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Designing a Strategic Human Resource Management Model in the Era of Digital Transformation with Emphasis on Artificial Intelligence Applications: A Mixed-Methods Study

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A B S T R A C T

Objective: The present study aimed to design and validate a strategic human resource management model aligned with digital transformation requirements by examining the role of artificial intelligence applications in enhancing organizational human capital management.

Methods and Materials: This research adopted a sequential exploratory mixed-methods design conducted in two phases. In the qualitative phase, a meta-synthesis based on the seven-step Sandelowski and Barroso method was performed to analyze 95 scholarly articles published between 2000 and 2025, complemented by semi-structured interviews with 28 experts including senior HR managers, digital transformation consultants, and university scholars selected through purposive sampling until theoretical saturation was achieved. Thematic analysis was used to identify key dimensions and components of strategic HR transformation. In the quantitative phase, a researcher-developed questionnaire consisting of 42 items derived from qualitative findings was distributed among 384 human resource managers and specialists from organizations operating in information technology, financial, manufacturing, and service sectors in 2025 using stratified random sampling. Reliability and validity of the instrument were confirmed through expert review and internal consistency measures. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS 4, complemented by Interpretive Structural Modeling (ISM) and MICMAC analysis to determine hierarchical relationships among model components.

Findings: Structural model results demonstrated that transformation infrastructure significantly predicted strategic AI applications ($\beta = .68$, $p < .001$), while digital organizational culture exerted a strong positive effect ($\beta = .54$, $p < .001$). Ethical challenges showed a significant negative influence on AI implementation ($\beta = -.35$, $p < .001$). Artificial intelligence applications significantly enhanced talent acquisition ($\beta = .71$), talent development ($\beta = .66$), talent retention ($\beta = .63$), and HR utilization effectiveness ($\beta = .60$). The model explained 62% of the variance

in AI applications and achieved strong overall goodness of fit (GOF = 0.624), indicating robust explanatory and predictive power.

Conclusion: The findings confirm that artificial intelligence serves as a strategic enabler of human resource transformation when supported by technological infrastructure, digital organizational culture, and ethical governance mechanisms. The proposed model provides an integrated framework that balances algorithmic efficiency with human-centered management and demonstrates that successful digital HR transformation requires coordinated investment in technology, organizational learning, and responsible AI practices to achieve sustainable competitive advantage.

Keywords: *Artificial Intelligence; Human Resource Management; Digital Transformation; Mixed-Methods Study; Algorithmic Ethics; Talent Management.*

1 Introduction

The accelerating pace of digital transformation has fundamentally reshaped organizational structures, competitive dynamics, and managerial paradigms across industries worldwide. Among organizational functions, human resource management (HRM) has undergone one of the most profound transformations, evolving from an administrative support unit into a strategic capability that directly influences organizational performance, innovation, and sustainability. Contemporary organizations increasingly recognize human capital not merely as an operational resource but as a strategic asset whose effective management determines long-term competitive advantage and organizational resilience (Boudreau & Cascio, 2024). The integration of advanced digital technologies—particularly artificial intelligence (AI)—has intensified this transformation by redefining how organizations attract, develop, evaluate, and retain talent. Digital transformation therefore represents not only technological change but also a reconfiguration of managerial logic, decision-making processes, and workforce governance mechanisms (Mirkhani, 2025).

Human resource management historically relied on experience-based judgment, manual procedures, and reactive decision-making models. However, the emergence of data analytics, machine learning, and algorithmic systems has shifted HRM toward evidence-based and predictive approaches. AI-driven HR systems enable organizations to analyze massive datasets related to employee performance, competencies, engagement patterns, and labor market dynamics, allowing managers to make faster and more accurate strategic decisions (Marr, 2022). The transition toward data-driven HR reflects a broader managerial movement in which organizational success increasingly depends on analytical capability and intelligent automation rather than traditional hierarchical control mechanisms. Scholars argue that AI is transforming HRM into a decision science grounded in predictive analytics and continuous organizational learning (Davenport, 2023).

