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IMPACT OF AI ON DIGITAL HUMAN RESOURCE MANAGEMENT: THE MEDIATING ROLE OF ORGANIZATIONAL SUSTAINABILITY

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Abstract

This study sheds light on how artificial intelligence (AI) information determines digital human resource management (HRM) in organizations, particularly by examining the mediating role of organizational sustainability. By utilizing relevant HRM and organizational sustainability theories, this study aims to explore the role of AI-enabled practices in the effectiveness of digital HRM and the mediating role of organizational sustainability in this process. We extracted field data and administered structured questionnaires to HR professionals and level 2 managers in organizations spanning multiple industries. The Partial Least Squares Structural Equation Modeling (PLS-SEM) technique was applied to evaluate the constructs of AI adoption, digital HRM effectiveness, and organizational sustainability. Results indicate that AI can be used as a substantial variable to enhance digital HRM practices and that organizational sustainability is a vital mediator that strengthens the relationship. This research provides valuable insights into the intersection of AI and HRM and encourages scholars to investigate the sustainability aspect of AI-driven HRM further. By establishing a bridge between AI adoption and sustainable HRM metrics, this study adds novel evidence by demonstrating the mediating effect of organizational sustainability between AI adoption and the digital HRM outcomes. It provides practical guidance for organizations seeking to capitalize on the AI revolution while promoting sustainable outcomes.

Keywords: AI-powered Employee Engagement, AI-based Performance Management, Digital Human Resource Management, Organizational Sustainability.

INTRODUCTION

Artificial intelligence (AI) technology has grown quickly in advancement, adapting the new phases around human resource management (HRM) over time (Sharabati et al., 2024). Adopting AI within HRM practices, known as digital HRM, represents a key opportunity for organizations seeking to improve operational efficiency and enable sustainable growth (Atieh Ali et al., 2024). With increasing pressures on businesses to embrace technological change and meet sustainability goals, the contribution of artificial intelligence (AI) in transforming human resource management (HRM) processes has become an area of interest as it has been recognized.(Jawabreh et al., 2023) The link is even more marked considering that in the current continuously changing business scenario, organizations

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must maintain a balance between innovation and sustainability to maintain competitiveness(Allahham, et al., 2024.). Previous studies have examined how AI directly affects HRM outcomes, such as improved decision-making, streamlined processes, and enhanced employee experiences; however, the mediating effect of organizational sustainability has not been widely addressed. Organizational sustainability, generally understood as a capacity to equilibrate economic, social, and environmental dimensions, has been acknowledged as a key determinant of the organization's long-term resilience and performance. Although this is an important topic, a non-negligible gap has not yet been reported in the literature; that is, how organizational sustainability mediates the relationship between AI adoption and digital HRM effectiveness worldwide, especially when sustainability becomes a strategic priority for organizations (Wang & Prajogo, 2024). This study will fill this gap by analyzing how AI is utilized in digital HRM and how organizational sustainability mediates this relationship (Almustafa et al., 2023). A cross-sectional quantitative research design was employed, using structured questionnaires administered to HR professionals in various industries. Partial Least Squares Structural Equation Modeling (PLS-SEM) was carried out to statistically test the relationships between AI adoption, digital HRM effectiveness, and organizational sustainability. This will help illuminate the best practices for working with the aid of AI in HRM, as well as call for a need for sustainability, and thus, theoretical contributions and future directions for practice will be made. According to the problem statement, the research questions are:

RQ1: What is the effect of AI adoption on the effectiveness of digital HRM practices?

RQ2: What is the mediating role of organizational sustainability in the relationship between AI adoption and digital HRM effectiveness?

RQ3: How would organizations leverage AI-driven HRM practices for sustainability goals through organizational sustainability?

The remainder of the article is structured as follows: We present the theoretical framework in Section 2, followed by a synthesis of the literature related to AI, digital HRM, and organizational sustainability, which led to the hypotheses. Section 3 describes the research methodology, which includes a description of the data collection process and the statistical methods for testing the proposed relationships. The results are presented in section 4, providing the evidence that supports the hypotheses. Section 5 provides an in-depth discussion of the findings and their contributions to digital HRM and organizational sustainability literature.

LITERATURE REVIEW

A. AI-Driven Employee Engagementss

Employee engagement is a key organizational performance driver, and AI-driven tools are improving employee engagement(Allahham et al., 2024). AI technologies like sentiment analysis, chatbots, and personalized feedback systems allow organizations to monitor employee satisfaction levels, predict turnover risks, and customize interventions to enhance workplace morale(Allahham, et al., 2024). AI tools can also help examine and

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analyze the results of employee surveys and communication patterns to identify problem areas and help recommend actionable ideas. In particular, these tools are useful in workplaces that are remote or hybrid, where employee engagement is especially difficult to maintain(sharabati , et al., 2024.). In terms of sustainability, AI-enabled employee engagement creates a rewarding employee culture, lower attrition costs, and a long-term employee well-being approach, thus aligning with the tenets of social sustainability(Alrjoub et al., 2021).

B. Artificial Intelligence in Performance Management

Whether it is a traditional business or a startup, as companies race to implement AI-based performance management systems, how are they currently evaluating and developing their workforce. Old review performance systems based on subjective assessments and poor frequency are being rapidly replaced by AI-fueled persistent performance tracking methods(Morshed et al., 2024).

In these systems, real-time data collection and predictive analytics as well as automated feedback mechanisms are used to deliver insights into employee and managerial behaviour. AI can monitor KPIs, identify skill gaps, and suggest personal development plans, by aligning workforce capabilities with strategic goals, this delivers sustainable organizational benefits through improved individual and team performance.

Moreover, AI-enhanced performance management encourages fairness and transparency, countering common criticisms faced by traditional systems and establishing trust in the organization(Alkhazaleh et al., 2023). However, there is only limited literature examining how sustainability mediates the impact of AI-based performance management systems effectiveness. Digital HRM involves the application of digital technologies, such as artificial intelligence (AI), to HR functions to improve their efficiency and effectiveness and the experience of employees in an organization(Shehadeh et al., 2024). By replacing outdated paper-based systems with digital HRM practices, organizations can automate routine tasks, enhance data accuracy, and redirect their efforts toward strategic initiatives.

