

Artificial intelligence applications in human resource management and their impact on HRM effectiveness in Saudi Arabia

Abdallah Ali Mohammad Alrifae^{1*}, Sultan Eisi Madraba²

¹ Faculty of Business, Middle East University, Amman, Jordan

² School of Management, Universiti Sains Malaysia, Penang, Malaysia

*Corresponding author E-mail: abdallahalrifae9@gmail.com

Received May 9, 2025
Revised Sep. 29, 2026
Accepted Oct. 2, 2026
Online Oct. 16, 2026

Abstract

Application of artificial intelligence (AI) in human resource management (HRM) creates more efficient hiring practices, increases the engagement and productivity rates, and the performance of decision-making. his research examines the impact of AI-based talent acquisition, AI-based employee engagement, AI-driven workforce productivity, and AI-assisted HR decision-making on HRM effectiveness in Saudi Arabian organizations. A quantitative analysis was conducted using SEM in AMOS 24 to validate the proposed models, based on data gathered from 532 participants across 442 validated surveys. Using AI technology in talent acquisition delivers enhanced capabilities and higher-quality selection in hiring processes ($\beta = 0.38, p < 0.001$). Work satisfaction, employee retention rates, and interaction performance levels are the most substantially influenced by SE ($\beta = 0.44, p < 0.001$). The workforce productivity capabilities of AI support both operational efficiency and strategic workforce planning ($\beta = 0.41, p < 0.001$) and the capacity of AI to enhance HR decisions ($\beta = 0.37, p < 0.001$). Organizations must tackle three AI implementation obstacles including biased algorithm occurrence alongside worker resistance and regulatory standards to create effective AI solutions. AI management depends on trained personnel who require ethical governance standards and human-AI mixed decision frameworks to achieve optimal results without compromising traditional human resource values. Future research must evaluate how AI affects HR performance, as this requires insights into employee safety mechanisms and international acceptance of AI-HRM frameworks.

© The Author 2026.
Published by ARDA.

Keywords: Artificial intelligence, Human resource management, HRM effectiveness, Talent acquisition, Employee engagement, Workforce productivity, AI-driven decision-making, Saudi Arabia.

1. Introduction

The rapid development of AI technology has transformed human resource management practices. Implementing AI solutions in human resource departments enables better recruitment system optimization while enhancing

employee relations, HR department evaluation processes, and decision-making capabilities [1], [2]. Worldwide, companies achieve superior HRM results through AI-based recruitment chatbots, predictive workforce analytics, and AI-administered learning systems. Combining artificial intelligence with data allows HR professionals to obtain vital insights and prioritize business-critical issues instead of mundane administrative functions.

Many Saudi Arabian businesses demonstrate meaningful implementations of AI in human resource management operations. However, a substantial number of organizations still use AI primarily to enhance operational efficiency, streamline the recruitment process, and elevate employee satisfaction levels. The Saudi Arabian labor market faces talent deficits and frequent employee turnover, which require substantial changes to human resource management systems [3]. Machine learning technology delivers three primary advantages: competent candidate selection, automated administrative tasks, and accurate employee retention predictions [4], [5]. The available data currently provides insufficient insight regarding the specific level of improvement that artificial intelligence integrations contribute to human resource management in Saudi Arabian organizations.

Implementing artificial intelligence regulations continues to face numerous barriers in human resource management. A path to successful AI implementation in HR management demands the resolution of database security threats, algorithmic bias problems, worker resistance to technological processes, and organization-level improvements for digital systems [5]. Human resource professionals must embrace AI decision-making capabilities to boost the use of this technology for workforce management evaluation. Research teams must fully disclose every element that facilitates AI deployment in HRM and identify specific barriers to creating strategic directions and evidence-based policies for HRM AI transformation [6].

The study evaluates how Saudi Arabian companies are affected by implementing AI systems within their human resource management practices. It explores how integrated systems that involve AI-based talent acquisition solutions, employee engagement methods, and AI-based decision-making platforms can increase HRM success metrics. The findings from empirical data analysis using SEM provide essential insights for HR professionals, business leaders, and policymakers on how AI supports HR tasks, drives digital transformation, and improves workforce flexibility.

This paper establishes research hypotheses in the literature review section that describe the relationships between HRM success factors and AI-based HRM processes. The research results will enhance the understanding of current HR technology adoption by providing organizations with practical execution methods for effective AI-driven HRM solutions.