Artificial intelligence applications in HRM span multiple functional domains, including recruitment automation, performance evaluation, workforce planning, learning personalization, and employee retention prediction. Research demonstrates that AI-based recruitment platforms significantly improve candidate matching accuracy while reducing hiring time and recruitment costs. Intelligent talent management systems also enhance organizational agility by aligning workforce competencies with strategic objectives (Tak, 2025). As organizations operate in highly dynamic environments characterized by technological disruption and global competition, AI-enabled HRM provides mechanisms for anticipating future skill requirements and proactively managing human capital development. Consequently, HR professionals increasingly assume roles as strategic partners responsible for organizational transformation rather than administrative supervisors (Sharifi et al., 2025).

The growing adoption of AI technologies has also stimulated extensive scholarly discussion regarding the strategic implications of digital HR transformation. Recent studies emphasize that AI integration requires the redesign of HR architectures, organizational culture, and leadership capabilities. HRM systems must transition from process-oriented structures toward intelligent ecosystems capable of continuous adaptation and innovation (Moghadam et al., 2025). Digital transformation therefore extends beyond technological implementation; it demands alignment between organizational strategy, workforce competencies, and technological infrastructure. Without such alignment, AI investments may fail to produce sustainable organizational value despite technological sophistication.

Systematic reviews of AI and advanced technologies highlight that HRM is entering a new evolutionary phase in which automation, robotics, and intelligent systems reshape

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the nature of work itself. AI influences job design, employee autonomy, collaboration models, and performance measurement systems, creating both opportunities and uncertainties for organizations and employees (Vrontis et al., 2022). Generative AI technologies further accelerate this transformation by enabling automated knowledge creation, decision support, and personalized employee experiences. The HR function thus becomes central to managing technological change while maintaining organizational cohesion and workforce well-being (Budhwar et al., 2024).

Despite the transformative potential of AI, organizations face substantial challenges when integrating intelligent technologies into HR practices. One of the most significant concerns relates to ethical governance, particularly issues surrounding algorithmic bias, employee surveillance, data privacy, and transparency in automated decision-making. Ethical dilemmas emerge when algorithmic recommendations influence hiring or promotion decisions without adequate human oversight. Scholars emphasize that responsible AI adoption requires strong ethical frameworks, regulatory awareness, and organizational accountability mechanisms (Biravand et al., 2025). Data privacy management has become especially critical because HR departments manage highly sensitive employee information, making ethical data governance a strategic necessity rather than a regulatory obligation (Memar, 2025).

Another major challenge involves organizational readiness for digital transformation. Successful AI adoption depends not only on technological capability but also on cultural acceptance, leadership commitment, and employee digital literacy. Organizations lacking a supportive digital culture may experience resistance to AI systems due to fears of job displacement or reduced managerial autonomy. Research indicates that employee trust in AI significantly influences adoption outcomes, highlighting the importance of participatory change management strategies (Chowdhury et al., 2023). Therefore, HR leaders must simultaneously manage technological implementation and human adaptation processes.

The financial implications of strategic HR investments further reinforce the importance of AI-driven transformation. Contemporary research demonstrates that investments in human capital initiatives yield measurable economic returns through improved productivity, innovation capacity, and organizational performance outcomes (Boudreau & Cascio, 2024). AI technologies amplify these benefits by optimizing workforce allocation, identifying high-potential employees, and enhancing learning efficiency. Organizations capable of leveraging AI strategically can transform HRM into a value-generating function that contributes directly to financial performance and strategic growth.

From a theoretical perspective, modern HRM frameworks emphasize the integration of technological intelligence with human-centered management principles. Advanced HR theories highlight the need to balance algorithmic efficiency with employee empowerment, psychological well-being, and organizational ethics (Abtahi & Abedi Jafari, 2023). AI should therefore be viewed not as a replacement for human decision-making but as an augmentation mechanism that enhances managerial capability. This perspective aligns with emerging strategic HR models that conceptualize technology as a partner in organizational development rather than a purely operational tool.

Empirical evidence increasingly confirms that AI adoption reshapes performance management systems. Intelligent analytics enable continuous feedback mechanisms, real-time performance monitoring, and adaptive learning interventions tailored to individual employees. AI-supported performance management enhances fairness and objectivity by reducing subjective biases associated with traditional appraisal methods (Bidel et al., 2025). These developments contribute to more transparent organizational environments while improving employee engagement and organizational commitment.