Cloud-based HR systems, for instance, promote cross-departmental collaboration, and AI-based analytics offer insight into workforce trends and problems(Alibraheem et al., 2024). However, this implementation comes with challenges that need to be addressed from the beginning, like restructuring to accept digital HRM, cost, change management, and cybersecurity. On the environmental front, to achieve environmental objectives, digital HRM also minimizes the usage of papers and encourages remote work, which reduces the carbon footprints(Bani et al., 2024).

This also contributes to economic sustainability through improving resource allocation and providing organizations with more agility. Nevertheless, based on the literature, we cannot yet confirm that by all means, digital HRM practices can stimulate the achievement of long-term resilience by aligning them with organizational sustainability goals(William et al., 2024).

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C. Sustainability of the Organization

Organizational sustainability is the process of integrating the three dimensions of economy, society, and environment into business practices to operate sustainably over a long period of time(Jebreel et al., 2023). Within the framework of HRM, this means that workforce strategies are developed that harmonize with goals for the broader organization, such as minimizing environmental footprint, enhancing diversity and inclusion, and promoting employee well-being.

Moreover, AI has the potential to enhance organizational sustainability via data-driven decision-making, resource efficiency, and ethical practices(Pham et et al., 2023) . AI tools can enable organizations to monitor and report sustainability metrics, pinpoint areas of improvement, and adopt greener initiatives(Stahl et al., 2019). It is known from research that companies that are focusing on sustainability are often associated with superior financial performance, improved brand image, and increased employee satisfaction(Piwowar-Sulej, 2021). Nevertheless, the literature is still unclear on how AI-enabled HRM practices can be integrated with sustainability strategies to help maximize their impact(Fawehinmi et al., 2020).

D. Gaps in the Literature

However, little has been explored within HRM regarding the impact of AI presence and influence in augmenting sustainable practices. The majority of studies concentrate on the direct effects of AI-based HRM practices, recruitment, employee commitment, and performance management. without sufficiently addressing the mechanisms that may link these practices to downstream organizational performance. Moreover, there is no apparent evidence of studies considering the mediation role of organizational sustainability to enhance the effectiveness of AI adoption in HRM. While a handful of studies have suggested that AI may hold the potential to facilitate sustainability objectives, there is a scarcity of empirical insights about the specifics of how these technologies could be leveraged within HRM strategies to enable long-term resilience and value creation. Moreover, previous service focused on either AI or sustainability and paid no attention to how their adoption can impact digital HRM effectiveness.

These gaps accentuate the importance of exploring the intersections of AI and sustainability in HRM, which remains largely unexplored in extant studies. The study provides a comprehensive view by highlighting the mediating role of sustainability, bridging the gap between technological innovation and sustainable growth in HRM practices. PLS-SEM is an industry-leading approach to examining empirical studies and theory generation, reinforcing robust findings. In addition, this study contributes to the literature by providing practical recommendations for organizations looking to adopt AI-driven HRM practices sustainably(Strohmeier, 2020). While the implications of this study contribute to the academic knowledge in the respective fields, there are also practical insights, such as how to integrate AI-facilitated sustainability efforts with resilience building and enhancing employee experiences to ensure long-term success for organizations. By doing so, it paves the way for future studies on the transformative role of AI in promoting sustainable HRM practices.

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HYPOTHESIS DEVELOPMENT

A. From Performance Management based on AI to Human Resource Management in the Digital World

AI-driven performance management systems use advanced analytics, machine learning, and real-time feedback to streamline and enhance HR processes like recruitment, training, and talent development. It allows organizations to align the capabilities of the workforce with the strategic priorities of the organization (Banmairuroy et al., 2022) based on the efficiency and accuracy of decision-making in HRM each subset. With the ability to automate repetitive work and deliver insights in real time, AI-based performance management can help create a more agile and data driven HR function. the hypothesis we propose is the following:

H1: AI based performance management has significant positive impact on digital human resource management effectiveness.

B. AI-Based Performance Management to Organizational Sustainability

AI-driven performance management solutions make it possible for companies to better identify skills gaps, anticipate future workforce demands and encourage continuous learning, helping to ensure that workers are prepared to meet sustainability targets (Aparecida et al., 2020). These tools promote transparency and fairness in performance evaluations, which enhances trust and accountability, essential ingredients for long-term sustainability (Acquah et al., 2021). AI-driven insights also allow organizations to minimize waste and use resources more effectively while better aligning workforce practices and environmental and social priorities. Therefore, the hypothesis is:

H3: Organization sustainability is immensely improved by the data-driven performance management.

C. AI-Based Employee Engagement Solution to Digital HR Solution

By incorporating AI-driven solutions like sentiment analysis and personalized feedback systems, HR teams can monitor and enhance employee satisfaction, anticipate turnover risks, and cultivate a positive workplace environment(Suvattanadilok, 2024). Others, such as HR analytics, enable proactive organizational decision making and employee-centered strategies. This can allow organizations to develop a more agile and responsive HR function whereby integrating AI into engagement practices(Bidya & Pravat, 2019). Therefore, the hypothesis is as follows:

H3: Data-driven performance management has a significant positive impact on organizational sustainability.

D. AI Marking Employee Engagement to Organizational Sustainability

AI-generated engagement tools foster employee well-being, satisfaction, and retention all vital measures of *Organizational* sustainability.(Acquah et al., 2021) These tools support organizations in adopting an inclusive culture and a continuous feedback loop within their workplace to build a sustainable workforce that not only absorbs this

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information but also actively champions sustainability initiatives. People who feel engaged are more likely to undertake environmental and social goals, creating a virtuous cycle of performance and sustainability(Sahioun et al., 2023). Thus, the hypothesis is:

H4: Employee engagement powered by AI has a significantly positive impact on organizational sustainability.