2. Literature review and hypotheses development

The automation elements of artificial intelligence help human resource management develop analytical predictions for intelligent decision-making systems. HR operations automation tools help executives monitor essential business information, enabling them to improve their HR management systems, from candidate recruitment to staff support and execution planning and strategic planning at the executive level [1], [4], [5], [6]. AI applications in human resource management create outstanding operational benefits, lower discrimination during hiring, promote workforce diversity, and help the department adapt to organizational changes [7]. The performance outcomes of HRM develop from three essential elements, including organizational digital maturity alongside the acceptance of AI systems by employees, responsible regimes for AI development, and proper alignment of HR management goals with AI implementation strategies. AI system deployment in HR management steadily advances despite the need to overcome technical security needs [5], the reluctance of workers to accept AI systems, and automatic bias identification. Research investigations from this field serve as foundations for developing conceptual models and empirical research assumptions that explain AI's impact on operational efficiency in HRM. Consequently, further empirical validation remains necessary to evaluate how these integrated technologies perform across diverse organizational contexts while safeguarding fundamental human resource practices.

2.1. AI-powered talent acquisition and HRM effectiveness

Artificial intelligence applications in human resource management achieve the most advanced level of development within talent recruitment practices. AI recruitment tools evaluate resumes using their features, which provide market recommendations while performing video interviews to produce predictive employee assessment outputs [8]. The current recruitment methods allow HR professionals to perform short and efficient candidate screening while selecting the most suitable candidates [9]. Using machine learning algorithms, the AI recruitment system evaluates numerous candidate profiles and job requirements to generate future hiring predictions from historical recruitment data [10].

The AI-based assessment system identifies suitable candidates through skill checks instead of demographic screening to establish a fair hiring process with diversity [8]. Organizations must create temporary measures for AI hiring to stop automated discrimination of candidates and protect applicant privacy throughout recruitment system functions. AI recruitment systems develop discriminatory behavior because biases exist in training datasets [11]. Vacancy applicants experience primary worries regarding information security risks, together with suspicions about automated recruitment methods. Organizations must exhibit AI systems with ethical governance frameworks that perform regular algorithm inspections to maximize their recruitment technology's benefits [10].

2.2. AI-driven employee engagement and HRM effectiveness

AI becomes the underlying driver of employee engagement, as it allows HR specialists to provide them with personalized training, run chatbots that may be powered by AI, and perform real-time employee sentiment analysis [12]. Modern HR-related AI systems can help human resources experts to avoid workplace issues preemptively by processing data related to employee opinions, engagement rates, and workforce sentiment [13]. The ability of AI to assess skills will enable organizations to create personalized learning materials, which are consistent with the qualifications and work goals of any specific staff [14].

Artificial intelligence systems enable companies to design personal recognition awards, incentive plans, and peer-based appreciation programs, after which they will work to provide inspirational working environments among their employees [15]. The study of the problem of employee disengagement by AI allows HR managers to make forecasts and prevent employee turnover and therefore increase long-term retention strategies [4].

Implementing AI-based tools for HR tasks becomes challenging for employers because their workforce resists these technological advancements. Workers often express concerns over job displacement and AI-driven performance evaluations [4]. Workers become more tense with their jobs when AI technology conducts electronic monitoring since they view it as an invasion of privacy. Human capital management professionals must create open AI policies and train workers with information about AI benefits, but they must also enforce ethical principles for AI systems.

2.3. AI and workforce productivity in HRM

Implementing AI systems removes non-core HR administrative work from workforce personnel and improves scheduling management and employee prediction systems. Human resource professionals use modern analytics systems to conduct performance evaluations and workflow analysis to create improved task management systems. AI-powered workforce management systems produce better operational performance and better resource utilization with fewer errors [13].

Workforce planning systems operated through AI technology help organizations forecast upcoming business needs by processing performance data and market patterns [15]. Through AI predictive analytics, HR departments generate strategic workforce plans that deliver continuous skilled workforce staffing [6].

AI-based productivity enhancements in workforce operations require organizations to attain digital readiness standards first. Organizations experiencing difficulties achieving optimal AI system implementation lack

appropriate AI-ready human resources technology or sufficient information technology infrastructure with staff who understand AI principles. Staff members who work with robotic technologies in AI automation programs express hesitation toward their work's future, leading to reluctance against implementation. AI training and AI-collaborative models enable people to develop workforce development capabilities, which will help human resource professionals enhance workforce adaptability through change management implementation [6].

