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AI-Powered Digital HRM And Organizational Performance: A Multilevel Framework

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Abstract

This conceptual paper synthesizes recent advances in digital human resource management (HRM) literature to develop an integrative framework examining how AI-enabled HR systems influence organizational performance. Drawing upon signaling theory and dynamic capabilities view, the study proposes that successful digital HRM requires system-level integration across technological, processual, and strategic dimensions. The paper distinguishes electronic HRM (e-HRM) as operational digitization from digital HRM (d-HRM) as strategic transformation. Key findings reveal that HRM system strength mediates the relationship between digitalization and organizational performance outcomes, while employee participation moderates this relationship. Technological turbulence and employee participation shape digital HRM effectiveness. The framework offers theoretical contributions to digital HRM scholarship and practical guidance for organizations navigating digital transformation.

Keywords: Digital HRM, Artificial Intelligence, HRM System Strength, Organizational Performance, Strategic HRM

1. Introduction

Artificial intelligence and digital technologies have fundamentally transformed human resource management. Organizations increasingly use AI-powered systems for recruitment, performance management, and workforce planning (Pavithra et al., 2025). The digitalization of HRM attracts significant attention as organizations transition toward AI-powered systems that recruit employees, appraise performance, conduct talent analytics, and plan the workforce (Pavithra et al., 2025).

However, the literature remains fragmented across multiple dimensions. First, conceptual ambiguity persists regarding electronic HRM (e-HRM) versus digital HRM (d-HRM), with scholars often using these terms interchangeably despite potentially distinct theoretical implications (Barghini & Bonti, 2024). Second, existing studies tend to examine AI adoption, flexible work arrangements, and strategic HRM as separate phenomena rather than integrated systems, leaving a significant gap in system-level conceptualizations that combine these elements (Pavithra et al., 2025). Third, while the performance benefits of digital HRM are recognized, the mechanisms through which system-level integration translates into organizational performance outcomes remain undertheorized (Sun et al., 2025; Zhou et al., 2026).

This paper addresses these gaps by developing an integrative multilevel framework addressing three research questions: (1) How do AI-enabled HR systems and digital work platforms interact to influence organizational performance? (2) Through what mechanisms does system-level digital HRM integration translate into organizational performance outcomes? (3) What contextual and processual factors moderate the effectiveness of digital HRM implementation?

2. Theoretical Foundations

2.1 Digital HRM: Conceptual Clarification

Barghini and Bonti (2024) provide a systematic clarification of terminology through their review of 174 documents. They distinguish between two conceptually distinct constructs.

a. **Electronic HRM (e-HRM)** refers to the atomistic application of digital technologies to specific HR functions—recruitment, performance appraisal, training administration—with primary emphasis on operational efficiency. E-HRM operates at the operational level, characterized by asynchronous polymorph development where different HR functions adopt digital tools at varying rates and intensities. Organizations typically experience what Barghini and Bonti (2024) term "asynchronous polymorph development" where not all traditional HRM practices are digitalized simultaneously or with equal intensity.

b. **Digital HRM (d-HRM)** denotes the holistic transformation of the HR system as an integrated whole. Operating at the strategic level, d-HRM involves systemic alignment of digital capabilities with organizational strategy, culture, and structure. Barghini and Bonti (2024) emphasize that simply implementing e-HRM practices operationally will not necessarily result in desired organizational outcomes. Instead, shifting from an atomistic functional approach to a holistic integrative approach is crucial. While e-HRM yields isolated efficiency gains, d-HRM generates synergistic value through coordinated harmonization, enabling what Pavithra et al. (2025) term "system-level integration."

2.2 Signaling Theory and HRM System Strength

Signaling theory provides a compelling lens for understanding digital HRM's influence on organizational outcomes. Zhou et al. (2026) apply signaling theory to examine how HRM digitalization affects outcomes through HRM system strength. Bowen and Ostroff's (2004) concept of HRM system strength—comprising distinctiveness, consistency, and consensus—captures HRM process effectiveness. Recent scholarship reconceptualizes HRM system strength as an independent signal conveying organizational values and support (Zhou et al., 2026).

