

Mediating Role of ICT Adoption on the Relationship between E-HRM Practice and Organizational Agility in the Digital Age in State-owned higher institutions in Borno State: Conceptual Review

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Abstract

The digital age has ushered in profound changes in organizational dynamics, particularly in the fields of Human Resource Management (HRM) and organizational agility. As organizations strive to maintain competitiveness, the ability to adapt quickly to changes has become essential. This conceptual paper explores the mediating role of Information and Communication Technology (ICT) adoption on the relationship between Electronic Human Resource Management (E-HRM) practices and organizational agility. ICT is increasingly recognized as a crucial enabler, facilitating E-HRM functions such as e-recruitment, e-performance appraisal, and e-training, while simultaneously supporting organizational agility by enhancing communication, data-driven decision-making, and operational flexibility. Drawing from reviewed literature, the study reveals that ICT adoption enhances the effectiveness of E-HRM functions such as e-recruitment, e-training, and e-performance appraisal by improving communication, knowledge sharing and data-driven decision-making. Based on the literature reviewed, the paper recommends that organizations, particularly public higher institutions, prioritize ICT investment and digital skill development among HR professionals to strengthen HRM's strategic role in fostering agility. The study concludes that ICT serves as a vital enabler that bridges E-HRM practices and organizational agility, offering both theoretical and practical implications for achieving sustainable performance in the digital era.

Keywords: E-HRM, ICT Adoption, Organisational Agility

1. Introduction

The Digital Age has transformed how organisations operate, pushing organisations to rethink traditional business models and adopt more agile frameworks (Tallon et al., 2019). Rapid technological advancements and the widespread adoption of digital tools have accelerated changes, forcing organisations to adapt quickly to remain competitive. Agility, therefore, has become a critical organizational capability, allowing organisations to respond dynamically to shifts in technological innovations, and competitive pressures. Unlike static organisational models, where processes and structures remain relatively fixed, agile organisations prioritize flexibility, adaptability, and continuous improvement. This shift has driven organisations to move beyond simply optimizing existing processes; they must now develop the ability to pivot and transform based on emerging trends and disruptions (Nematollahi et al., 2024). As organisations become more agile, they invest in fostering a culture of innovation and resilience, encouraging employees to embrace change and develop new skills. These capabilities, facilitated by digital tools and adaptive HRM practices, position organisations to thrive in an environment that demands constant evolution and responsiveness.

Electronic Human Resource Management (E-HRM) practice plays a central role in developing an agile workforce by emphasizing critical areas like e-recruitment, e-performance appraisal, and e-training, all of which streamline HR processes, empower employees, and contribute to building a responsive, agile workforce capable of adapting to evolving organizational needs (Yu & Jinjun, 2020). Through targeted HRM practices, organisations can foster a flexible and resilient workforce by ensuring employees are equipped with the latest skills, adaptability, and the ability to engage in innovative problem-solving (Heffernan et al., 2022). E-HRM initiatives focus on aligning employee development with organizational goals, enabling the workforce to remain competitive and responsive. Talent management programs ensure that the right individuals are in the right roles, while continuous learning opportunities support ongoing skill enhancement. Additionally, HRM's commitment to fostering a culture of adaptability helps build a mindset that is essential for navigating unexpected challenges and seizing emerging opportunities (Khuzaini et al., 2024).

Moreover, the integration of Information and Communication Technology (ICT) within E-HRM functions amplifies this capacity for agility by providing digital tools that streamline and optimize E-HR processes (Boudlaie et al., 2021). ICT facilitates seamless communication channels and collaboration tools, which enable

rapid information sharing and coordination across teams, thereby supporting more agile decision-making processes (Bondarouk & Brewster, 2016). Furthermore, data analytics capabilities offered by ICT allow E-HRM to gain insights into workforce performance, skills gaps, and productivity trends, enabling more informed and proactive management of employee development, hence it modernize traditional HR processes, making them more scalable and responsive.

However, in this Digital Age, the adoption of Information and Communication Technology (ICT) has expanded dramatically, transforming operations across all sector, including the education. State-owned higher institutions in Borno State face unique challenges in building agile and responsive organizational structures due to limited resources and a traditionally static approach to Human Resource Management (HRM). These institutions are increasingly pressured to adapt to changing educational demands, rapidly advancing technologies, and the need for more effective administrative practices. However, the slow adaptation of ICT within E-HRM functions has impeded these institutions' ability to enhance their organizational agility, thereby affecting their responsiveness to both internal and external changes.

