Management, Green Human Resource Management, and Sustainable Performance found that few studies have integrated these factors into a comprehensive framework. This study aims to fill this important research gap by investigating their effects on long-term performance in tandem.

SCIENTIFIC SIGNIFICANCE

This research provides a supplement to the existing literature by proposing a framework linking Artificial Intelligence, Digital Human Resource Management, Green Human Resource Management and Sustainable Performance. It contributes to the academic knowledge in AI, digital HRM, green HRM, and sustainability management.

PRACTICAL SIGNIFICANCE

This research is useful because it can help businesses that are experiencing a digital transformation. The findings provide important insights for organizations aiming to digitize HR tasks, adopt environmentally friendly HR practices, improve operational efficiency, reduce costs and ultimately improve long-term organizational performance.

RESEARCH SAMPLE

The study sample consisted of employees working in mobile telecommunications companies (Atheer & Asiaticell). A total of 120 valid questionnaires were collected and analyzed for statistical purposes.

PROPOSED RESEARCH MODEL

Figure 1. Proposed conceptual research model illustrating the hypothesized relationships among Artificial Intelligence, Digital Human Resource Management, Green Human Resource Management, and Sustainable Performance.

LITERATURE REVIEW

ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is a multidisciplinary field of computer science that aims to develop intelligent systems capable of performing tasks that normally require human intelligence, including learning, reasoning, problem-solving, decision-making, perception, and language understanding. The term "artificial intelligence" consists of two components: *intelligence*, which refers to the cognitive ability to understand, learn, and adapt to new situations, and *artificial*, which refers to systems created by humans rather than occurring naturally.

According to Yaseen, (2012), artificial intelligence can be defined as the science of designing computer systems capable of performing tasks that require human intelligence. More comprehensively, AI represents a branch of computer science dedicated to developing intelligent programs and systems capable of analyzing large amounts of data, interacting with users, learning from experience, and making accurate decisions with remarkable speed and efficiency. (Wajih, 2024).

ARTIFICIAL INTELLIGENCE IN THE WORKPLACE

During the past three decades, artificial intelligence has evolved from a theoretical concept into an essential organizational resource. Modern AI technologies extend beyond computational efficiency to include knowledge representation, reasoning, learning, and intelligent decision-making. Artificial intelligence

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employs numerous techniques, including expert systems, neural networks, fuzzy logic, machine learning, deep learning, semantic networks, and natural language processing, to solve complex organizational problems that exceed human computational capabilities. (Tiwari&etl.,2021)

One of the most significant contributions of AI in the workplace is the automation of repetitive and time-consuming activities. AI-powered apps can automate routine administrative tasks including data entry, report generation, document processing, scheduling, payroll processing and employee record keeping. So, workers don't have to repeat the same task over and over, and they can concentrate on more critical strategic tasks which require creativity, innovation and critical thinking.

AI also reduces human error, increases efficiency, raises productivity and improves the effectiveness of organizations. These improvements will allow the organization to sustain good performance over the long-term. AI has also changed how people speak to each other and collaborate at work. Smart chatbots and virtual assistants can respond to employees' inquiries in real time, assist in customer service, facilitate internal communication, and make an organization more responsive. Similarly, AI-based language translation systems enable employees from diverse linguistics and cultural backgrounds to communicate with each other, thereby encouraging global collaboration. AI-powered project management tools, intelligent collaboration software, and cloud-based document editing systems enable employees to work effectively from anywhere in the world. These technologies can help people to collaborate, communicate, complete projects faster and make businesses more productive. (Chaurasiya et al. 2023).

HUMAN RESOURCE STRATEGY IN THE ERA OF ARTIFICIAL INTELLIGENCE

The significant impact of artificial intelligence and digital technologies on business decision-making, managing employees, reducing costs, and strategic planning in general has been documented in previous research (Douchessi, O'Keefe, & O'Leary, 1993). Increasingly, today's businesses are under pressure to leverage AI in their strategic planning for competitive advantage. (Tiwari et al 2020). In such a situation firms usually have two different strategic strategies to choose from: • Using AI to do the work once done by people. • People and artificial intelligence collaborating to enhance human capabilities. A great deal of the strategic human resource management literature suggests that the HR strategy should be very much like the strategy of the organization. Human resources should no longer simply be there to help with paperwork, they should be a strategic business partner whose job is to make the company more competitive.