Zhou et al. (2026) explain that HRM digitalization increases HRM system strength through multiple pathways. Digital online management platforms exhibit higher timeliness and agility, enabling managers to issue HRM policies at frequencies easier for employees to observe. Collecting and analyzing HR data helps managers understand employees' personalized needs, enabling development of HRM policies reflecting employee goals. Digital HRM systems provide information-sharing platforms helping employees directly receive and consult relevant managers to grasp HRM policy content and eliminate ambiguities.

HRM system strength, in turn, influences organizational outcomes. When employees perceive consistent work expectations and motivational signals from various policies, they focus efforts on encouraged tasks. The consistency dimension indicates a transparent information environment where employees fully recognize rewarding and punishing policies and effort-reward links, enhancing operational efficiency.

2.3 Dynamic Capabilities View

The dynamic capabilities view provides a foundation for understanding organizational competencies in resource orchestration and environmental adaptation. Teece et al. (1997) proposed that a firm's competitive advantages are rooted in its ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. Sun et al. (2025) apply this perspective to examine how business group digitalization influences subsidiary performance.

Digitalization enables timely information communication and data analysis, reducing parent-subsidiary information asymmetry and enabling rapid adaptation to organizational changes. Digital technology breaks through temporal and spatial limitations, expanding exchange and communication scope between parent companies and subsidiaries. Through digital transformation, subsidiaries integrate data resources with other production factors, accelerating digital adoption in research, development, procurement, production, and inventory management. This process establishes data resources as crucial tools for obtaining market information and optimizing resource allocation.

Sun et al. (2025) demonstrate that digitalization facilitates communication and collaboration between parent companies and subsidiaries. Information technology promotes inter-firm information sharing, reducing communication and transaction costs. Digital transformation streamlines data transmission channels throughout the entire supply chain, optimizing resource allocation among subsidiaries, enabling accurate matching of market supply and demand, and enhancing production efficiency.

3. A Multilevel Framework

Pavithra et al. (2025) propose a technology-driven conceptual framework comprising four interconnected layers that explain the relationship between emerging technologies and organizational performance.

3.1 AI Layer

The AI layer comprises machine learning algorithms, natural language processing methods, and predictive analytics utilized in HR functions. This layer promotes automated recruitment and candidate screening, performance assessment, and workforce analytics. The AI layer increases precision, data uniformity, and scalability in HR processes by promoting data-driven decision-making and providing proactive information that lowers administrative work and subjectivity.

3.2 Digital Work Platform Layer

The second layer comprises cloud-based collaboration tools, enterprise communication systems, and human resource information systems supporting flexible work arrangements. Through these platforms, organizations enable remote collaboration, virtual teamwork, flex time scheduling, and real-time communication among geographically dispersed teams. This layer provides the technology backbone for hybrid and remote work, ensuring organizational agility, continuity, and resilience in dynamic work environments.

3.3 Strategic HRM Layer

The strategic HRM layer incorporates insights from AI and digital platform layers into organizational decision-making. This layer deals with data-driven HR policy development and execution aligned with organizational requirements. Strategic HRM uses analytics to plan the workforce, predict skills, develop and retain talent, and manage performance to achieve alignment between human capital strategies and long-term organizational strategy. Sun et al. (2025) found that parent-subsidiary HRM collaboration significantly mediates digitalization-performance relationships.

3.4 Organizational Performance Layer

The organizational performance layer reflects outcomes from the interaction of preceding layers. Performance outcomes include increased productivity, enhanced innovation capability, employee satisfaction, and operational efficiency. This layer captures quantitative and qualitative measures demonstrating technology-enabled HRM's role in creating sustained competitive advantage.

The framework can be represented as: **OP = f(AI, DWP, SHRM)** where organizational performance emerges from interdependent relationships between AI capabilities, digital work platforms, and strategic HRM practices (Pavithra et al., 2025).

4. Mechanisms and Boundary Conditions

4.1 HRM System Strength as Mediator

Zhou et al. (2026) provide empirical support for HRM system strength as a mediating mechanism. In their multi-wave, multi-source study of 128 organizations and 2,077 employees, they found that HRM digitalization positively predicts HRM system strength ($b = 0.33$, $SE = 0.09$, $p < 0.001$). HRM system strength positively predicts organizational performance outcomes ($b = 0.18$, $SE = 0.04$, $p < 0.001$). The mediation effect was significant ($b = 0.06$, $SE = 0.02$, 95% CI = [0.02, 0.10]).