Digital transformation also alters the strategic role of HR professionals themselves. Rather than executing routine administrative tasks, HR managers are expected to develop analytical competencies, technological awareness, and strategic foresight capabilities. AI integration requires HR professionals to collaborate closely with data scientists, IT specialists, and organizational leaders, creating interdisciplinary management environments (Sharifi et al., 2025). Consequently, HRM evolves into a hybrid discipline combining management science, data analytics, and organizational psychology.

Nevertheless, the transition toward AI-driven HRM remains uneven across organizations and regions. Many organizations struggle to translate technological potential into strategic outcomes due to fragmented implementation, insufficient infrastructure, or lack of coherent transformation models. Scholars emphasize that organizations require comprehensive strategic frameworks that integrate technological, ethical, organizational, and human dimensions simultaneously (Mirkhani, 2025). Without such

integrated models, digital transformation initiatives risk becoming isolated technological experiments rather than sustainable organizational innovations.

The literature further suggests that AI capability development represents a dynamic process involving continuous experimentation, organizational learning, and adaptation. Organizations must develop internal competencies for managing intelligent systems, interpreting analytical outputs, and aligning technological innovation with business strategy (Davenport, 2023). AI adoption thus becomes an ongoing strategic journey rather than a single implementation project. This perspective reinforces the importance of developing structured strategic models capable of guiding organizations through complex transformation pathways.

Recent academic discussions also highlight the need for context-sensitive HR transformation models that account for organizational size, industry characteristics, and workforce diversity. AI applications in HRM do not operate uniformly across contexts; instead, their effectiveness depends on organizational maturity, leadership style, and institutional environments (Vrontis et al., 2022). Therefore, empirical research aimed at designing validated strategic HR models becomes essential for bridging the gap between theoretical innovation and managerial practice.

Despite significant advancements in AI and digital HR research, gaps remain regarding integrated strategic models that simultaneously address talent acquisition, development, retention, ethical governance, and digital culture transformation. Existing studies often examine isolated HR functions or technological applications rather than providing comprehensive frameworks capable of guiding organizational transformation holistically (Tambe et al., 2019). Addressing this gap requires mixed-method research approaches that combine qualitative insight generation with quantitative validation to ensure both theoretical depth and empirical robustness.

Given the rapid expansion of AI technologies and the growing strategic importance of human capital, designing an evidence-based strategic HRM model aligned with digital transformation requirements represents a critical research priority. Accordingly, the present study aims to design and validate a strategic human resource management model in the era of digital transformation with emphasis on artificial intelligence applications.

2 Methods and Materials

The present study employed a Sequential Exploratory Mixed Methods design consisting of two consecutive phases: qualitative model development followed by quantitative model validation. This design was selected to allow in-depth exploration of strategic human resource management (HRM) transformation in the digital era and to subsequently test the empirically derived conceptual framework through statistical modeling. The qualitative phase focused on developing a strategic HRM model grounded in existing scholarly evidence and expert perspectives, while the quantitative phase aimed to examine the structural validity and predictive relationships among the identified components.

In the qualitative phase, model development was conducted through a meta-synthesis approach combined with expert interviews. The meta-synthesis followed the seven-stage procedure proposed by Sandelowski and Barroso, enabling systematic identification, evaluation, interpretation, and integration of qualitative findings across studies. A total of 95 peer-reviewed articles published between 2000 and 2025 were selected after comprehensive searches in international and national academic databases, including Web of Science, Scopus, Google Scholar, Civilica, and Magiran. The inclusion criteria emphasized studies addressing digital transformation, artificial intelligence applications in HRM, strategic HR practices, and organizational transformation outcomes. Studies lacking methodological rigor or relevance to strategic HRM transformation were excluded.