Park Woosung presented a comprehensive framework with four HR strategies that perform well in the AI era:

- Entrepreneurial Human Resource Strategy
- Creative Human Resource Strategy
- Expertise-Based Human Resource Strategy
- Dual Human Resource Strategy

The double strategy emphasizes achieving the correct balance between operational efficiency and organizational innovation by introducing AI into existing company procedures while simultaneously fostering innovation and continuous improvement. The framework additionally incorporates the concept of Collaborative Intelligence, which encourages effective cooperation among humans and artificial intelligence. Rather of replacing human ability, AI should enhance it via improving decision-making, increasing operational efficiency, spurring innovation, and strengthening organizational competitiveness. Organizations that successfully incorporate collaborative intelligence are likely to achieve higher levels of long-term organizational performance.

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DIGITAL HUMAN RESOURCE MANAGEMENT (DHRM)

Digital Human Resource Management (DHRM) is the procedure of creating, deploying, and utilizing digital technologies and information systems to improve the efficiency and effectiveness of HR services. Digital HRM is the application of digital transformation technologies to various HR functions like as recruitment, employee selection, training, payroll administration, attendance tracking, performance evaluation, career planning, and employee growth. (Saleh and Dakil, 2023). Modern digital human resource management relies heavily on the integration of SMAC technology, especially:

- Social technologies
- Mobile technologies
- Analytics and Big Data
- Cloud Computing

Collectively, these technologies allow firms to turn traditional human resource operations into intelligent, data-driven management systems. (Strohmeier S., 2020). Examples of digital HRM applications are:

1. ATS employ AI to filter and analyze job applications based on defined competencies.
2. Automate recruiting, onboarding, training, attendance, leave management, payroll, and performance evaluations using electronic recruitment systems.
3. Apply big data analytics for workforce planning, talent management, employee performance prediction, competency gap evaluation, succession planning, and making strategic choices.

DIGITAL HUMAN RESOURCE MANAGEMENT AND SUSTAINABLE PERFORMANCE

Digital innovation in Human Resource Management significantly improves company effectiveness by allowing data-driven decision-making, maximizing use of resources, cutting administrative expenditures, and enhancing efficiency in operations. According to Olena Sova et al. (2023), digital HRM allows firms to enhance HR operations while also supporting sustainability goals via effective resource management and long-term organizational growth. Organizations that use digital HR practices may increase productivity, decrease operational waste, speed administrative processes, and boost employee happiness, all of which contribute directly to long-term organizational success. Researchers are increasingly seeing digital transformation as a necessary requirement for establishing organizational sustainability. As a result, Digital Human Resource Management has become a critical component of Sustainable Human Resource Management. (Bieliaieva, N. et al., 2021).

THE IMPACT OF ARTIFICIAL INTELLIGENCE ON DIGITAL HUMAN RESOURCE MANAGEMENT AND SUSTAINABLE PERFORMANCE

Artificial intelligence improves forecasting capacities, supports evidence-based decision-making, and facilitates strategic planning, all of which contribute to long-term organizational success. The combination of AI and Big Data analytics has radically changed organizational operations and Human Resource Management procedures. According to Karaboğa et al. (2023), AI may help firms evaluate large amounts of structured and unstructured data, detect trends, create predictive insights, and enhance proactive decision-making. These competencies include a wide range of sustainability-related disciplines, including:. (Olena Sova et al., 2023).

- Energy management
- Waste reduction
- Supply chain optimization

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- Resource allocation
- Environmental monitoring
- Workforce optimization

AI-assisted Human Resource Analytics offers managers significant strategic insights into employee performance, workforce planning, talent acquisition, retention, and organizational growth. As a result, Digital Human Resource Management powered by artificial intelligence provides significant opportunity for enterprises to increase operational efficiency while simultaneously promoting sustainable development goals.