This demonstrates that HRM system strength serves as a critical mechanism translating digital investments into organizational outcomes. The distinctiveness, consistency, and consensus dimensions of HRM system strength ensure that HRM signals are effectively transmitted, received, and interpreted by employees, leading to aligned behaviors that enhance organizational performance.

4.2 Employee Participation as Moderator

The effectiveness of HRM system strength signals depends on credibility. Zhou et al. (2026) found that employee participation in goal setting amplifies the positive relationship between HRM system strength and organizational outcomes. When employee participation is high, HRM system strength shows significant positive influence on outcomes ($b = 0.56$, $SE = 0.15$, $p < 0.001$). When participation is low, the relationship is non-significant ($b = -0.20$, $SE = 0.15$).

This finding demonstrates that participatory HRM content enhances signal credibility through two pathways. First, employees who participate in goal setting can assess HRM signal authenticity across multiple stages, comparing information from design and implementation phases. Second, voice in decision-making increases perceptions of respect and reduces concerns about exploitation, making signals more credible.

4.3 Technological Turbulence as Contingency

Sun et al. (2025) demonstrated that technological turbulence positively moderates the relationship between digitalization and HRM collaboration. Analyzing 202 subsidiaries across three waves, they found the interaction between business group digitalization and technological turbulence was significant in predicting HRM collaboration ($\beta = 0.153$, $p < 0.05$).

Simple slope tests revealed that at higher technological turbulence levels, the positive relationship between digitalization and subsidiary performance is stronger ($\beta = 0.365$, $p < 0.001$) versus weaker at lower turbulence ($\beta = 0.155$, $p < 0.05$). This suggests digitalization benefits are amplified in dynamic environments where rapid technological changes necessitate more frequent communication and knowledge sharing between parent companies and subsidiaries.

5. Parent-Subsidiary HRM Collaboration

Sun et al. (2025) examine HRM collaboration between parent companies and subsidiaries as a critical mechanism linking digitalization to organizational performance. Their study of 202 affiliated subsidiaries across three waves reveals that parent-subsidiary HRM collaboration mediates the relationship between business group digitalization and subsidiary performance.

Business group digitalization positively associates with parent-subsidiary HRM collaboration ($\beta = 0.397$, $p < 0.001$). Parent-subsidiary HRM collaboration positively associates with subsidiary performance ($\beta = 0.256$, $p < 0.001$). When both variables were entered, digitalization remained significant ($\beta = 0.275$, $p < 0.001$), indicating partial mediation.

This collaboration facilitates knowledge and resource transfer within business groups. HRM practices focusing on acquisition, development, and motivation of employees become sources of competitive advantage. Through experience sharing among managers and employees from different group companies, collaborative HR practices help mitigate skilled labor scarcity risks and facilitate strategic employee reallocation to high-potential subsidiaries. Parent-subsidiary HRM collaboration improves heterogeneous and intangible resources, enabling subsidiaries to develop competitive advantages and create synergistic value.

6. Ethical Considerations

Sun et al. (2025) emphasize responsible AI as critical for ethical business operations. Pavithra et al. (2025) identify key challenges in AI implementation for HRM.

a. **Algorithmic Bias:** AI-based recruitment, performance assessment, and workforce intelligence tools are often based on vast quantities of personal and behavioral data, leading to concerns regarding algorithm bias, accountability, and fairness. Biased training data can unwittingly support the status quo, making explainability and accountability essential features of digital HR applications.

b. **Transparency and Explainability:** The "black box" nature of some AI models conflicts with employees' rights to understand decisions affecting their careers. Organizations must ensure their AI tools are transparent and that decision-making processes can be explained to stakeholders.

c. **Data Privacy and Cybersecurity:** The growing use of cloud-based HR information systems and remote work services widens the scope of attack, making employee sensitive information vulnerable to breaches and cyber-attack. Implementation of secure authentication, encrypted data storage, and adherence to data protection laws is essential.