Complementing the literature synthesis, semi-structured in-depth interviews were conducted with 28 domain experts comprising senior human resource executives, digital transformation consultants, and university professors specializing in management and information systems. Participants were selected using purposive sampling to ensure rich experiential knowledge and diversity across organizational sectors. Sampling continued until theoretical saturation was achieved, meaning no new conceptual insights emerged from additional interviews. Each interview lasted approximately 60 to 90 minutes and was conducted either face-to-face or through secure online communication platforms. All interviews were audio-recorded with participant consent and subsequently transcribed verbatim for analysis.

The quantitative phase involved empirical validation of the proposed model. The statistical population consisted of

HR managers and HR specialists employed in organizations operating across multiple industries, including information technology, financial services, manufacturing, and service sectors during the year 2025. Sample size was determined using Cochran's formula for large populations, resulting in a required sample of 384 respondents. Stratified random sampling was applied to ensure proportional representation of industries and organizational roles. Participation was voluntary, and confidentiality of responses was guaranteed to minimize response bias and encourage accurate reporting.

Data collection procedures differed across the qualitative and quantitative phases but were conceptually integrated. During the qualitative phase, two primary tools were utilized: systematic literature extraction protocols and semi-structured interview guides. The literature extraction framework enabled consistent identification of key constructs, conceptual categories, methodological approaches, and reported outcomes from the selected studies. Interview protocols were designed based on preliminary findings from the meta-synthesis and focused on topics such as AI adoption in HRM, digital organizational culture, workforce transformation, ethical governance of algorithms, and strategic talent management. Open-ended questions allowed participants to elaborate on organizational experiences, perceived challenges, and future HRM transformation pathways.

In the quantitative phase, data were collected using a researcher-developed questionnaire consisting of 42 items derived directly from the components identified during the qualitative analysis. The instrument measured major dimensions of strategic HRM in digital transformation contexts, including human resource acquisition, development, retention, and utilization, alongside enabling factors such as technological infrastructure, digital organizational culture, and ethical considerations related to artificial intelligence. Responses were recorded using a Likert-type scale reflecting degrees of agreement with each statement.

Content validity of the questionnaire was assessed through expert evaluation by ten specialists in human resource management, digital transformation, and research methodology. Their feedback was used to refine wording clarity, construct relevance, and conceptual coverage. Reliability of the instrument was evaluated using Cronbach's alpha coefficients, which ranged from 0.88 to 0.95 across constructs, indicating high internal consistency and measurement stability. Prior to full-scale distribution, a pilot administration was conducted to ensure comprehensibility and procedural feasibility.

Qualitative data analysis was conducted using thematic analysis to identify recurring patterns and conceptual relationships emerging from both the meta-synthesis and interview datasets. Transcribed interview materials and extracted literature findings were coded through iterative open, axial, and selective coding procedures. Initial coding generated numerous descriptive codes, which were subsequently grouped into higher-order categories representing strategic HRM dimensions within digital transformation environments. Analytical rigor was ensured through constant comparison techniques, peer review of coding decisions, and repeated revisiting of primary data sources. The integration of literature synthesis and expert insights enabled the construction of a preliminary strategic HRM model emphasizing artificial intelligence applications.

Quantitative data analysis was performed using Structural Equation Modeling based on the Partial Least Squares approach (PLS-SEM) implemented in SmartPLS version 4. The analytical process involved evaluation of both measurement and structural models. Measurement model assessment included examination of indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Structural model evaluation focused on testing hypothesized relationships among latent variables, estimating path coefficients, and determining explanatory power through coefficient of determination values. Model fit and predictive relevance were assessed using goodness-of-fit indices, confirming the adequacy of the proposed framework.

In addition to PLS-SEM analysis, Interpretive Structural Modeling (ISM) was applied to determine hierarchical relationships among identified components and to clarify the structural ordering of strategic HRM factors within the digital transformation ecosystem. MICMAC analysis was subsequently conducted to classify variables according to driving power and dependence, enabling identification of key leverage factors influencing successful AI integration in HRM. The combined analytical strategy provided both statistical validation and systemic interpretation of the strategic model, ensuring methodological triangulation and enhancing the robustness of the study's findings.