E. Digital Human Resource Management from Organizational Sustainability

HRM practices are aligned with the broader organizational objectives relating to economic, social, and environmental factors through organizational sustainability which complements the digital aspects of HRM (Arasti et al., 2012). Implementing Sustainable HRM practices will not only enhance operational efficiency through resource efficiency, ethical compliance but also protect employee experiences and organizational resilience. Sustainability in human resources notes Make your people before your processes or technologies Sustainable. Therefore, the hypothesis is:

H5: Organizational sustainability has a significant positive effect on organizational digital human resource management effectiveness.

F. Integrative Approach: RBV and Institutional Theory

By developing a model integrating the Resource-Based View (RBV) and Institutional Theory, this study attempts to elucidate the impact of AI adoption and organizational sustainability on digital HRM effectiveness (Puspita et al., 2020). Based on RBV, valuable, rare, inimitable, and non-substitutable (VRIN) resources. AI-driven HRM practices and sustainability strategies, create a sustainable competitive advantage. Here, AI-enabled HRM practices help foster operational efficiency, employee experiences, and long-term adaptability, and are thus regarded as strategic resources that can reinforce organizational sustainability (Khan et al., 2023). Whereas RBV focuses on the internal strengths and weaknesses of a firm, Institutional Theory focuses on how social pressures, including regulatory and normative factors, drive organizations to alter their strategy or practices in alignment with external expectations. For example, organizations are under increasing pressure to implement sustainable practices to avoid the risk of losing legitimacy and to reduce legitimacy uncertainty. AI-driven HRM practices with sustainability-oriented external pressures serve to satisfy both external pressures by the organization while at the same time creating internal efficiencies. We identify an integrated framework with internal factors and external pressures embedded in RBV and Institutional Theory to explain digital HRM; this explains the relationship between internal resources, external pressures, organizational sustainability and effectiveness of digital HRM (Strohmeier, 2020).

G. Research Framework

The objective of this study is to investigate the relationship between AI adoption and effectiveness of digital HRM under the mediating role of organizational sustainability. The proposed framework shows a direct and indirect impact of AI-based HRM practices, employee engagement and performance management on digital HRM effectiveness.

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Aspects of organizational sustainability play a central mediation role, which supports the alignment of AI-driven operational practices with wider economic, social, and environmental aims. Theoretical framework. We outline the interrelationships between AI adoption, organizational sustainability and effectiveness of digital HRM. It highlights the need to align AI-powered HRM practices with sustainability strategies for holistic operability and resilience in dynamic business settings. Emphasizing the importance of both internal potentials and external demands, this structure yields practical guidance for entities aiming to capitalize on AI and facilitate sustainable development.

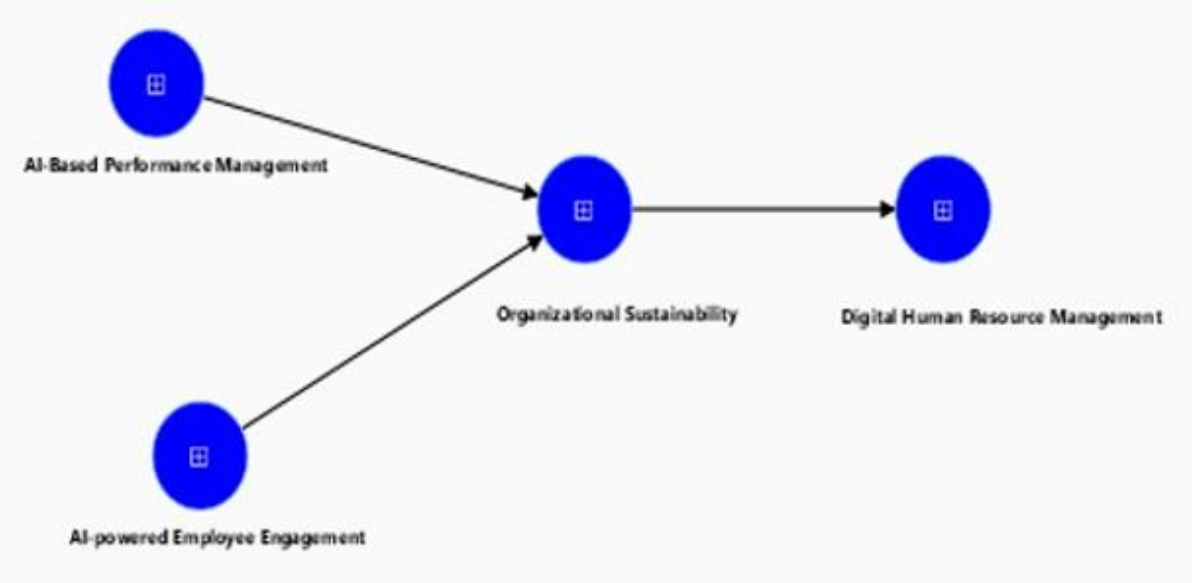

Figure 1: Research model

RESEARCH METHODOLOGY

The research methodology adopted for the study This chapter summarizes the research methodology adopted to study the relationship between AI adoption and digital HRM effectiveness through organizational sustainability (Hatamlah, Allahham, Abu-AlSondos, Al-junaidi, et al., 2023). It covers questionnaire design, sampling methods, data collection, and data analysis methods.

A. Questionnaire Development and Pilot Testing

We employed a structured questionnaire to assess the constructs in the study, namely AI adoption, organizational sustainability, and digital HRM effectiveness. Ensure all constructs were operationalized with items adapted from existing literature to maximize content validity and relevance.

For instance:

- Organizational Sustainability: Measured via 10 items covering the economic, social, and environmental dimensions of sustainability based on the HRM.

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- Digital HRM Effectiveness: Gauged via 12 items on the efficiency, accuracy, and strategic alignment of AI-driven HRM practices.

In order to verify whether the questionnaire would be as clear, relevant and applicable as desired, a pre-test of the questionnaire was carried out with the assistance of a number of experts; three academic researchers on HRM and AI; two industry experts with experience in digital HRM and sustainability practice(Hatamlah, et al., 2023). Results from this pre-test identified that measures were unique, comprehensive, and representative of the study's goals.