PREVIOUS STUDIES ON ARTIFICIAL INTELLIGENCE, DIGITAL HUMAN RESOURCE MANAGEMENT, AND GREEN HUMAN RESOURCE MANAGEMENT

Numerous prior research have looked at the links between Artificial Intelligence (AI), Digital Human Resource Management (DHRM), Green Human Resource Management (GHRM), and Sustainable Performance. Kramar (2022) defined six important features of Sustainable Human Resource Management (SHRM) and differentiated it from Strategic Human Resource Management and Digital Human Resource Management. Similarly, Strohmeier (2020) created a complete conceptual framework for Digital Human Resource Management by adding new vocabulary and categories that define the notion and set it apart from other HR methods. Dantas et al. (2021) did a thorough investigation into how integrating the Circular Economy with Industry 4.0 technology helps to achieve the Sustainable Development Goals (SDGs). Similarly, Meijerink (2021) stressed the significance of Digital Human Resource Management by combining interdisciplinary advancements and research results on digital HR transformation. El Bilali (2019) examined sustainability transitions in agricultural and food systems from multiple perspectives, whereas Aldieri and Vinci (2018) investigated the role of knowledge diffusion in promoting sustainable economic development and job creation among multinational corporations. Renwick et al. (2013) emphasized the significance of combining environmental management with human resource management in order to identify research gaps and develop Green Human Resource Management as an emerging profession. Their study showed employees that participation and engagement in environmental activities significantly enhances business sustainability. Similarly, Cheema and Javed (2017) found that Green Human Resource Management methods improve environmental sustainability and corporate social responsibility. Despite these significant contributions, the literature lacks comprehensive studies that examine the integrated links between Artificial Intelligence, Digital Human Resource Management, Green Human Resource Management, and Sustainable Performance within a cohesive conceptual framework. This gap is the fundamental impetus for the current.

GREEN HUMAN RESOURCE MANAGEMENT (GHRM)

Green Human Resource Management (GHRM) is the integration of environmental management ideas into HRM policies and practices in order to improve environmental sustainability while also improving organizational performance. Green HRM aims to foster environmentally responsible behavior among workers by incorporating sustainability concepts into all HR processes, such as recruiting, selection, training, performance evaluation, remuneration, incentives, employee involvement, and organizational culture. Stojanoski (2016) defines Green HRM as organizational activities and management frameworks that educate workers toward ecologically responsible behavior that benefits people, companies, society, and the natural environment. Tang (2018) stressed that Green HRM is a strategic HR approach defined by high-performance work systems and strong organizational commitment. Similarly, Ahuja (2015) defined Green HRM as integrating environmental goals into recruiting, employee training, performance assessment, and incentive systems.

Zoogah (2011) defined Green HRM as the application of human resource philosophies, policies, and practices that encourage sustainable resource utilization while minimizing environmental damage within organizations.

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Similarly, Arulajah and Opatha (2014) argued that Green HRM comprises HR practices that foster environmentally responsible employee behavior, enabling individuals to maximize their contribution toward sustainable business models.

GREEN HUMAN RESOURCE MANAGEMENT AND SUSTAINABLE PERFORMANCE

Green Human Resource Management contributes directly to the three fundamental dimensions of sustainable performance.(Wagner et al,2016)

1. Economic Performance

Green HRM improves organizational efficiency by enhancing operational effectiveness, reducing waste, optimizing resource utilization, lowering energy consumption, and minimizing production costs. Furthermore, environmentally responsible HR practices improve employee morale, organizational commitment, job satisfaction, occupational health and safety, and perceptions of organizational justice. These improvements ultimately increase productivity, sales, profitability, and long-term financial sustainability. (Kromar and Hariadi,2010)

2. Social Performance

Green HRM offers an administrative framework for Corporate Social Responsibility (CSR) efforts by integrating sustainability into HR policy and employee development programs. Organizations achieve social sustainability by: (Jamali et al., 2015); (Jabbour and Santos, 2008).

- Green recruitment and selection
- Environmental education and training
- Community engagement initiatives
- Employee volunteering programs
- Fair treatment and equal employment opportunities
- Transparent promotion systems
- Continuous monitoring of social performance indicators

These strategies increase employee commitment while also improving company reputation and stakeholder confidence.

3. Environmental Performance

Probably the most important contribution of Green HRM is to improve environmental performance. Green HRM promotes environmental stewardship and good employee conduct. It raises environmental consciousness, enhances pro-environmental principles, promotes pollution avoidance, stimulates recycling activities, decreases waste output, and helps to produce ecologically friendly goods and services. (Arulajah and Thevanes, 2017). Employee engagement in environmental management systems helps firms reach better levels of environmental sustainability while also enhancing overall organizational performance.