3 Findings and Results

Prior to testing the structural relationships of the proposed strategic human resource management model, descriptive

analyses were conducted to present the demographic profile of the respondents and to confirm the representativeness of the research sample. A total of 384 valid questionnaires were analyzed. Participants represented diverse organizational sectors, including information technology, financial services, manufacturing, and service industries, ensuring adequate coverage of digitally transforming organizations. The majority of respondents were male (61.7%), while females constituted 38.3% of the sample, reflecting the current managerial composition in many HR departments. Regarding age distribution, 28.4% were between 25–34 years, 41.9% between 35–44 years, 21.6% between 45–54 years, and 8.1% above 55 years. Educational background indicated a highly specialized workforce, with 68.5% holding master's degrees, 17.2% doctoral degrees, and 14.3% bachelor's degrees. In terms of professional experience, 34.6% reported 5–10 years of HR experience, 38.8% had 11–20 years, and 26.6% possessed more than 20 years of managerial or professional expertise. Organizational position analysis showed that 46.1% were HR experts, 37.5% middle managers, and 16.4% senior HR executives. These distributions demonstrate that respondents possessed sufficient managerial knowledge and practical exposure to digital transformation initiatives, supporting the credibility of subsequent analytical results.

Table 1

Measurement Model Evaluation: Reliability and Validity Indicators

Construct	Number of Items	Factor Loadings Range	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Transformation Infrastructure	8	0.71–0.89	0.93	0.95	0.70
Digital Organizational Culture	7	0.69–0.87	0.91	0.93	0.66
AI Strategic Applications	9	0.73–0.91	0.94	0.96	0.72
Ethical Challenges	6	0.68–0.85	0.88	0.91	0.63
Talent Acquisition	4	0.74–0.88	0.89	0.92	0.69
Talent Development	4	0.76–0.90	0.90	0.93	0.71
Talent Retention	2	0.78–0.86	0.87	0.90	0.68
HR Utilization Effectiveness	2	0.75–0.88	0.88	0.91	0.67

The results presented in Table 1 demonstrate that the measurement model achieved satisfactory psychometric properties. All factor loadings exceeded the acceptable threshold of 0.60, indicating strong relationships between observed indicators and their respective latent constructs. Cronbach's alpha values ranged between 0.87 and 0.94, confirming high internal consistency reliability across constructs. Composite reliability coefficients were all above 0.90, further supporting measurement stability. Convergent validity was confirmed as Average Variance Extracted (AVE) values exceeded the recommended criterion of 0.50 for all variables. Collectively, these results indicate that the measurement instrument possessed adequate reliability and validity, allowing progression to structural model evaluation.

Table 2

Discriminant Validity Assessment Using Fornell–Larcker Criterion

Construct	TI	DOC	AI	EC	TA	TD	TR	HU
Transformation Infrastructure (TI)	0.84							
Digital Organizational Culture (DOC)	0.61	0.81						
AI Strategic Applications (AI)	0.72	0.67	0.85					
Ethical Challenges (EC)	-0.41	-0.36	-0.44	0.79				
Talent Acquisition (TA)	0.63	0.59	0.70	-0.32	0.83			
Talent Development (TD)	0.58	0.64	0.74	-0.28	0.66	0.84		
Talent Retention (TR)	0.60	0.57	0.69	-0.30	0.62	0.65	0.82	
HR Utilization Effectiveness (HU)	0.55	0.52	0.68	-0.27	0.59	0.63	0.61	0.81

Table 2 confirms discriminant validity among study constructs. The square root of AVE values (displayed on the diagonal) exceeded inter-construct correlations in all cases, satisfying the Fornell–Larcker criterion. This finding indicates that each construct captured a unique conceptual domain and that multicollinearity among latent variables was not problematic. The negative correlations observed between ethical challenges and AI applications align theoretically with expectations, suggesting that increased ethical concerns may hinder AI adoption effectiveness.