This process ensured the content validity and usefulness of the questionnaire as data collection instrument with regard to understanding the extent to which AI adoption will impact digital HRM under the umbrella of organizational sustainability (Salhab et al., 2023).

B. Research Methods and Data Collection

Target population in this study comprises HR professionals, managers, and top-level executives responsible for implementing AI-driven HRM practices and sustainability strategies in their organizations.

These participants were chosen because they were directly involved in the decision-making processes related to digital HRM and sustainability initiatives. Methods Data were obtained from a structured survey administered across several industries.

The survey collected a total of 150 usable responses from various professional levels, notably HR managers, talent acquisition specialists, and organizational development officers. That was enough for us in terms of sample size to conduct statistical analysis and for findings to be solid enough to be representative of what is happening today with companies that are also using AI for their HRM without losing the sight of their sustainability objectives. They were asked to assess AI adoption, organizational sustainability, and digital HRM effectiveness on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

C. Data Analysis

The data were analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM), which is a popular method for the examination of complex interrelationships of latent variables.

PLS-SEM was deemed suitable for this study, provided it possesses certain advantages such as: (i) being able to examine small-to-medium samples, and (ii) being applicable for exploratory analysis based on the aim of hypothesis testing. The analysis process consisted of the following steps: Measurement Model Assessment: Used Cronbach's alpha, composite reliability, and average variance extracted (AVE) for reliability validity of constructs.

It included the structural model assessment: Evaluated the proposed relationships among AI adoption, organizational sustainability, and digital HRM effectiveness. To

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examine indirect effects, bootstrapping techniques of mediation were used with organizational sustainability as the mediator. Goodness-of-Fit: Used measures such as R^2 and Q^2 to confirm that the model fits well and explains expected outcomes. The findings offered insights on the direct and indirect effects of AI adoption on digital HRM effectiveness, underscoring the importance of organizational sustainability as a mediator.

D. Common Method Bias

In order to cope with this potential common method bias (CMB) since data were collected from one single source for all variables, the following actions were taken Procedural Remedies: The questionnaire included directions stressing the need for independent and honest answers. Furthermore, the items were presented in a random order to attenuate response biases.

Statistical Tests: A complete collinearity test was conducted and Variance Inflation Factors (VIF) were calculated for all constructs. Values greater than 3.3 are suggestive of potential collinearity problems, in accordance with common guidelines. According to the results, in this study all the VIF values were below the threshold (10), indicating that common method bias was not a concern.

Also, the results of these analyses reinforced the reliability of the findings, especially concerning the role of organizational sustainability as a mediator explaining the relationship between AI adoption and digital HRM effectiveness.

E. Assessment of the Measurement Model

Table 1: Measurement items and reliability

Constructs	Items	Factor loadings	Cronbach's Alpha	C.R.	(AVE)
AI-Based Performance Management	PM1	0.845	0.876	0.915	0.729
	PM2	0.861			
	PM3	0.872			
	PM4	0.837			
AI-powered Employee Engagement	EE1	0.822	0.843	0.895	0.68
	EE2	0.815			
	EE3	0.831			
	EE4	0.83			
Digital Human Resource Management	HRM1	0.804	0.868	0.908	0.712
	HRM2	0.883			
	HRM3	0.842			
	HRM4	0.844			
Organizational Sustainability	OS1	0.841	0.883	0.919	0.739
	OS2	0.844			
	OS3	0.89			
	OS4	0.864			

Table 1 presents the Reliability analysis of the measurement items for the four constructs AI-Based Performance Management, AI-powered Employee Engagement, Digital Human Resource Management, and Organizational Sustainability.

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All items have factor loadings of above 0.80, which shows high relationships between items and respective constructs.

The construct validity was confirmed above 0.70 (the lowest loading (HRM1) is 0.804). Cronbach's Alpha and Composite Reliability (C.R.) levels suggest that internal consistency is significantly strong. All Cronbach's Alpha values range from 0.843 to 0.883 (C.R.: 0.895 – 0.919), which are all higher than the minimum accepted value (0.70). The results affirm the reliability of the constructs.

Furthermore, the Average Variance Extracted (AVE) values are between 0.68 and 0.739 which are greater than the 0.50 criterion, confirming convergent validity as the constructs explain sufficient variance from their indicators. Importantly, Organizational Sustainability displays the highest AVE of 0.739, which enhances its validity significantly. All in all, the results prove the items of measurement are reliable, as well as valid for research.

The results show that the high factor loadings, strong reliability coefficients, and satisfactory AVE values indicate that dataset is large enough for further statistical analyses such as SEM or hypothesis testing. Also, explorations of the discriminant validity and in-depth model fit assessment may enhance our understanding about the robustness these constructs.

Table 2: HTMT

	AI-Based Performance Management	AI-powered Employee Engagement	Digital Human Resource Management	Organizational Sustainability
AI-Based Performance Management				
AI-powered Employee Engagement	0.662			
Digital Human Resource Management	0.541	0.588		
Organizational Sustainability	0.536	0.423	0.281	

Tables 2 Analysis of Discriminant Validity between the constructs by using the Heterotrait-Monotrait (HTMT) ratio of correlations (Table 2).

The HTMT values represent the similarity between constructs, and a threshold (conservative) of 0.85 (or 0.90) is commonly adopted for exhibit acceptable discriminant validity. The outcomes demonstrate that all HTMT values are far below 0.85, indicating strong discriminant validity among the constructs.

We find the highest correlation to be at 0.662 (between AI-Based Performance Management and AI-powered Employee Engagement) a telling but still moderate relationship and that should be within a permissive zone.

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Lower correlations are observed with other values (AI-Based Performance Management and Digital Human Resource Management (0.541) and AI-Based Performance Management and Organizational Sustainability (0.536), further confirming that these constructs are not similar.

In addition, the lowest relationship of 0.281 (Digital Human Resource Management and Organizational Sustainability) further validates these variables measure different dimensions.

The HTMT results explain that overall, this provides evidence of the discriminant validity of the actual model avoiding an overlap of constructs. This adds to the reliability of the model for statistics like structural equation modelling (SEM) or hypothesis testing.