PRACTICAL STUDY

CONSTRUCT VALIDITY ASSESSMENT

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ARTIFICIAL INTELLIGENCE SCALE

The Artificial Intelligence concept was assessed using four primary dimensions:

- AI influence on Human Resource Management
- Employee Experience and Work Engagement
- Employee Acceptance and Adaptability
- Perceived Risks

The measuring scale comprised of twenty questionnaire items. Confirmatory Factor Analysis (CFA) revealed that all model fit indices were within globally recognized criteria, demonstrating that the suggested measurement model accurately describes the observed data and verifies the construct validity of the Artificial Intelligence scale. Furthermore, all standardized factor loadings showed statistical significance. The estimated t-values surpassed the threshold value of 1.984 at the 0.05 significance level, while all p-values were less than 0.05, demonstrating that each measurement item substantially contributes to its underlying latent construct.

DIGITAL HUMAN RESOURCE MANAGEMENT SCALE

Digital Human Resource Management was assessed in three aspects:

- Digital Support Strategy Management
- Digital Workforce
- Digital Work and Tasks

The scale had nine measurement elements. Confirmatory Factor Analysis findings showed a reasonable model fit based on established goodness-of-fit criteria. All standardized factor loadings were statistically significant, with computed t-values larger than 1.984 and p-values less than 0.05, demonstrating the construct validity and reliability of the Digital HRM measurement model.

GREEN HUMAN RESOURCE MANAGEMENT SCALE

Green human resource management was assessed across four aspects:

- Green Recruitment and Selection
- Green Compensation
- Green Training
- Green Performance Appraisal

The measuring scale included 12 questionnaire items. The CFA findings showed that all model fit indicators met established statistical norms. Every assessment item showed statistically significant factor loadings, with t-values more than the crucial value of 1.984 and p-values less than 0.05, demonstrating the validity of the Green Human Resource Management concept.

SUSTAINABLE PERFORMANCE SCALE

The long-term performance construct consisted of twelve measurement criteria. The Confirmatory factor analysis found that all goodness-of-fit indicators were within acceptable limits, confirming the assessment

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model's suitability. Additionally, each measuring item demonstrated statistically significant standardized factor loadings, with t-values bigger than 1.984 and p-values less than 0.05, indicating strong construct validity for the sustainable performance scale.

PRACTICAL STUDY

HYPOTHESIS TESTING

DIRECT EFFECT HYPOTHESES

HYPOTHESIS 1

H 1: AI has no statistically meaningful influence on long-term success.

Table 1 shows that the calculated F-value for the effect of Artificial Intelligence on Sustainable Performance was 163.018, which is substantially more than the reported F-value (3.94) at the 0.05 level of significance. The correlation coefficient (R) was 0.762, and the coefficient of determination (R^2) was 0.580, indicating that Artificial Intelligence accounts for 58.0% of the variance in Sustainable Performance. Furthermore, the calculated t-value for the regression coefficient (β) was 12.768, above the critical value of 1.984 with a significance level of $p = 0.000$. These statistics suggest that artificial intelligence has a positive and statistically significant influence on long-term performance. As a result, the null hypothesis is rejected and the alternative hypothesis is supported, indicating that Artificial Intelligence considerably improves Sustainable Performance. A basic linear regression analysis was used to investigate the impact of artificial intelligence on long-term performance. The statistical data are provided in Table 1.

Table 1. Statistical indications of artificial intelligence's influence on long-term success

Dependent Variable	Artificial Intelligence	Coefficient	t-value	R	R^2	Adjusted R^2	F-value	Sig.	Decision
Sustainable Performance	α	1.013	4.681	0.762	0.580	0.577	163.018	0.000	Accept the Alternative Hypothesis
	β	0.751	12.768	—	—	—	—	—	—

Note: $F = 3.94$; $t = 1.984$; Sample size (N) = 120.

As indicated in Table 1, the computed F-value (163.018) is more than the crucial F-value (3.94) at the 0.05 significance level. The correlation coefficient (R) was 0.762, and the coefficient of determination (R^2) was 0.580, showing that Artificial Intelligence explains 58.0% of the variation in Sustainable Performance. Furthermore, the estimated t-value for the regression coefficient ($\beta = 0.751$) was 12.768, above the crucial criterion (1.984) with $p = 0.000$. As a result, Artificial Intelligence has a positive and statistically significant impact on Sustainable Performance, and the alternative hypothesis is accepted.

HYPOTHESIS 2

H2: There is no statistically significant relationship between digital human resource management and sustainable performance.