2.4. AI-assisted HR decision-making and HRM effectiveness

AI in HR decision systems enhances performance assessments such as succession programs, pension planning, and workforce projections through predictive analysis and big data processing [12]. Combining employee behavioral analysis and performance metrics data with engagement metrics allows AI algorithms to provide data-supported recommendations to HR for their interventions. Implementing AI improves organizational outcomes through two core benefits in human resource management: it reduces personal judgment while creating more accurate data-based decisions.

AI technologies allow for live employee performance assessment, real-time KPI tracking, and performance enhancement point detection [16]. HR analytics powered by AI allow organizations to discover excellent candidates who qualify for leadership roles and leadership succession programs [13], [14].

AI decision systems face ethical dilemmas and difficulty explaining their operations. HR management leaders face difficulties interpreting AI-established suggestions, which fuels their worries regarding machine learning systems and their ability to provide explainable decision-making details [4]. According to [4], AI-driven human resource policies need ethical guidelines to maintain employee fairness. Organizations must implement explainable AI (XAI) methods combined with ethical standards and human-controlled oversight to enhance trust in HR decisions managed by AI systems.

This study examines the following hypotheses:

- H1: AI-powered talent acquisition positively influences HRM effectiveness in Saudi Arabian organizations.
- H2: AI-driven employee engagement positively influences HRM effectiveness in Saudi Arabian organizations.
- H3: AI-driven workforce productivity positively influences HRM effectiveness in Saudi Arabian organizations.
- H4: AI-assisted HR decision-making positively influences HRM effectiveness in Saudi Arabian organizations.

This research empirically investigates the suggested hypotheses while relying on quantitative methods to expand knowledge regarding AI applications for HRM. This section outlines the research methodology, including the data collection methods, the statistical methods of analysis, and the measurement tools used in order to prove the proposed conceptual framework.

3. Methodology

The current quantitative research study will be based on the impact of the implementation of AI on the performance of human resource management in Saudi Arabian companies. The rising usage of artificial intelligence in HR activities requires stringent and objective assessments to determine how artificial intelligence-based talent acquisition, employee relationship models, workforce productivity, and human resource decision-making will affect the effectiveness of HRM. The research uses structural equation modelling through AMOS 24 to determine direct variable correlations and structural relationships that determine the adoption of AI in HRM. Overall, this approach provides empirical insights into how organizational readiness and ethical considerations shape AI integration within these enterprises.

The target population comprised HR professionals, managers, and employees involved in HR-related activities in organizations operating in Saudi Arabia. To ensure representation across different organizational settings, a stratified sampling approach was adopted, covering five major industry groups: banking, information technology, healthcare, education, and manufacturing. These industries were treated as separate strata because they represent important sectors of the Saudi economy in which digital transformation and AI-enabled HR practices are increasingly relevant.

A total of 532 questionnaires were distributed across the five industry strata. Following data screening for completeness and usability, 442 valid questionnaires were retained for the final analysis, representing an effective response rate of 83.1%. The final sample comprised respondents from banking ($n = 92$), information technology ($n = 96$), healthcare ($n = 84$), education ($n = 88$), and manufacturing ($n = 82$). Eligible participants were HR professionals, managers, or employees involved in HR-related activities and familiar with digital or AI-supported HR practices within their organizations [17].

The research instrument is divided into two separate sections. The first section of the survey acquired data about age, gender, industry, job position, and degree of AI exposure from participants. Participants evaluated all study variables using a five-point Likert scale, which spanned from 1 = strongly disagree to 5 = strongly agree, in the second section of the survey. The measurement scales, along with the constructs, were developed based on the proven validated research. In the analysis of collected data, the measurement model achieved the validity when it was tested through confirmatory factor analysis (CFA). Internal consistency of the instrument was determined to be above 0.7 in the composite reliability (CR) and Cronbach's alpha to establish reliability of the instrument. The path analysis in SEM confirmed the correlations of factors of AI adoption and HR management effectiveness. To ascertain the statistical stability of a model, its judgment of fit was based on the usual measures such as CFI, TLI, RMSEA, and the Chi-square/df ratio. The methodology will allow the research to provide practical results regarding the application of AI in HRM, and essential technological devices and challenges Saudi Arabian institutions face when using AI to promote HRM development and decisions.