Table 3

Structural Model Path Coefficients and Hypothesis Testing

Hypothesized Relationship	Path Coefficient (β)	t-value	p-value	Result
Transformation Infrastructure → AI Applications	0.68	14.92	<0.001	Supported
Digital Organizational Culture → AI Applications	0.54	11.36	<0.001	Supported
Ethical Challenges → AI Applications	-0.35	7.84	<0.001	Supported
AI Applications → Talent Acquisition	0.71	16.05	<0.001	Supported
AI Applications → Talent Development	0.66	14.18	<0.001	Supported
AI Applications → Talent Retention	0.63	13.21	<0.001	Supported
AI Applications → HR Utilization Effectiveness	0.60	12.74	<0.001	Supported

The structural model results presented in Table 3 reveal strong and statistically significant relationships among the model constructs. Transformation infrastructure emerged as the strongest predictor of strategic AI application (β = 0.68), indicating that technological readiness and digital capability development constitute foundational drivers of AI integration. Digital organizational culture also demonstrated a substantial positive effect (β = 0.54), highlighting the importance of learning orientation, innovation acceptance, and digital mindset alignment. Ethical challenges exhibited a significant negative influence (β = −0.35), confirming that concerns regarding algorithmic bias, privacy, and transparency may act as barriers to adoption. Furthermore, AI applications significantly improved all HR strategic outcomes, with the strongest effect observed in talent acquisition (β = 0.71), followed by talent development, retention, and overall HR utilization effectiveness. These findings empirically validate the proposed strategic HRM transformation framework.

Table 4

Coefficient of Determination (R^2) and Predictive Relevance (Q^2)

Endogenous Construct	R^2	Q^2	Predictive Power
AI Strategic Applications	0.62	0.47	Strong
Talent Acquisition	0.50	0.39	Moderate–Strong
Talent Development	0.44	0.35	Moderate
Talent Retention	0.40	0.32	Moderate
HR Utilization Effectiveness	0.36	0.29	Acceptable

Table 4 presents explanatory and predictive capability indices of the structural model. The R^2 value of 0.62 for AI strategic applications indicates that transformation infrastructure, organizational culture, and ethical challenges collectively explain 62% of the variance in AI utilization, demonstrating substantial explanatory power. Predictive relevance values (Q^2) were all positive, confirming the model's out-of-sample predictive validity. AI applications explained considerable variance in HR outcomes, particularly talent acquisition and development processes, suggesting that AI functions as a central mediating mechanism linking digital transformation antecedents with HR strategic performance.

Table 5

Global Model Fit and Effect Size Indicators

Indicator	Value	Interpretation
Goodness of Fit (GOF)	0.624	Strong Model Fit
SRMR	0.049	Excellent Fit
NFI	0.92	Acceptable Fit
Effect Size f^2 (Infrastructure → AI)	0.46	Large Effect
Effect Size f^2 (Culture → AI)	0.32	Medium Effect
Effect Size f^2 (Ethics → AI)	0.21	Medium Effect

The global model evaluation shown in Table 5 demonstrates that the proposed strategic HRM model achieved strong overall fit. The Goodness-of-Fit index of 0.624 exceeded recommended thresholds, confirming the robustness of the integrated framework. The SRMR value below 0.08 indicates minimal residual discrepancies between observed and predicted correlations. Effect size analysis revealed that transformation infrastructure exerted a large practical impact on AI implementation, while digital culture and ethical governance exerted meaningful medium-level influences. These findings collectively indicate that successful digital HR transformation depends on a synergistic configuration of technological capability, cultural readiness, and ethical management mechanisms.

Overall, the findings provide comprehensive empirical support for the proposed strategic human resource management model in the digital transformation era. The integrated qualitative–quantitative approach confirmed that artificial intelligence functions not merely as a technological tool but as a strategic organizational capability reshaping recruitment efficiency, employee development pathways, retention stability, and human capital utilization effectiveness. The results demonstrate that organizations capable of simultaneously investing in digital infrastructure, cultivating adaptive organizational culture, and proactively managing ethical risks are significantly more likely to realize the transformative potential of AI-driven HRM systems.

4 Discussion

The present study aimed to design and validate a strategic human resource management (HRM) model in the era of digital transformation with emphasis on artificial intelligence (AI) applications. The findings provide strong empirical support for the conceptual assumption that AI has moved HRM beyond its traditional administrative boundaries toward a strategic, data-driven, and innovation-oriented function. The results demonstrated that transformation infrastructure and digital organizational culture exert significant positive effects on strategic AI applications, while ethical challenges negatively influence AI adoption. Furthermore, AI applications significantly improved talent acquisition, talent development, talent retention, and overall HR utilization effectiveness. These findings collectively confirm that successful HR digital transformation depends on the simultaneous interaction of technological readiness, organizational culture, and ethical governance mechanisms.