Table 2 shows that the estimated F-value reached 206.529, which was significantly higher than the reported value (3.94) at the 0.05 level. The correlation coefficient (R) was 0.798, with a R^2 of 0.636. This shows that Digital Human Resource Management is responsible for 63.6% of the variation in Sustainable Performance. The regression coefficient yielded a calculated t-value of 14.371, which was significantly more than the critical value of 1.984 ($p = 0.000$). These findings indicate that Digital Human Resource Management has a strong, favorable, and statistically significant influence on Sustainable Performance. As a consequence, the

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alternative hypothesis is accepted and the null hypothesis rejected. A basic linear regression analysis was utilized to look at the influence of digital human resource management on long-term performance. Table 2 presents statistical data.

Table 2. Quantitative metrics to assess the effect of digital human resource management on long-term achievement

Dependent Variable	Digital Human Resource Management	Coefficient	t-value	R	R ²	Adjusted R ²	F-value	Sig.	Decision
Sustainable Performance	α	0.826	4.023	0.798	0.636	0.633	206.529	0.000	Accept the Alternative Hypothesis
	β	0.794	14.371	—	—	—	—	—	—
$F = 3.94; t = 1.984; \text{sample size } (N) = 120$									

As observed in Table 2, the calculated F-value was 206.529, which exceeds the critical F-value (3.94) at the 0.05 level. The correlation coefficient (R) is 0.798, and the coefficient of determination (R²) is 0.636, indicating that Digital Human Resource Management accounts for 63.6% of the variance in Sustainable Efficiency. Furthermore, the calculated t-value for the regression coefficient ($\beta = 0.794$) was 14.371, exceeding the critical value (1.984) with $p = 0.000$. Therefore, Digital Human Resource Management has a positive and statistically significant effect on Sustainable Performance, and the alternative hypothesis is accepted.

HYPOTHESIS 3

H3: Green Human Resource Management practices have no statistically significant effect on Sustainable Performance.

As presented in Table 3, the calculated F-value was 183.896, exceeding the tabulated value (3.94) at the 0.05 significance level.

The correlation coefficient (R) reached 0.780, indicating a strong positive relationship between Green HRM practices and Sustainable Performance. The coefficient of determination (R²) was 0.609, implying that Green HRM explains 60.9% of the variance in Sustainable Performance.

The calculated t-value for the regression coefficient was 13.561, exceeding the critical value (1.984) with $p = 0.000$.

The standardized regression coefficient ($\beta = 0.691$) indicates that a one-unit increase in Green Human Resource Management practices leads to approximately a 69.1% improvement in Sustainable Performance.

As a result, the null hypothesis is rejected, indicating that Green Human Resource Management techniques considerably increase Sustainable Performance. A simple linear regression analysis was used to investigate the impact of Green Human Resource Management methods on long-term performance. The statistical data are provided in Table 3.

Table 3. Statistical measurements of the impact of green human resource management strategies on long-term success.

Dependent	Green Human Resource	Coefficient	t-value	R	R ²	Adjusted	F-value	Sig.	Decision
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Variable	Management Practices					R ²			
Sustainable Performance	α	1.250	6.692	0.780	0.609	0.606	183.896	0.000	Accept the Alternative Hypothesis
	β	0.691	13.561	—	—	—	—	—	—

Note: $F = 3.94$; $t = 1.984$; Sample size (N) = 120.

As shown in Table 3, the computed F-value was 183.896, which is more than the crucial F-value (3.94) at the 0.05 level. The correlation coefficient (R) was 0.780, demonstrating a significant positive association between Green Human Resource Management practices and Sustainable Performance. The coefficient of determination (R^2) was 0.609, indicating that Green Human Resource Management techniques explain 60.9% of the variation in Sustainable Performance. The regression coefficient ($\beta = 0.691$) had a computed t-value of 13.561, which was higher than the critical threshold of 1.984 ($p = 0.000$). Green Human Resource Management techniques have a positive and statistically significant influence on Sustainable Performance, hence the alternative hypothesis is accepted.

HYPOTHESIS 4

H4: AI has no statistically meaningful impact on Digital Human Resource Management.

Table 4 shows that the computed F-value was 434.104, well beyond the crucial limit (3.94) at the 0.05 significant level. The correlation coefficient (R) was 0.871, with a coefficient of determination (R^2) of 0.759, showing that Artificial Intelligence explains 75.9% of the variation in Digital Human Resource Management. The computed t-value was 20.835, which is much higher than the crucial value (1.984) at $p = 0.000$. The standardized regression coefficient ($\beta = 0.903$) shows that increasing AI adoption by one unit leads to a 90.3% rise in Digital Human Resource Management implementation. These results highlight the critical role of artificial intelligence in driving digital transformation and upgrading human resource management processes. As a result, the alternative hypothesis is accepted, whereas the null hypothesis is rejected. A basic linear regression analysis was used to investigate the impact of artificial intelligence on digital human resource management. The statistical data are provided in Table 4.