3.1. Measurement of constructs

The questionnaire consisted of two sections. The first section collected demographic information, including gender, age, educational level, work experience, and industry. The second section measured the five constructs included in the conceptual model: AI-powered talent acquisition, AI-driven employee engagement, AI-driven workforce productivity, AI-assisted HR decision-making, and HRM effectiveness. Each construct was operationalized using four items, resulting in a total of 20 measurement items. All items were assessed using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The measurement items were adapted from prior literature on artificial intelligence applications in HRM, digital HR practices, workforce analytics, and HRM effectiveness. The wording of the original items was modified where necessary to ensure their relevance to AI-enabled HR practices and the Saudi Arabian organizational context. The questionnaire was reviewed for clarity, relevance, and consistency before data collection. The measurement model was subsequently evaluated using confirmatory factor analysis (CFA). Construct reliability was assessed using Cronbach's alpha and composite reliability (CR), while convergent validity was evaluated using standardized factor loadings and average variance extracted (AVE). Discriminant validity was additionally examined to establish that the five constructs represented empirically distinct concepts.

4. Results and analysis

The empirical study presented in this paper is associated with important aspects of the development of artificial intelligence implementation to the effectiveness of human resource management in Saudi Arabian organizations. The study used structural equation modelling, AMOS 24, to strictly test the theoretical links between the variables. Consequently, the findings offer actionable insights for organizational leaders seeking to optimize HR performance through strategic AI adoption.

Regarding the demographic characteristics of the respondents, 54.8% were male and 45.2% were female. Respondents aged 30–39 years represented the largest age group (41.3%), followed by those aged 40–49 years (32.6%). In terms of educational attainment, 69.2% held a bachelor's degree, while 20.6% held postgraduate qualifications, comprising 16.3% with master's degrees and 4.3% with doctoral degrees. Regarding work experience, 49.8% of respondents had between six and ten years of professional experience. The respondents were also distributed across five industry groups: banking, information technology, healthcare, education, and manufacturing, thereby providing cross-industry representation within the Saudi Arabian organizational context.

The measurement model was evaluated based on confirmatory factor analysis (CFA), which evaluates both validity and reliability as shown in Table 3. The construct measurement indicators were all greater than the recommended 0.70 and hence proved to be appropriate for the analysis. Internal consistency was very high, as composite reliability scores ranged between 0.86 and 0.92. The results of the analysis of average variance extracted showed that validity was established, with extracted values exceeding 0.50. Table 3 shows that the model fit indices are acceptable, with an RMSEA of 0.041, CFI of 0.945, and TLI of 0.931.

The research in Table 6 establishes that each HRM effectiveness component, including talent acquisition with AI, AI-driven employee engagement, AI-driven workforce productivity, and AI-assisted HR decision-making, produces substantial positive effects on Saudi Arabian organizations. The tests reveal that AI-controlled talent acquisition systems generate an extensive correlation $\beta = 0.38$ with HRM effectiveness scores at $p < 0.001$ significance level. The research demonstrates that AI-driven employee engagement is the core dimension of HRM effectiveness; it integrates AI-based feedback mechanisms with custom HR programs to boost employee satisfaction and maintain employee loyalty ($\beta = 0.44$, $p < 0.001$). Research data shows that workforce productivity increases when automation uses AI because automated systems generate quantifiable effects that measure $\beta = 0.41$ ($p < 0.001$). Implementing AI-based systems for decision-making has proven efficient for HRM practices because they enhance both HRM planning and employee performance assessment ($\beta = 0.37$, $p < 0.001$).

The authors present crucial technological information about AI-based human resource changes in Saudi Arabian corporate systems. The adoption of AI in HR solutions is a significant investment for organizations, enabling staff to utilize AI-based tools for recruitment improvements, staffing management, and decision-making. The study shows that companies need to implement extensive digital education, as human resource professionals must possess a high level of artificial intelligence skills and the willingness to adopt new technologies.

Table 1. Demographic profile of respondents

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	242	54.8
	Female	200	45.2
Age group	18–29 years	83	18.8
	30–39 years	182	41.3
	40–49 years	144	32.6
	50+ years	33	7.5
Education level	High school	45	10.2
	Bachelor's degree	306	69.2
	Master's degree	72	16.3
	PhD	19	4.3
Work experience	0–5 years	87	19.7
	6–10 years	220	49.8

Demographic Variable	Category	Frequency	Percentage (%)
Industry*	11+ years	135	30.5
	Banking	92	20.8
	Information technology	96	21.7
	Healthcare	84	19.0
	Education	88	19.9
	Manufacturing	82	18.6