Table 3: Fornell-Larcker

	AI-Based Performance Management	**AI-powered Employee Engagement**	**Digital Human Resource Management**	**Organizational Sustainability**
AI-Based Performance Management	0.854			
AI-powered Employee Engagement	0.571	0.825		
Digital Human Resource Management	0.473	0.511	0.844	
Organizational Sustainability	0.475	0.371	0.26	0.86

Table 3: The Fornell-Larcker criterion, the square root of the Average Variance Extracted (AVE) (diagonal values) for each latent variable exceeds the correlations between constructs (off-diagonal values). Discriminant validity is established when the square root of AVE of each construct is greater than their correlations with other constructs.

Again, as seen in the diagonal values for AI-Based Performance Management (0.854), AI-powered Employee Engagement (0.825), Digital Human Resource Management (0.844), and Organizational Sustainability (0.860), all are larger than the corresponding off-diagonal values, confirming, hence that there is a stronger relationship between items with the same construct than those from outside.

The maturing of constructs led to greatest correlation of 0.571 (AI-Based Performance Management and AI Powered Employee Engagement) which is also less than the square root of AVE for both constructs thus maintaining their distinct identity.

These results enhance discriminant validity, indicating that the constructs assess separate components of the model instead of blending. This ensures increasing the reliability of the dataset for any statistical runs such as SEM or hypothesis testing.

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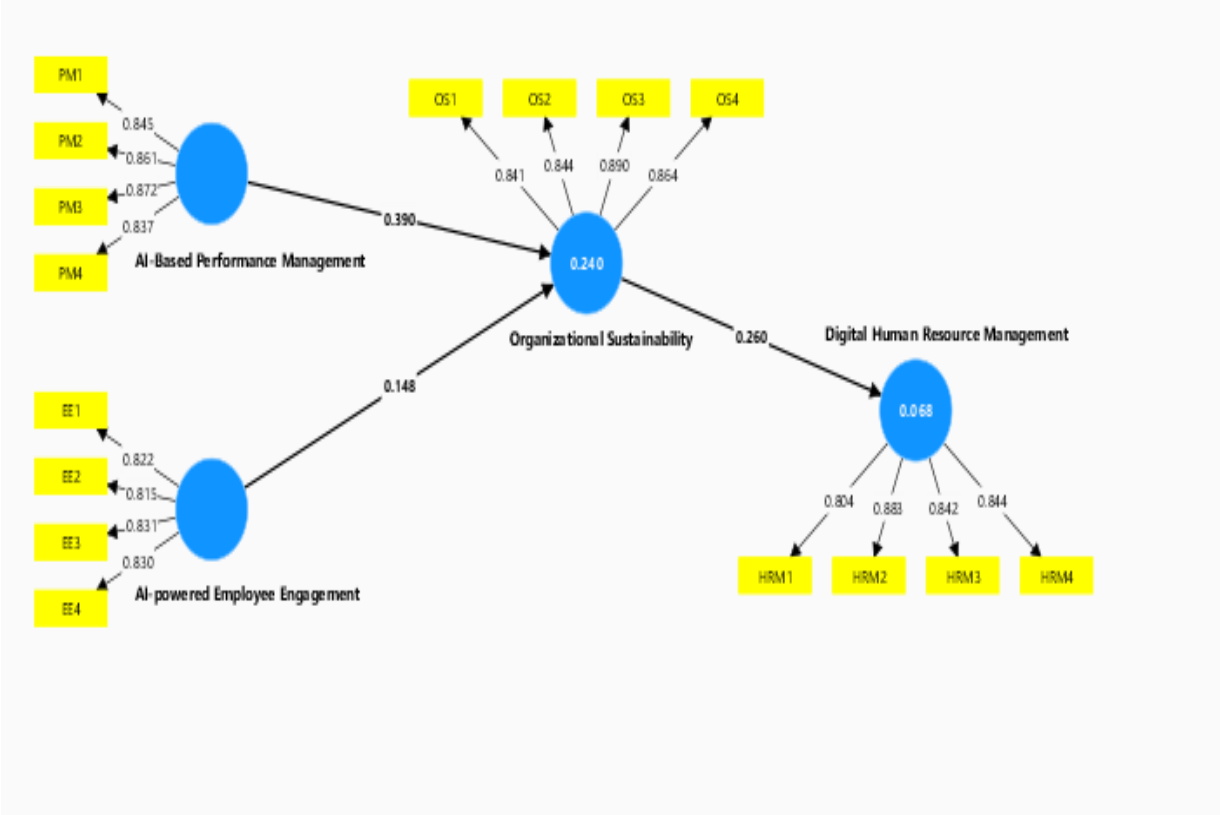

Figure 2: Measurement model

F. Assessment of the Measurement Model

The paper proposes the measurement constructs to evaluate and analyze how AI affects DHRM and subsequently DHRM influences the organization sustainability. The study not only paves way for streamlining processes but enables workflow and automation within human resource functions by operationalizing AI driven HR processes. A systematic literature review was implemented to identify the relevant extant literature on AI-powered HR management, digital transformation, and organizational sustainability, and nine composite constructs were developed to enhance construct validity and reliability. These constructs were first validated from the literature and further iterated with industry professionals in a pilot. It tested the measurement model using data from a survey applied for managers and decision-makers in companies adopting AI-based HR practices. Confirmatory factor analysis (CFA) and other advanced statistical techniques were used to validate the constructs. These initially established the discriminant validity and reliability of all constructs allowing for the correct utilization of the measures for subsequent explorations. This thorough verification procedure corroborates the findings of SEM and also emphasizes the mediating effect of organizational sustainability between AI adoption in HR and overall digital transformation. This evidence provides some strategic implications of how AI can facilitate sustainable and efficient HR practices with a positive impact on the long-term resilience and performance of organizations.