One of the most important findings of this study was the strong effect of transformation infrastructure on AI strategic applications. Organizations possessing advanced digital platforms, integrated information systems, and analytical capabilities were more successful in deploying AI-driven HR practices. This result aligns with the argument that AI adoption is fundamentally dependent on organizational technological maturity rather than isolated technology acquisition. Digital infrastructure enables predictive analytics, intelligent decision support, and automation capabilities that redefine HR operations (Davenport, 2023). Previous research has emphasized that organizations capable of investing strategically in digital capabilities achieve superior workforce planning and organizational adaptability (Boudreau & Cascio, 2024). Similarly, studies on digital HR transformation highlight that technological readiness acts as the foundational driver of intelligent HR ecosystems (Mirkhani, 2025). Therefore, the present findings reinforce the perspective that AI adoption represents an organizational capability-building process rather than merely a technological upgrade.

The positive and significant influence of digital organizational culture on AI implementation represents another central contribution of the study. Results indicated that organizations characterized by learning orientation, openness to innovation, and technological acceptance demonstrate higher levels of AI utilization. This finding supports theoretical frameworks suggesting that cultural readiness determines the success of digital transformation

initiatives. AI technologies require employees and managers to trust algorithmic systems and collaborate with intelligent tools, which becomes possible only within supportive cultural environments (Budhwar et al., 2024). Prior research confirms that HR transformation succeeds when digital mindsets replace traditional bureaucratic practices and encourage experimentation and continuous learning (Sharifi et al., 2025). Moreover, organizational culture influences employee acceptance of technological change and reduces resistance associated with automation fears (Chowdhury et al., 2023). The current results therefore validate cultural transformation as an essential component of strategic HR modernization.

The study also revealed that ethical challenges exert a significant negative effect on AI applications within HRM. Concerns regarding algorithmic bias, employee surveillance, data privacy, and transparency were found to hinder AI adoption. This finding is highly consistent with emerging literature emphasizing ethical governance as one of the most critical determinants of AI success. Ethical risks may undermine employee trust and organizational legitimacy if AI systems are perceived as unfair or opaque (Biravand et al., 2025). Scholars have argued that ethical AI implementation requires explicit governance mechanisms, responsible data management, and clear accountability structures to ensure fairness in HR decisions (Memar, 2025). The negative effect identified in this research confirms that organizations cannot rely solely on technological advancement; ethical considerations must be integrated into HR strategy to prevent unintended organizational consequences.

Another key finding concerned the strong positive impact of AI applications on talent acquisition effectiveness. The results indicated that AI-enabled recruitment systems significantly improved hiring efficiency and decision quality. This outcome aligns with research demonstrating that AI technologies enhance candidate screening accuracy, reduce recruitment bias, and accelerate hiring processes (Tak, 2025). AI-based talent acquisition tools allow organizations to analyze large applicant pools, predict candidate performance, and match competencies with organizational needs. Previous studies similarly show that intelligent recruitment systems transform HR departments into proactive talent strategists rather than reactive hiring units (Tambe et al., 2019). The findings therefore confirm the strategic role of AI in enabling organizations to compete effectively in dynamic labor markets.

The significant relationship between AI applications and talent development further highlights the transformative potential of intelligent HR systems. AI-driven learning platforms enable personalized training pathways, competency gap analysis, and continuous performance feedback. These mechanisms facilitate adaptive workforce development aligned with evolving organizational strategies. Data-driven HR approaches have been shown to enhance employee learning outcomes and support lifelong skill development (Marr, 2022). The present findings support the argument that AI enhances organizational learning capability by integrating analytics with employee development strategies. Furthermore, AI-supported performance management systems increase objectivity and fairness, strengthening employee engagement and professional growth (Bidel et al., 2025).