Table 2. Measurement items and sources

Construct	Code	Measurement item	Adapted source
AI-powered talent acquisition	AIPTA1	AI is used to screen and identify suitable job applicants.	[18]
	AIPTA2	AI improves the efficiency of candidate selection.	[18]
	AIPTA3	AI supports better matching between applicants and job requirements.	[18]
	AIPTA4	AI improves the overall quality of recruitment decisions.	[18]
AI-driven employee engagement	AIDEE1	AI-enabled HR tools facilitate effective communication with employees.	[19]
	AIDEE2	AI supports personalized employee development and learning opportunities.	[19]
	AIDEE3	AI enables the organization to respond more effectively to employee feedback.	[19]
	AIDEE4	AI-enabled HR practices contribute to greater employee engagement.	[19]
AI-driven workforce productivity	AIDWP1	AI helps automate routine HR-related tasks.	[19]
	AIDWP2	AI improves the efficiency with which employees perform their work.	[19]
	AIDWP3	AI supports more effective workforce planning and resource allocation.	[19]
	AIDWP4	AI contributes to improvements in workforce productivity.	[19]
AI-assisted HR decision-making	AIHRDM1	AI provides useful information for HR decision-making.	[19]
	AIHRDM2	AI supports data-driven HR decisions.	[19]
	AIHRDM3	AI improves the accuracy of HR-related decisions.	[19]
	AIHRDM4	AI assists managers in making more effective workforce decisions.	[19]

Construct	Code	Measurement item	Adapted source
HRM effectiveness	HRME1	HR practices effectively support organizational objectives.	[20]
	HRME2	HR practices contribute to effective management of employees.	[20]
	HRME3	HR activities are carried out efficiently within the organization.	[20]
	HRME4	Overall, the organization's HRM function operates effectively.	[20]

Table 3. Construct reliability and validity assessment

Constructs	Number of items	Factor loadings	AVE	CR	Cronbach's alpha (α)
AI-powered talent acquisition	4	0.72 - 0.89	0.64	0.89	0.86
AI-driven employee engagement	4	0.74 - 0.91	0.66	0.90	0.88
AI-driven workforce productivity	4	0.71 - 0.88	0.64	0.88	0.85
AI-assisted HR decision-making	4	0.70 - 0.86	0.62	0.86	0.84
HRM effectiveness	4	0.73 - 0.90	0.65	0.91	0.87

Discriminant validity was assessed using the heterotrait–monotrait ratio of correlations (HTMT). The HTMT criterion was applied to determine whether the study constructs were empirically distinct from one another. As shown in Table 3, all HTMT values were below the recommended threshold of 0.85, indicating satisfactory discriminant validity among the five constructs. This confirms that each construct captures a unique dimension of AI implementation within the HRM framework.

Table 4. Discriminant validity assessment using HTMT

Construct	1	2	3	4	5
AIPTA	—				
AIDEE	0.68	—			
AIDWP	0.64	0.72	—		
AIHRDM	0.61	0.67	0.70	—	
HRME	0.69	0.74	0.71	0.66	—

The results presented in Table 3 show that the HTMT values ranged from 0.61 to 0.74, with all values remaining below the recommended threshold of 0.85. Therefore, adequate discriminant validity was established among all constructs included in the measurement model. These findings confirm that the constructs are statistically independent and suitable for structural equation modeling analysis.

Table 5. Model fit indices

Fit index	Obtained value	Recommended threshold	Decision
RMSEA	0.041	RMSEA < 0.08	Good fit
CFI	0.945	CFI > 0.90	Good fit
TLI	0.931	TLI > 0.90	Good fit
Chi-square/df	2.07	< 3.00	Good fit

Table 6. Hypothesis testing results

Hypothesis	Path coefficient (β)	S.E.	C.R.	P-value	Result
H1: AI-powered talent acquisition $\rightarrow$ HRM effectiveness	0.38	0.06	7.2	<0.001	Supported
H2: AI-driven employee engagement $\rightarrow$ HRM effectiveness	0.44	0.07	7.9	<0.001	Supported
H3: AI-driven workforce productivity $\rightarrow$ HRM effectiveness	0.41	0.08	6.7	<0.001	Supported
H4: AI-assisted HR decision-making $\rightarrow$ HRM effectiveness	0.37	0.05	7.1	<0.001	Supported

Implementing AI-assisted HRM tools enhances recruitment processes, employee engagement metrics, and organizational productivity while boosting the effectiveness of HR decisions inside Saudi Arabian businesses. Organizations should adopt employee engagement driven by AI because it is the primary condition to establish the vital nature of AI-based employee communication tools, HR chatbots, and feedback-oriented HRM systems. Organizations should unite HR automation with AI-driven scheduling systems to maximize efficiency because workforce productivity shows the best results from AI implementation. The study provides essential knowledge to help Saudi Arabian businesses, HR professionals, and policymakers develop AI capabilities for HRM while improving employee skills in AI technology and organizational readiness for AI. A review of forthcoming research possibilities and practical applications of this study for existing research follows in the next section.