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PATH RESULT

A. Specific Indirect Effects

Table 6: Hypotheses testing estimates

	Original sample	Sample mean	Standard deviation	T statistics	P values	Result
AI-Based Performance Management -> Digital Human Resource Management	0.101	0.104	0.035	2.933	0.003	Supported
AI-Based Performance Management -> Organizational Sustainability	0.39	0.39	0.07	5.562	0	Supported
AI-powered Employee Engagement -> Digital Human Resource Management	0.039	0.042	0.024	1.609	0.108	Not Supported
AI-powered Employee Engagement -> Organizational Sustainability	0.148	0.153	0.068	2.166	0.03	Supported
Organizational Sustainability -> Digital Human Resource Management	0.26	0.266	0.067	3.868	0	Supported

Table 6 hypothesis analysis, it is established that 4 hypotheses out of 5 were supported on the significant relation of AI-based performance management, AI-powered employee engagement, organizational sustainability, and digital human resource management (DHRM). Results indicate a statistically significant positive relationship of AI-Based Performance Management with both Digital Human Resource Management ($p = 0.003$) and Organizational Sustainability ($p = 0.000$). It indicates how human resources digitalization can be achieved through sustainable organizational practices and the integration of AI in the performance management process. Furthermore, it is important to keep an Eye on the second Pillar of Sustainability: Generating Organizational Sustainability through AI-powered Employee Engagement ($p = 0.030$), Increasing Employee Engagement leads to Organizational Sustainability. Moreover, it was found that Organizational Sustainability is significantly influential ($p = 0.000$) over Digital Human Resource Management, establishing Organizational Sustainability's mediating role in the digital transformation process of HR functions. On the other hand, the hypothesis that links AI-powered Employee Engagement to Digital Human Resource Management was not yet supported ($p = 0.108$, $T = 1.609$). Thus, suggesting that AI-enabled engagement initiatives might contribute to improved sustainability for the organization, but do not directly fuel the transformation of HR into the digital world. The non-significant relationship may suggest that leadership buy-in, organizational culture, or technological infrastructure may moderate this relationship. deconstruct the findings into an insight on

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AI Based Performance Management, Organizational Sustainability and Digital HRM. These findings suggest strategic implications for organizations seeking to implement AI-powered human resource solutions in alignment with sustainable business initiatives.

FINDING

A. Discussion and Conclusions

This investigation validates several significant outcomes, underscoring the critical role of organizational sustainability as a mediating variable in the relationship between AI adoption and digital HRM effectiveness. The study demonstrates that AI-driven practices, employee engagement, and performance management, are significantly correlated with enhanced HRM outcomes, particularly when aligned with sustainability goals. These findings are especially pertinent in industries facing dynamic market conditions and increasing regulatory pressures, where sustainability has become a strategic priority. The results reveal that organizational sustainability significantly enhances the association between AI adoption and digital HRM effectiveness at a statistically significant level. This indicates that integrating AI-driven HRM practices with sustainability strategies creates a synergistic effect, transforming technological capabilities into sustainable value creation. Furthermore, the study highlights that organizational sustainability mediates the positive effects of AI adoption on digital HRM effectiveness, emphasizing the necessity for integrated approaches to HRM innovation. These insights are highly relevant for stakeholders in various industries, as they provide a robust framework for leveraging AI while ensuring alignment with broader economic, social, and environmental goals. In conclusion, this research establishes a sophisticated model that can be strategically utilized by organizat**ions** to design HRM strategies combining AI adoption and sustainability. By focusing on creating high operational efficiency and fostering resilience, organizations can achieve superior performance outcomes while contributing to long-term sustainability objectives.

B. Theoretical Implications

This study makes multiple theoretical contributions to the existing literature on AI adoption, organizational sustainability, and digital HRM effectiveness. First, it illuminates the mediating role of organizational sustainability in bridging AI adoption and digital HRM effectiveness, thereby extending prior research that often examines these constructs in isolation. The findings enrich the literature on sustainable HRM by demonstrating how AI-driven practices can be aligned with sustainability goals to enhance organizational resilience and performance. Second, the study contributes to the growing body of knowledge on the integration of technology and sustainability in HRM. It underscores the importance of adopting a holistic approach that combines AI-driven innovations with sustainability strategies, offering a new perspective on how organizations can achieve both operational efficiency and environmental responsibility. These insights open avenues for future research, particularly in exploring the interplay between AI, sustainability, and HRM across diverse industries. Finally, the study provides a strong foundation for investigating the broader implications of AI adoption in HRM, encouraging

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scholars to explore alternative mediators or moderators that may influence the relationship between AI and digital HRM effectiveness.

C. Managerial Implications

The findings of this study offer valuable strategic insights for organizations seeking to enhance their HRM practices through AI adoption while aligning with sustainability goals. For managers, these results serve as a blueprint for designing HRM strategies that emphasize the integration of AI-driven tools with sustainability initiatives. By prioritizing organizational sustainability, managers can ensure that AI adoption not only improves operational efficiency but also fosters long-term resilience and value creation. This study also highlights the significance of aligning AI-driven HRM practices with broader organizational goals, such as reducing environmental impact, promoting diversity and inclusion, and enhancing employee well-being. A holistic approach to HRM innovation enables organizations to transition from viewing sustainability as a support function to positioning it as a core driver of performance and competitiveness. Furthermore, the findings underscore the importance of investing in system and process integration to maximize the benefits of AI adoption. By implementing integrated systems, organizations can improve coordination, reduce redundancies, and enhance decision-making, ultimately leading to better HRM outcomes and sustainability performance. These insights are particularly relevant for industries facing stringent regulatory requirements and increasing societal expectations for sustainable practices.

D. Limitations of the Study

While this study provides valuable theoretical and empirical contributions, several limitations should be acknowledged. First, the focus on a specific set of industries may limit the generalizability of the findings to other sectors with different structural and operational dynamics. Future research should explore the applicability of these findings across diverse industries to validate their broader relevance. Second, the study primarily examines organizational sustainability as the mediating variable, overlooking other potential mediators or moderators that may influence the relationship between AI adoption and digital HRM effectiveness. For instance, factors such as organizational culture, leadership style, and technological readiness could play significant roles in shaping these relationships and warrant further investigation. Third, the sample size and composition may have influenced the results. The study relied largely on responses from middle and first-line managers, which may not fully capture the perspectives of senior executives who play a critical role in shaping organizational strategies. Additionally, the heterogeneous social and educational backgrounds of respondents may have affected their perceptions and judgments regarding AI adoption and sustainability practices. Finally, the study was constrained by time and resource limitations, which may have impacted data saturation and the depth of analyzes. Future research should address these limitations by expanding the sample size, incorporating longitudinal data, and exploring additional variables that may influence the relationship between AI adoption and digital HRM effectiveness.