Studies have examine the relationship between E-HRM practices and organizational agility in the Digital Age, highlighting a significant and positive relationship between these variables. For instance, Nematollahi et al. (2024); Khammadee (2023); Asfahani (2021), Saha et al. (2019), Alamro et al. (2019), and Bushey (2019). In addition, Information and Communication Technology (ICT) has shown potential in further strengthening HRM's contribution to organizational agility. Research by Gadzali et al. (2023), Almasradi et al. (2022), and Waheed et al. (2020) indicates that ICT tools, when integrated into E-HRM processes, can enhance E-HRM practice by improving its process, and facilitating digital transformation. These studies propose that ICT serves as a critical enabler, allowing organizations to deploy E-HRM practices more effectively to foster an agile workforce and adapt to the fast-paced demands of the Digital Age.

1.1 Objectives

1. To examine the relationship between Electronic Human Resource Management (E-HRM) practices and organizational agility in the Digital Age within state-owned higher institutions in Borno State
2. To assess the relationship between E-HRM practices and ICT adoption within state-owned higher institutions in Borno State

3. To determine the relationship between ICT adoption and organizational agility in the digital age within state-owned higher institutions in Borno State
4. To evaluate the mediating role of ICT in the relationship between HRM practices and organizational agility

2. Literature Review

2.1 Organisational Agility

Organisational agility can be defined as the adaptive framework that integrates flexibility, speed, and responsiveness into the core operational processes of an organization, it involves the ability to quickly adjust to shifts in customer demands, technological advancements, and competitive pressures, making it essential for organizations operating in fast-paced environments (Akkaya & Mert, 2022). Akkaya and Mert, (2022) describe organizational agility as an adaptive approach that integrates flexibility, speed, and responsiveness into the core operational processes of an organization. Agility involves the ability to quickly adjust to shifts in customer demands, technological advancements, and competitive pressures, making it essential for organizations operating in fast-paced environments (Akkaya & Mert, 2022).

Khammadee (2023) Conceptualize organizational agility as a culture that prioritizes innovation, continuous learning, and proactive change management. It goes beyond structural adjustments to include a mindset that encourages experimentation and the development of new capabilities, positioning organizations to adapt more effectively to evolving industry trends. Organizational agility also involves continuous improvement and learning. These organizations promote a culture in which a mistake is treated as a learning opportunity rather than a failure. Regular retrospectives and feedback from customers allow for continuous improvement of processes and products. In this way, agile organizations strive to continually increase their effectiveness and competitiveness (O'Reilly and Tushman, 2013).

2.2 Electronic Human Resource Management (EHRM)

EHRM can be conceptually defined as the application of digital technologies to streamline, automate, and enhance HR processes, including recruitment, performance management, training, and employee engagement. E-HRM enables organizations to optimize HR operations by shifting routine and strategic HR

functions to online platforms, allowing for greater efficiency, accessibility, and data-driven decision-making (Nematollahi et al., 2023). E-HRM not only improves the effectiveness of HR practices but also aligns HR functions more closely with organizational goals, facilitating a more agile and responsive approach to managing human capital in the digital age (Strohmeier, 2007). By leveraging digital tools, E-HRM fosters enhanced communication, transparency, and accessibility for both HR professionals and employees, ultimately contributing to a more flexible and adaptive organizational environment.

2.3 E-Recruitment

E-recruitment refers to the process of leveraging online platforms, such as job portals, company websites, and social media, to attract and hire candidates. This approach streamlines traditional hiring methods by broadening the reach to a larger audience, enabling organizations to efficiently source and engage with qualified talent in a timely manner (Poisat & Mey, 2017). In addition, it involves the use of digital tools and online systems to facilitate various stages of the hiring process, including job posting, applicant screening, and candidate selection. By automating these tasks, e-recruitment improves the speed and effectiveness of recruitment efforts, allowing HR departments to manage large applicant pools more effectively and identify the best-fit candidates for organizational needs (Almasradi et al., 2024).

2.4 E-Training

E-training involves using digital tools and platforms to deliver training programs, enabling employees to learn new skills and improve competencies through online resources. This method supports flexibility, allowing learners to access training materials at any time, which enhances engagement and retention (Noe et al., 2021). E-training is the implementation of web-based training modules tailored to meet the specific learning needs of employees, offering scalable and personalized content. This approach reduces the cost and logistical challenges of traditional training while ensuring consistent skill development across the workforce (Stone et al., 2020).

2.5 E-Performance Appraisal

E-performance appraisal involves the use of online systems to assess and monitor employee performance, enabling continuous feedback through digital platforms.

This method improves efficiency, reduces paperwork, and allows for real-time performance tracking and data-driven insights that help managers make informed decisions (Dessler, 2020). In addition, E-performance appraisal refers to the application of technology to manage and evaluate employee performance through web-based tools, enabling streamlined and transparent evaluations. By automating appraisals, organizations can provide timely feedback, foster employee development, and align performance with organizational goals more effectively (Aguinis, 2019).