5. Discussion

Workforce management procedures benefit from artificial intelligence implementation in human resource management, which creates superior recruitment results, improved employee interaction and productivity, and better decision-making abilities. The study investigated how AI recruitment tools impact HR decision-making systems when connected to AI-involved staff members to measure their effects on HRM outcomes for businesses operating in Saudi Arabia. Research evidence reveals that AI-based HRM tools enhance HR operational processes, aligning with and expanding upon previously documented findings focused on specific Saudi Arabian business sectors. The discussion evaluates past research, identifies the underlying factors behind these results, and showcases their practical applications alongside theoretical implications.

5.1 AI-powered talent acquisition and HRM effectiveness

The research data indicates that organizations operating with AI technology in their applicant management system achieve higher levels of HRM effectiveness ($\beta=0.38$, $p < 0.001$). Organizations achieve higher recruitment efficiency through their agent-based tools using automated screening, AI-matching, and machine learning assessment technologies to produce exact hiring choices. According to [11], AI recruitment applications decrease discriminatory hiring decisions and lead to better person-job fit, as per the authors. Furthermore, research by [10], [11] shows that applicant tracking systems utilizing AI solutions can shorten the recruitment cycle by up to 60%.

However, challenges remain. Automated recruitment systems remain susceptible to biases embedded within their training data, potentially leading to discriminatory decisions among candidate pools. Consequently, organizations in Saudi Arabia seeking to maintain extensive AI hiring algorithms must develop transparent models with strict bias controls. To ensure responsible deployment, organizations must establish robust oversight frameworks and ethical guidelines for AI-driven human resource management practices [11].

5.2 AI-driven employee engagement as the strongest predictor

This research indicates that employee engagement based on AI is the dominating factor ($\beta = 0.44$, $p < 0.001$) determining HRM effectiveness measurements. Workplace communication improves when businesses implement HR chatbots integrated with personalized learning programs and AI-supported sentiment analysis systems, leading to better employee recognition and sustained workforce engagement. For instance, AI-operated engagement platforms have been shown to boost organizational employee retention by 35% [4].

Managers utilize AI technologies to receive rapid feedback on their HR initiatives, enabling them to design individualized engagement strategies [21]. However, existing literature cautions against potential drawbacks, as employee distrust in automated HR processes can diminish valuable human interaction when AI chatbots replace direct HR services [12]. Maintaining a balance between human and AI capabilities allows organizations to achieve optimal outcomes through hybrid HRM models that combine computational power with human-centered HR approaches.

5.3 AI-driven workforce productivity and HRM efficiency

Statistics show that AI implementation worldwide applications create substantial HRM efficiency improvements ($\beta = 0.41$, $p < 0.001$) significance level. The combination of AI-based workforce scheduling automation, task optimization systems, and predictive workforce analytics by AI creates high operational excellence in organizations. AI workforce analytics provides a 28% increase in staff member performance throughout the industry based on data from [5].

According to [4], the platform allows human resource specialists to generate their strategic workforce plans through its regular operational functions. However, challenges persist. When AI automation is deployed in workforce operations, it creates two essential problems for staff employment continuity and AI system preparedness. Saudi Arabian organizations must develop AI-based training programs for employees to increase their acceptance of technological systems because these programs enable workers to utilize professional AI platforms [12].

5.4 AI-assisted HR decision-making and HRM effectiveness

Artificial intelligence applications in human resource decision processes produce positive HRM effectiveness scores with a strong statistical relationship ($\beta = 0.37$, $p < 0.001$). Human resources teams use AI technology in workforce planning and predictive performance evaluations to improve strategic HR management through better decision-making while achieving higher accuracy for their HR decisions. The research findings from [6] showed that AI analytics in human resources leads to performance monitoring improvements at this level.

Human professionals must collaborate with the AI analytics systems installed in HR departments to ensure ethical and contextually appropriate conclusions resulting from AI algorithm processing, according to [10]. Adequate training programs developed explicitly for Saudi Arabian HR professionals will enable them to precisely use AI outputs and thus maximize the efficiency of AI-based HR decision systems beyond traditional human expertise.

This study confirms the need for immediate training initiatives to teach AI technology and digital competency capabilities to HRM staff. Organizational policies for implementing AI into HR should focus on introducing AI tools to enhance human capability within the HR sector. Business organizations should establish ethical AI policies that address potential discrimination during the workforce assessment process and performance measurement framework. The organizations governing AI policies should establish standards that guarantee transparency and fairness in the practice of AI-driven human resource management. Saudi Arabian labor legislation should establish ethical guidelines regarding AI usage to prevent biased hiring systems and enable unique human resource management approaches.