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E. Conclusions

This study makes a significant contribution to the literature by exploring how organizational sustainability mediates the impact of AI adoption on digital HRM effectiveness. The findings demonstrate that integrating AI-driven HRM practices with sustainability strategies creates a synergistic effect, enhancing both operational efficiency and long-term resilience. By highlighting the importance of a holistic approach, this research provides organizations with a strategic framework for leveraging AI while ensuring alignment with broader economic, social, and environmental goals. The results underscore the necessity of adopting integrated systems and processes to translate AI-driven capabilities into sustainable value creation. This study not only advances academic knowledge but also offers practical recommendations for organizations seeking to enhance their HRM practices through AI adoption and sustainability alignment. Ultimately, the findings highlight the transformative potential of AI in reshaping HRM practices and achieving sustainable growth in an increasingly dynamic business environment.

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References

1) Acquah, I. S. K., Agyabeng-Mensah, Y., & Afum, E. (2021). Examining the link among green human resource management practices, green supply chain management practices and performance. *Benchmarking*, *28*(1), 267–290. https://doi.org/10.1108/BIJ-05-2020-0205

2) Alibraheem, M. H. M., Siam, I. M., Al-Daoud, K., Alkhazaali, A. R. M. K., Freihat, B. M. M., Ahmad, A. Y. A. B., Bataineh, K. A., & Al Zoubi, M. (2024). The moderating role of internal control system on the relationship between service quality of accounting information system and customer satisfaction: a study of some selected customers from commercial banks in Jordan. *Uncertain Supply Chain Management*, *12*(1), 567–572. https://doi.org/10.5267/j.uscm.2023.8.015

3) Alkhazaleh, A., Assaf, A., Shehada, M., Almustafa, E., & Allahham, M. (2023). Analysis of the Impact of Fintech Firms' Lending on the Expansion of Service Base Companies in Jordan. *Information Sciences Letters*, *12*(8), 2891–2902. https://doi.org/10.18576/ISL/120837

4) Allahham, m. . sharabati a, hatamlah, h. . ahmad, a. Y. B. . sabra, s. . & daoud, m. K. (n.d.). *Big data analytics and AI for green supply chain integration and sustainability in hospitals*.

5) Allahham, M. . & A. A. (2024. (n.d.). *). AI-induced anxiety in the assessment of factors influencing the adoption of mobile payment services in supply chain firms: A mental accounting perspective*.

6) Allahham, M., Sharabati, A. A. A., Al-Sager, M., Sabra, S., Awartani, L., & Khraim, A. S. L. (2024). Supply chain risks in the age of big data and artificial intelligence: The role of risk alert tools and managerial apprehensions. *Uncertain Supply Chain Management*, *12*(1), 399–406. https://doi.org/10.5267/j.uscm.2023.9.012

7) Allahham, M., Sharabati, A. A. A., Almazaydeh, L., Sha-Latony, Q. M., Frangieh, R. H., & Al-Anati, G. M. (2024). The impact of fintech-based eco-friendly incentives in improving sustainable environmental performance: A mediating-moderating model. *International Journal of Data and Network Science*, *8*(1), 415–430. https://doi.org/10.5267/j.ijdns.2023.9.013

8) Almustafa, E., Assaf, A., & Allahham, M. (2023). IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE

Tianjin Daxue Xuebao (Ziran Kexue yu Gongcheng Jishu Ban)/
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FOR FINANCIAL 1 INTRODUCTION Artificial intelligence (AI) is the intelligence of robots , not humans . Most academic textbooks characterize artificial intelligence as studying " intelligent agents ." These agent. *RGSA – Revista de Gestão Social e Ambiental*, *17*(9), 1–17.

9) Alrjoub, A. M. S., Almomani, S. N., Al-Hosban, A. A., & Allahham, M. I. (2021). the Impact of Financial Performance on Earnings Management Practice Behavior (an Empirical Study on Financial Companies in Jordan). *Academy of Strategic Management Journal*, *20*(Special Issue 2), 1–15.

10) Aparecida, E., Campos, R. De, Carísio, I., Paula, D., & Schwengber, C. (2020). *Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company ' s public news and information . January*.

11) Arasti, Z., Zandi, F., & Talebi, K. (2012). Exploring the Effect of Individual Factors on Business Failure in Iranian New Established Small Businesses. *International Business Research*, *5*(4), 2–11. https://doi.org/10.5539/ibr.v5n4p2

12) Atieh Ali, A. A., Sharabati, A. A. A., Allahham, M., & Nasereddin, A. Y. (2024). The Relationship between Supply Chain Resilience and Digital Supply Chain and the Impact on Sustainability: Supply Chain Dynamism as a Moderator. *Sustainability (Switzerland)* , *16*(7), 1–20. https://doi.org/10.3390/su16073082

13) Bani, A. Y. A., Husseini, R., Abu-, I. A., Khamis, K., & Ziani, A. (2024). *Uncertain Supply Chain Management Measuring the ROI of paid advertising campaigns in digital marketing and its effect on business profitability*. *12*, 1275–1284. https://doi.org/10.5267/j.uscm.2023.11.009

14) Banmairuroy, W., Kritjaroen, T., & Homsombat, W. (2022). The effect of knowledge-oriented leadership and human resource development on sustainable competitive advantage through organizational innovation's component factors: Evidence from Thailand 's new S- curve industries. *Asia Pacific Management Review*, *27*(3), 200–209. https://doi.org/10.1016/j.apmrv.2021.09.001

15) Bidya, D., & Pravat, K. M. (2019). The Effects of Work Environment, Self-evaluation at Workplace and Employee Morale on Employee Engagement. *Srusti Management Review*, 33–39.