Table 4. Statistical indications of the influence of AI on digital human resource management.

Mediating Variable	Artificial Intelligence	Coefficient	t-value	R	R ²	Adjusted R ²	F-value	Sig.	Decision
Digital Human Resource Management	α	0.384	2.317	0.871	0.759	0.757	434.104	0.000	Accept the Alternative Hypothesis
	β	0.903	20.835	—	—	—	—	—	—

Note: $F = 3.94$; $t = 1.984$; Sample size (N) = 140.

As demonstrated in Table 4, the computed F-value was 434.104, which is more than the crucial F-value (3.94) at the 0.05 level. The correlation coefficient (R) was 0.871 and the coefficient of determination (R^2) was 0.759, showing that Artificial Intelligence explains 75.9% of the variation in Digital HR Management. Furthermore, the estimated t-value for the regression coefficient ($\beta = 0.903$) was 20.835, above the crucial criterion (1.984) with $p = 0.000$. These results show that artificial intelligence has a substantial, favorable, and statistically significant impact on digital human resource management. Thus, the alternative theory is accepted.

HYPOTHESIS 5

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H5: Artificial intelligence has no statistically significant impact on Green HRM practices.

Table 5 summarizes the findings, which demonstrate that the estimated F-value reached 200.204, above the tabulated value (3.94) at the 0.05 level of significance. The correlation coefficient (R) was 0.769 and the coefficient of determination (R^2) was 0.592, showing that Artificial Intelligence explains roughly 59.2% of the variation in Green Human Resource Management methods. The predicted t-value was 14.149, which above the critical limit of 1.984 ($p = 0.000$). The standardized regression coefficient ($\beta = 0.851$) indicates that increasing AI utilization by one unit leads to an 85.1% improvement in Green Human Resource Management practices. These results show that artificial intelligence makes a significant contribution to the adoption of environmentally friendly organizational practices. As a consequence, the null hypothesis is rejected, whereas the alternative hypothesis is accepted. A basic linear regression analysis was utilized to look at the effect of artificial intelligence on green human resource management methods. Table 5 presents statistical data.

Table 5. Statistical Indicators of the Effect of Artificial Intelligence on Green Human Resource Management Practices

Mediating Variable	Artificial Intelligence	Coefficient	t-value	R	R^2	Adjusted R^2	F-value	Sig.	Decision
Green Human Resource Management Practices	α	0.516	2.242	0.769	0.592	0.589	200.204	0.000	Accept the Alternative Hypothesis
	β	0.851	14.149	—	—	—	—	—	—

Note: $F = 3.94$; $t = 1.984$; Sample size (N) = 140.

As shown in Table 5, the calculated F-value was 200.204, meaning it is higher than the required F-value (3.94) at the 0.05 significance level. The correlation coefficient (R) was 0.769, and the coefficient of determination (R^2) was 0.592, indicating that AI accounts for 59.2% of the variance in Green HRM practices. The coefficient of the regression ($\beta = 0.851$) yielded a calculated t-value of 14.149, over the critical limit of 1.984 ($p = 0.000$). These results show that artificial intelligence has a substantial, favorable, and statistically significant impact on green human resource management practices. Thus, the alternative theory is accepted.

MEDIATION ANALYSIS

HYPOTHESIS 6

H6: Artificial Intelligence has no statistically significant indirect effect on Sustainable Performance through the mediating roles of Digital Human Resource Management and Green Human Resource Management.

The Structural Equation Modeling (SEM) results presented in Table 6 and Figure 2 provide strong evidence supporting the mediating roles of Digital Human Resource Management and Green Human Resource Management.

The major findings are summarized below:

To evaluate the mediating effects of Digital Human Resource Management and Green Human Resource Management Practices on the relationship between Artificial Intelligence and Sustainable Performance, Structural Equation Modeling (SEM) was employed. The direct and indirect effects are summarized in Table 6.