Addressing these challenges requires system-level governance frameworks prioritizing fairness, accountability, and transparency (Pavithra et al., 2025).

7. Discussion and Implications

7.1 Theoretical Contributions

This paper makes several theoretical contributions to the digital HRM literature.

First, it provides conceptual clarity by distinguishing e-HRM as operational digitization from d-HRM as strategic transformation. This differentiation, drawn from Barghini and Bonti (2024), resolves terminological confusion and establishes distinct theoretical domains for future research.

Second, it extends signaling theory by demonstrating HRM system strength as an independent signal mediating digital HRM effects. Zhou et al. (2026) provide empirical evidence that HRM system strength mediates the relationship between HRM digitalization and organizational outcomes, supporting the reconceptualization of HRM processes as meaningful organizational signals rather than mere implementation mechanisms.

Third, it applies the dynamic capabilities view to digital HRM contexts, revealing how organizations reconfigure resources through parent-subsidiary HRM collaboration to achieve performance gains (Sun et al., 2025).

Fourth, it identifies key boundary conditions shaping digital HRM effectiveness, including employee participation in goal setting (Zhou et al., 2026) and technological turbulence (Sun et al., 2025).

7.2 Practical Implications

The framework yields actionable insights for organizations pursuing digital HRM.

a. **Pursue system-level integration:** Organizations must invest not only in AI technologies but also in complementary digital platforms and strategic HRM practices that enable synergy. The Motivation–Trust–Vulnerability (MTV) conceptual model demonstrates that performance emerges from the interaction of AI, digital work platforms, and strategic HRM (Pavithra et al., 2025).

b. **Strengthen HRM system strength:** HR directors should design digital systems that enhance distinctiveness, consistency, and consensus in HRM signals. Professional e-HR systems that transfer HRM information, collect HR data, and enable interpersonal information exchange are essential (Zhou et al., 2026).

c. **Enable employee participation:** Organizations should actively invite employees to participate in decision-making processes, share decision-related information, and adopt their suggestions when setting work goals. This enhances signal credibility and amplifies digital HRM benefits (Zhou et al., 2026).

d. **Leverage technological turbulence:** Organizations operating in dynamic technology environments should adopt enhanced monitoring systems that can adapt to fast-changing circumstances, as digitalization benefits are amplified under conditions of high technological turbulence (Sun et al., 2025).

e. **Adopt responsible AI practices:** Organizations must implement governance frameworks ensuring algorithmic fairness, transparency, and data privacy. This includes developing explainable AI models, securing employee data, and adhering to ethical guidelines for AI deployment in HRM (Pavithra et al., 2025; Sun et al., 2025).

7.3 Future Research

Several avenues for future research emerge from this study.

a. **Empirical validation:** The proposed framework requires empirical testing through longitudinal designs and quantitative methods such as structural equation modeling or machine learning-based prediction models (Pavithra et al., 2025).

b. **Cross-cultural studies:** Comparative research across different national contexts would illuminate how cultural values moderate digital HRM effectiveness. The dynamic capabilities view emphasizes context-specific nature of organizational capabilities (Sun et al., 2025).

c. **Generative AI:** The emergence of generative AI technologies presents new opportunities and challenges for HRM that remain largely unexplored in existing literature.

d. **Digital HRM architectures:** Research on secure-by-design digital HR architectures that incorporate cybersecurity principles at the system level is needed to protect employee data and organizational assets (Pavithra et al., 2025).

8. Conclusion

Successful digital HRM requires system-level integration across technological, processual, and strategic dimensions. The proposed multilevel framework demonstrates that organizational performance emerges from the synergistic interaction between AI capabilities, digital work platforms, and strategic HRM practices. HRM system strength serves as a critical mediating mechanism translating digital investments into organizational outcomes, while employee participation in goal setting ensures signal credibility and amplifies digital HRM benefits. Technological turbulence amplifies digitalization benefits, making digital capabilities particularly valuable for organizations navigating rapid technological change. Responsible AI practices, including algorithmic fairness, transparency, and data privacy, are essential for sustainable digital HRM implementation. By integrating fragmented streams of research, this paper offers theoretical contributions to digital HRM scholarship and provides practical guidance for organizations navigating digital transformation.

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