16) Fawehinmi, O., Yusliza, M. Y., Mohamad, Z., Noor Faezah, J., & Muhammad, Z. (2020). Assessing the green behaviour of academics: The role of green human resource management and environmental knowledge. *International Journal of Manpower*, *41*(7), 879–900. https://doi.org/10.1108/IJM-07-2019-0347

17) Hatamlah, H., Allahham, M., Abu-AlSondos, I. A., Al-junaidi, A., Al-Anati, G. M., & Al-Shaikh, and M. (2023). The Role of Business Intelligence adoption as a Mediator of Big Data Analytics in the Management of Outsourced Reverse Supply Chain Operations. *Applied Mathematics and Information Sciences*, *17*(5), 897–903. https://doi.org/10.18576/AMIS/170516

18) Hatamlah, H., Allahham, M., Abu-AlSondos, I. A., Mushtaha, A. S., Al-Anati, G. M., Al-Shaikh, M., & Ali, and B. J. A. (2023). Assessing the Moderating Effect of Innovation on the Relationship between Information Technology and Supply Chain Management: An Empirical Examination. *Applied Mathematics and Information Sciences*, *17*(5), 889–895. https://doi.org/10.18576/AMIS/170515

19) Jawabreh, O., Baadhem, A. M., Ali, B. J. A., Atta, A. A. B., Ali, A., Al-Hosaini, F. F., & Allahham, M. (2023). The Influence of Supply Chain Management Strategies on Organizational Performance in Hospitality Industry. *Applied Mathematics and Information Sciences*, *17*(5), 851–858. https://doi.org/10.18576/AMIS/170511

20) Jebreel, M., Alnaimat, M., Al-Shorafa, A., Qabajeh, M., Alqsass, M., & Ahmad, A. B. (2023). The Impact of Activity Ratios on Change in Earnings (Case Study:Based on Jordanian Food Companies). *Kurdish Studies*, *11*(2), 4551–4560. https://doi.org/10.58262/ks.v11i2.333

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Journal of Tianjin University Science and Technology
ISSN (Online):0493-2137
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DOI: 10.5281/zenodo.17735884

21) Khan, M., Ajmal, M. M., Jabeen, F., Talwar, S., & Dhir, A. (2023). Green supply chain management in manufacturing firms: A resource-based viewpoint. *Business Strategy and the Environment*, *32*(4), 1603–1618. https://doi.org/10.1002/bse.3207

22) Morshed, A., Maali, B., Ramadan, A., Ashal, N., Zoubi, M., & Allahham, M. (2024). The impact of supply chain finance on financial sustainability in Jordanian SMEs. *Uncertain Supply Chain Management*, *12*(4), 2767–2776. https://doi.org/10.5267/j.uscm.2024.4.025

23) Pham, N. T., Thanh, T. V., Tučková, Z., Thi, V., & Thuy, N. (n.d.). *14 Manuscript Details*.

24) Piwowar-Sulej, K. (2021). Human resources development as an element of sustainable HRM – with the focus on production engineers. *Journal of Cleaner Production*, *278*, 124008. https://doi.org/10.1016/j.jclepro.2020.124008

25) Puspita, L. E., Christiananta, B., & Ellitan, L. (2020). The effect of strategic orientation, supply chain capability, innovation capability on competitive advantage and performance of furniture retails. *International Journal of Scientific and Technology Research*, *9*(3), 4521–4529.

26) Sahioun, A., Bataineh, A. Q., Abu-AlSondos, I. A., & Haddad, H. (2023). The impact of green marketing on consumers' attitudes: A moderating role of green product awareness. *Innovative Marketing*, *19*(3), 237–253. https://doi.org/10.21511/im.19(3).2023.20

27) Salhab, H. A., Allahham, M., Abu-Alsondos, I. A., Frangieh, R. H., Alkhwaldi, A. F., & Ali, B. J. A. (2023). Inventory competition, artificial intelligence, and quality improvement decisions in supply chains with digital marketing. *Uncertain Supply Chain Management*, *11*(4), 1915–1924. https://doi.org/10.5267/j.uscm.2023.8.009

28) Sharabati, A. A. A., Awawdeh, H. Z., Sabra, S., Shehadeh, H. K., Allahham, M., & Ali, A. (2024). The role of artificial intelligence on digital supply chain in industrial companies mediating effect of operational efficiency. *Uncertain Supply Chain Management*, *12*(3), 1867–1878. https://doi.org/10.5267/j.uscm.2024.2.016

29) Shehadeh, H., Shajrawi, A., Zoubi, M., & Daoud, M. (2024). The mediating role of ICT on the impact of supply chain management (SCM) on organizational performance (OP): A field study in Pharmaceutical Companies in Jordan. *Uncertain Supply Chain Management*, *12*(2), 1251–1266. https://doi.org/10.5267/j.uscm.2023.11.011

30) Stahl, G. K., Brewster, C., Collings, D. G., & Hajro, A. (2019). Towards more relevant HRM research: understanding the role of HRM in corporate sustainability and social responsibility. *Human Resource Management Review*, *30*(3), 1–46.

31) Strohmeier, S. (2020). Digital human resource management: A conceptual clarification. *German Journal of Human Resource Management*, *34*(3), 345–365. https://doi.org/10.1177/2397002220921131

32) Suvattanadilok, M. (2024). Market variables influence customer behavior toward coffee business growth. *Cogent Business and Management*, *11*(1). https://doi.org/10.1080/23311975.2024.2329242

33) Wang, M., & Prajogo, D. (2024). The effect of supply chain digitalisation on a firm's performance. *Industrial Management and Data Systems*, *124*(5), 1725–1745. https://doi.org/10.1108/IMDS-09-2023-0629

34) William, P., Ahmad, A. Y. A. B., Deepak, A., Gupta, R., Bajaj, K. K., & Deshmukh, R. (2024). Sustainable Implementation of Artificial Intelligence Based Decision Support System for Irrigation Projects in the Development of Rural Settlements. *International Journal of Intelligent Systems and Applications in Engineering*, *12*(3s), 48–56.