Table 6. Direct and indirect effects of artificial intelligence on sustainable performance through the mediating roles of digital human resource management and green human resource management practices

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Research Path	Direct Effect	Indirect Effect (1)	Indirect Effect (2)	t-value	Sig.	Direct Effect Significance	Type of Mediation
Artificial Intelligence → Digital Human Resource Management	0.849	—	—	18.137	0.000	Significant	Full Mediation
Artificial Intelligence → Green Human Resource Management Practices	0.905	—	—	15.190	0.000	Significant	—
Artificial Intelligence → Sustainable Performance	0.231	0.342	0.253	1.883	0.060	Not Significant	—
Green Human Resource Management Practices → Sustainable Performance	0.253	—	—	3.196	0.001	Significant	—
Digital Human Resource Management → Sustainable Performance	0.342	—	—	3.401	0.000	Significant	—

As presented in Table 6 and Figure 2, Artificial Intelligence has a significant positive effect on both Digital Human Resource Management ($\beta = 0.849$, $t = 18.137$, $p < 0.001$) and Green Human Resource Management Practices ($\beta = 0.905$, $t = 15.190$, $p < 0.001$). In turn, Digital Human Resource Management ($\beta = 0.342$, $t = 3.401$, $p < 0.001$) and Green Human Resource Management Practices ($\beta = 0.253$, $t = 3.196$, $p = 0.001$) significantly enhance Sustainable Performance. Although the direct effect of Artificial Intelligence on Sustainable Performance ($\beta = 0.231$, $t = 1.883$, $p = 0.060$) was not statistically significant, the indirect effects through Digital Human Resource Management (0.342) and Green Human Resource Management Practices (0.253) were stronger and statistically meaningful.

ARTIFICIAL INTELLIGENCE → DIGITAL HUMAN RESOURCE MANAGEMENT

The calculated t-value of 18.137 exceeds the critical threshold of 1.984 at $p = 0.000$. This study argues that Artificial Intelligence significantly enhances Digital Human Resource Management via advancements in:

AI-supported HR functions, employee experience, employee engagement, employee adaptability, acceptance of intelligent technologies, and reduction of perceived technological risks

DIGITAL HUMAN RESOURCE MANAGEMENT → SUSTAINABLE PERFORMANCE

The resulting t-value of 3.401 surpasses the threshold of 1.984 ($p = 0.000$). This result demonstrates that Digital HRM considerably enhances sustainable performance via digital support strategies, digital workforce capabilities, and digital work activities.

ARTIFICIAL INTELLIGENCE → GREEN HUMAN RESOURCE MANAGEMENT

The determined t-value of 15.190 surpasses the threshold value of 1.984, with $p = 0.000$. This study demonstrates that AI considerably boosts the use of Green HRM practices and encourages environmentally friendly company activities.

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GREEN HUMAN RESOURCE MANAGEMENT → SUSTAINABLE PERFORMANCE

The determined t-value of 3.196 was higher than the threshold value (1.984), with $p = 0.001$. This research reveals that Green Human Resource Management significantly contributes to improving sustainability outcomes.

OVERALL MEDIATION EFFECT

The Structural Equation Model demonstrates that both Digital Human Resource Management and Green Human Resource Management play critical mediating roles in the relationship between Artificial Intelligence and Sustainable Performance. The research found that:

- The direct effect of AI on sustainable performance was 0.231 ($t = 1.883$, $p = 0.060$), although the relationship was not statistically significant.
- The indirect effect of Digital Human Resource Management was 0.342.
- Green HR Management had an indirect effect of 0.253.

Both indirect affects are more potent than direct influences.

These findings indicate the existence of complete (whole) mediation, implying that Artificial Intelligence enhances Sustainable Performance mostly via enhancing Digital Human Resource Management and Green Human Resource Management, rather than through a direct route. As a consequence, companies looking to capitalize on the benefits of Artificial Intelligence should prioritize digital transformation of Human Resource Management while integrating environmentally friendly HR practices into their organizational objectives.

Figure 2 depicts the standardized path coefficients obtained from the Structural Equation Modeling (SEM) analysis, which demonstrate the direct and indirect relationships between Artificial Intelligence (AI), Digital Human Resource Management (DHRM), Green Human Resource Management (GHRM) practices, and Sustainable Performance. The model indicates that AI has a considerable positive influence on both Digital Human Resource Management ($\beta = 0.849$) and Green Human Resource Management ($\beta = 0.905$). Both Digital Human Resource Management ($\beta = 0.342$) and Green Human Resource Management strategies ($\beta = 0.253$) improve long-term performance. Artificial intelligence has a direct impact on sustainable performance ($\beta = 0.231$), although the link is not statistically significant ($p = 0.060$). This implies that the impact of AI on sustainable performance is predominantly transferred via the two mediating factors. These results demonstrate the presence of complete mediation, indicating that Digital Human Resource Management and Green Human Resource Management techniques are the primary methods by which Artificial Intelligence improves Sustainable Performance. As a result, enterprises may optimize the sustainability advantages of Artificial Intelligence by speeding the digital transformation of Human Resource Management while also enhancing environmentally friendly HR practices.