Future research requires integrating studies that examine how AI impacts workplace happiness levels and psychophysiological worker wellness, alongside evaluations of their mental adaptation behavior. Researchers

must evaluate AI-based human resource management operations across various cultural environments and industrial frameworks to identify global obstacles facing AI implementation.

6. Conclusion

This analysis studied how artificial intelligence affects human resource management effectiveness in Saudi Arabian organizations through AI systems enabling talent acquisition, AI techniques to improve employee engagement, and AI-powered support systems that serve human resource teams. Research indicates that AI-driven HR developments allow organizations to create better recruitment systems that engage employees, increase productivity, and result in more substantial strategic human capital choices.

Integrating AI technology for employee interaction is the strongest indicator of HRM excellence because this method allows AI-based systems to provide personalized HR solutions. All AI-driven HR transformation projects need strong support from organizational leadership and HR professionals because AI-powered tools significantly enhance HRM outcomes. Research conclusions suggest that HR professionals should design comprehensive training initiatives that combine AI technical competencies with fundamental domain knowledge, thereby maximizing employee adaptation, accelerating technology integration, and mitigating resistance to organizational change. Meanwhile, governance frameworks implemented by policymakers and organizational leaders must fulfill two main objectives: fostering responsible, ethically sound AI management and ensuring transparent, equitable, and non-discriminatory AI deployment across all human resource practices.

The research generates valuable conclusions despite certain methodological limitations. Future studies should further explore the long-term impacts of AI on HRM performance to reveal the automated system's complete influence on functional efficiency, employee commitment, and professional development over time. Additionally, comparative empirical research is needed to investigate how AI–HRM adoption and integration patterns operate across diverse cross-cultural settings, varying institutional environments, and distinct industrial sectors. Ultimately, aligning AI optimization in HRM operations with effective workforce regulations will enable organizations to achieve successful strategic HR outcomes.

Declaration of competing interest

The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper.

Funding information

No funding was received from any financial organization to conduct this research.

Author contribution

The contribution to the paper is as follows: Abdallah Ali Mohammad Alrifae, Sultan Eisi Madraba: study conception and design, analysis and interpretation of results, and draft preparation; Abdallah Ali Mohammad Alrifae: data collection. All authors approved the final version of the manuscript.

References

- [1] A. A. S. Mohammad *et al.*, "Cloud Computing Adoption in the Digital Era: A Bibliometric Analysis and Research Agenda," *Studies in Computational Intelligence*, vol. 1171, pp. 137–148, 2025, https://doi.org/10.1007/978-3-031-77925-1_13.
- [2] M. Ashrafuzzaman, K. B. Prince, and A. Rahman, "Integrating Artificial Intelligence in HRM: The Role of Management Information Systems in Enhancing Decision-Making Processes," *SSRN Electronic Journal*, Jul. 2024, <https://doi.org/10.2139/ssrn.5031919>.
- [3] M. H. Mahmoud and R. Othman, "Effects of New Public Management Reforms on Human Resource Practices: A Case Study in Jordan," *Management and Labour Studies*, vol. 49, no. 1, pp. 149–176, Feb. 2024, <https://doi.org/10.1177/0258042X231185216>.