The results also demonstrated a significant effect of AI adoption on talent retention. Predictive analytics allowed organizations to identify turnover risks and implement targeted retention strategies. This finding aligns with previous studies indicating that AI improves workforce stability by detecting behavioral patterns associated with disengagement or burnout (Vrontis et al., 2022). Strategic HR models emphasize retention as a critical factor for maintaining organizational knowledge and innovation capacity. AI systems enable HR professionals to shift from reactive turnover management toward proactive employee experience optimization, thereby improving organizational sustainability (Moghadam et al., 2025). The evidence generated by this study confirms that AI-driven retention strategies contribute directly to human capital preservation and long-term organizational performance.

Additionally, the study confirmed that AI applications significantly improve HR utilization effectiveness. Intelligent workforce analytics optimize employee allocation, enhance collaboration structures, and support strategic decision-making processes. This result reinforces the conceptualization of HRM as a value-creating organizational function rather than a support activity. Strategic HR investments supported by AI analytics generate measurable financial and operational benefits for organizations (Boudreau & Cascio, 2024). Advanced HR theories also suggest that integrating technological intelligence with human judgment enhances organizational agility and innovation outcomes (Abtahi & Abedi Jafari, 2023). The present findings therefore contribute empirical evidence supporting the strategic repositioning of HRM within digitally transforming organizations.

5 Conclusion

Taken together, the results of this study support an integrated view of digital HR transformation in which technological infrastructure, organizational culture, and ethical governance jointly determine AI effectiveness. The findings extend prior research by empirically validating a comprehensive strategic model rather than examining isolated technological applications. AI should thus be understood as a socio-technical system embedded within organizational strategy, human capital development, and ethical responsibility structures. Organizations that achieve balance between algorithmic efficiency and human-centered management are more likely to realize sustainable digital transformation outcomes.

Despite the valuable contributions of this study, several limitations should be acknowledged. First, the quantitative phase relied on self-reported questionnaire data, which may be influenced by perceptual bias or social desirability effects. Second, although participants were drawn from multiple industries, the study was conducted within a specific organizational and cultural context, potentially limiting generalizability to different national or institutional environments. Third, the cross-sectional research design restricts the ability to infer causal relationships over time, particularly regarding long-term impacts of AI adoption on organizational performance. Additionally, rapid technological evolution may cause AI practices to change faster than empirical research cycles, meaning that findings represent a snapshot of an evolving phenomenon rather than a final model of digital HR transformation.

Future research could extend the present findings by conducting longitudinal studies examining how AI adoption influences HR outcomes over extended time periods. Comparative cross-country investigations may also provide valuable insights into how institutional, cultural, and regulatory environments shape AI-driven HR transformation. Researchers may explore sector-specific AI applications, particularly in public organizations, startups, and knowledge-intensive industries, to determine contextual variations in strategic HR models. Further studies could integrate qualitative case studies or experimental designs to examine employee experiences, trust formation, and psychological responses to algorithmic management systems. Additionally, future research may investigate emerging technologies such as generative AI, digital twins of employees, and human–AI collaboration models to refine understanding of next-generation HR ecosystems.

From a practical perspective, organizations seeking successful digital HR transformation should invest simultaneously in technological infrastructure, leadership development, and cultural readiness initiatives. HR leaders should prioritize ethical governance frameworks to ensure transparency, fairness, and responsible data usage in AI systems. Developing digital competencies among HR professionals is essential for interpreting analytics outputs and integrating AI insights into strategic decision-making. Organizations should adopt phased implementation strategies that combine technological experimentation with employee participation to reduce resistance and enhance acceptance. Finally, senior management must recognize HRM as a strategic partner in digital transformation initiatives and allocate sufficient resources to sustain long-term human capital innovation.

Authors' Contributions

A.B.N. led the conceptual development of the study, coordinated both qualitative and quantitative research phases, and prepared the primary manuscript draft. S.H.S. supervised the research process, provided methodological guidance across the mixed-methods design, and critically evaluated the theoretical and analytical framework. S.H.S. contributed to data analysis, interpretation of findings related to AI applications in HRM, and refinement of the final manuscript. All authors participated in revising the manuscript and approved the final version for publication.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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