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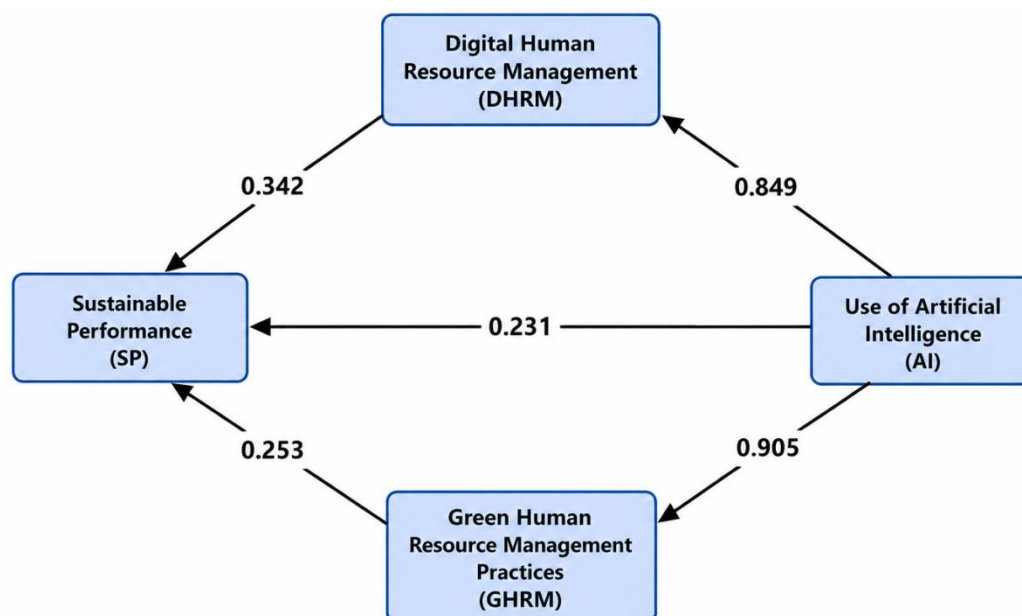


Figure 2. The structural path model depicts the direct and indirect impacts of artificial intelligence (AI) on sustainable performance (SP) via the mediating roles of digital human resource management (DHRM) and green human resource management (GHRM) practices.

CONCLUSION

According on the empirical results of this research, the following conclusions may be drawn:

1. Adopting AI improves an organization's capacity to meet sustainability targets. AI helps businesses to increase operational efficiency, streamline decision-making processes, and build long-term organizational resilience.
2. Digital HR Management has a substantial beneficial impact on sustainable performance. The digital transformation of HR activities promotes organizational agility, workforce efficiency, data-driven decision-making, and is a significant driver of long-term organizational growth.
3. Green Human Resource Management techniques enhance sustainable performance. Integrating environmental issues into human resource policies and practices enhances environmental responsibility, increases organizational commitment to sustainability, and adds to better economic, environmental, and social outcomes.
4. Artificial Intelligence significantly impacts Digital Human Resource Management. The findings show that AI technologies are a critical catalyst for speeding digital transformation in HR departments by boosting recruiting, training, performance management, workforce analytics, and strategic decision-making.
5. AI greatly improves Green Human Resource Management techniques. AI-based solutions help companies adopt environmentally responsible HR practices by increasing sustainable resource use, enhancing environmental monitoring, minimizing operational waste, and encouraging environmentally aware employee behavior.
6. Artificial intelligence has a mostly indirect impact on sustainable performance. The results show that AI increases Sustainable Performance primarily via its beneficial impacts on Digital Human Resource Management and Green Human Resource Management, showing the presence of complete mediation.
7. In order to achieve long-term success, firms must combine Artificial Intelligence, Digital Human Resource Management, and Green Human Resource Management. All three of these strategic factors must be considered complementary components of a unified management system capable of increasing organizational competitiveness while also encouraging long-term development.

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