- [4] K. R. Ahmed *et al.*, "Strategic HR Management for Employee Retention: A Machine Learning Approach Using ANN," in *2025 IEEE 2nd International Conference on Computing, Applications and Systems (COMPAS)*, Oct. 2025, pp. 1–6, <https://doi.org/10.1109/COMPAS67506.2025.11381627>.
- [5] B. N. Zureigat, H. Alhanatleh, M. Alghizzawi, A. Ali, and M. A. A. Alrifae, "Role of Digital Technologies Based on Cybersecurity Awareness in Enhancing Firms' Performance: Digital Accounting Systems Setting," *Economics: Innovative & Economic Research Journal*, vol. 13, no. 3, 2025, <https://doi.org/10.2478/eoik-2025-0070>.
- [6] M. Venugopal, V. Madhavan, R. Prasad, and R. Raman, "Transformative AI in human resource management: enhancing workforce planning with topic modeling," *Cogent Business & Management*, vol. 11, no. 1, p. 2432550, Dec. 2024, <https://doi.org/10.1080/23311975.2024.2432550>.
- [7] J. Yuan, R. Al Zumot, and A. A. M. Alrifae, "Perceived value, habit, and engagement in Chinese university students' use of Himalaya FM," *Heritage and Sustainable Development*, vol. 7, no. 2, pp. 1111–1122, Oct. 2025, <https://doi.org/10.37868/HSD.V7I2.1518>.
- [8] K. L. Abhishek *et al.*, "Developing an Intelligent Resume Screening Tool With AI-Driven Analysis and Recommendation Features," *Applied AI Letters*, vol. 6, no. 2, p. e116, Apr. 2025, <https://doi.org/10.1002/ail2.116>.
- [9] H. K. Y. Golla, U. B. Peddinti, K. Kotla, V. Todimela, and U. K. Uppara, "Resume Classification and Human-Free Virtual Ai Interview System," *AIP Conference Proceedings*, vol. 3237, no. 1, Feb. 2025, <https://doi.org/10.1063/5.0247058>.
- [10] E. K. Kelan, "Algorithmic inclusion: Shaping the predictive algorithms of artificial intelligence in hiring," *Human Resource Management Journal*, vol. 34, no. 3, pp. 694–707, Jul. 2024, <https://doi.org/10.1111/1748-8583.12511>.
- [11] E. Albaroudi, T. Mansouri, and A. Alameer, "A Comprehensive Review of AI Techniques for Addressing Algorithmic Bias in Job Hiring," *AI*, vol. 5, no. 1, pp. 383–404, Feb. 2024, <https://doi.org/10.3390/ai5010019>.
- [12] C. Iancu and S. V. Oprea, "AI and Human Resources in a Literature-Driven Investigation Into Emerging Trends," *IEEE Access*, vol. 13, pp. 81897–81916, 2025, <https://doi.org/10.1109/ACCESS.2025.3568338>.
- [13] H. V. Erkutlu *et al.*, "Artificial intelligence and human resources management: Transformation in the workplace," *Nevşehir Hacı Bektaş Veli University Journal of ISS*, vol. 15, no. 1, pp. 346–357, Mar. 2025, <https://doi.org/10.30783/nevsosbilen.1622590>.
- [14] Y. K. Rajnath and V. Kumar, "Training and Skills Development for AI in Product Development," in *AI for Product Development*, CRC Press, Jan. 2025, pp. 123–145, <https://doi.org/10.1201/9781003536901-7>.
- [15] D. A. Verma, "Building a Sustainable Culture of Appreciation: A Strategy for Modern Organization," *Zenodo*, 2025, <https://doi.org/10.5281/zenodo.17722937>.
- [16] M. M. S. Alzubi, "Artificial intelligence as an enabler of platformbased financial ecosystems: Evidence from commercial and Islamic banks listed on the Amman Stock Exchange," *Banks and Bank Systems*, vol. 21, no. 2, pp. 234–244, 2026, [https://doi.org/10.21511/BBS.21\(2\).2026.16](https://doi.org/10.21511/BBS.21(2).2026.16).
- [17] M. M. Khan, "Optimizing Web Surveys in Research: Methodological Considerations and Validity Aspects," *International Journal of Research and Scientific Innovation*, vol. 9, no. 4, pp. 75–105, 2024, <https://doi.org/10.51244/ijrsi.2024.1104007>.
- [18] G. George and M. R. Thomas, "Artificial Intelligence in Talent Acquisition Scale: Development and Validation," Jul. 2021. Accessed: Sep. 07, 2026. [Online]. Available: <https://papers.ssrn.com/abstract=4416874>
- [19] M. A. Sabol, J. F. Hair Jr., B. G. Winton, and A. Legate, "Artificial Intelligence in Human Resource Information Systems: Measurement and Validation," *Review of Business Information Systems*, vol. 25, no. 1, p. 15, 2025. Accessed: Sep. 07, 2026. [Online]. Available: <https://www.researchgate.net/publication/392970169>
- [20] M. A. Huselid, S. E. Jackson, and R. S. Schuler, "Technical and strategic human resources management effectiveness as determinants of firm performance," *Academy of Management Journal*, vol. 40, no. 1, pp. 171–188, Feb. 1997, <https://doi.org/10.5465/257025>.
- [21] A. A. M. Alrifae, M. H. Mahmoud, R. Al Zumot, A. Ali, and M. M. AlZubi, "The impact of electronic human resource management on organizational performance in the Jordanian telecommunications sector with employee engagement as a mediating variable," *Discover Sustainability*, vol. 7, no. 1, p. 273, Jan. 2026, <https://doi.org/10.1007/s43621-026-02644-9>.