2.6 Information Communication Technology (ICT)

Information and Communication Technology (ICT) is defined as a set of tools and resources that facilitate the creation, storage, processing, and transmission of information. This encompasses a range of digital devices, networks, and systems that enable efficient communication and data handling across multiple platforms (O'Brien & Marakas, 2021). ICT is viewed as a fundamental enabler of digital transformation, integrating advanced digital tools and platforms that reshape traditional business processes and foster innovation. It empowers organizations to streamline operations, improve decision-making, and enhance customer engagement by leveraging data-driven insights and digital connectivity (Kwasek et al., 2024). Furthermore, ICT can be defined as an interconnected system that facilitates knowledge sharing, collaboration, and communication across organizational boundaries. It includes both hardware and software components, such as intranets, video conferencing tools, and digital document-sharing platforms, which promote a collaborative work environment (Nath & Agrawal, 2020).

2.7 ICT Adoption as Mediator

In the Digital Age, Information and Communication Technology (ICT) has transformed organizational operations, especially by enhancing the effectiveness of Human Resource Management (HRM) in fostering organizational agility (Alrawashdeh et al., 2021). ICT enables HRM to drive agility through digital tools that streamline operations, facilitate rapid information flow, and promote adaptability. This digital integration allows HRM practices to be more responsive to organizational needs, ultimately supporting a more agile organizational structure (Kwasek et al., 2024). ICT's role as a mediator is critical, as it not only enhances communication and coordination across various HR functions but also provides

insights through data-driven analysis, helping organizations align their human resources with strategic agility goals.

Furthermore, ICT's mediating effect becomes particularly evident in HRM's ability to handle complex and dynamic workforce demands. ICT-driven HR systems support talent management by facilitating real-time updates on employee skills, performance metrics, and developmental needs, enabling quick adjustments to workforce allocation based on strategic priorities (Gadzali et al., 2023). These systems allow organizations to implement targeted training and development programs that enhance workforce agility, equipping employees with relevant skills to adapt to technological changes and evolving job roles, by integrating ICT into HRM, organizations ensure that agility is not only a strategic goal but a practical, achievable outcome supported by real-time employee data and analytics (Boudlaie et al., 2022).

Moreover, ICT plays a vital role in strengthening HRM's contribution to organizational agility by improving communication channels and collaborative platforms. Digital communication tools, such as instant messaging, video conferencing, and project management software, bridge geographical and departmental divides, fostering an environment of collaboration and rapid information exchange. This technological connectivity enhances HRM's capacity to promote agility by enabling swift decision-making, adaptive problem-solving, and seamless cross-functional teamwork (Almasradi et al., 2022). In an agile organization, the speed and accuracy of information flow are critical, and ICT facilitates this by providing platforms that keep employees aligned with organizational objectives and responsive to external changes.

In addition to operational efficiencies, ICT as a mediator also supports HRM in building a culture of continuous learning and innovation, both of which are essential to organizational agility. Digital learning platforms and knowledge management systems make skill development more accessible and tailored to individual needs, fostering an agile mindset throughout the workforce. Employees can access training and resources on-demand, promoting a culture of ongoing learning that prepares the organization to adapt to emerging industry trends (Nematollahi et al., 2024). By mediating the relationship between HRM and organizational agility, ICT enables HRM practices to contribute more effectively to organizational goals, ensuring that agility is embedded within the culture, operations, and strategic framework of the organization.

2.8 Theoretical Framework

2.8.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Venkatesh, Morris, Davis, and Davis in 2003. The UTAUT model synthesizes key constructs from eight existing models of technology acceptance to explain user intentions and behaviors concerning new technology. The core constructs of UTAUT include Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions each affecting an individual's acceptance and usage of technology within an organizational context. UTAUT is widely applied in studies examining technology adoption due to its comprehensive approach and predictive power for user behavior (Theres et al., 2023).

In exploring the mediating role of ICT in the relationship between EHRM practices and organizational agility in the digital age, the UTAUT model provides a useful framework to understand the factors influencing ICT adoption within HRM departments. In the context of EHRM, performance expectancy reflects the belief that ICT will enhance EHRM practices, thus contributing to organizational agility. HR professionals may adopt ICT tools, expecting that these tools will improve operational efficiency, streamline processes, and foster a more responsive to organizational needs (Venkatesh et al., 2003) By applying UTAUT , this study can investigate how each of these factors contributes to effective ICT adoption within EHRM, thereby enhancing HRM's role in achieving organizational agility. UTAUT helps illustrate why EHR staff adopt ICT, which in turn, enables the flexibility, responsiveness, and adaptability needed for agility in the fast-changing digital environment (Ruel & Bondarouk, 2014).

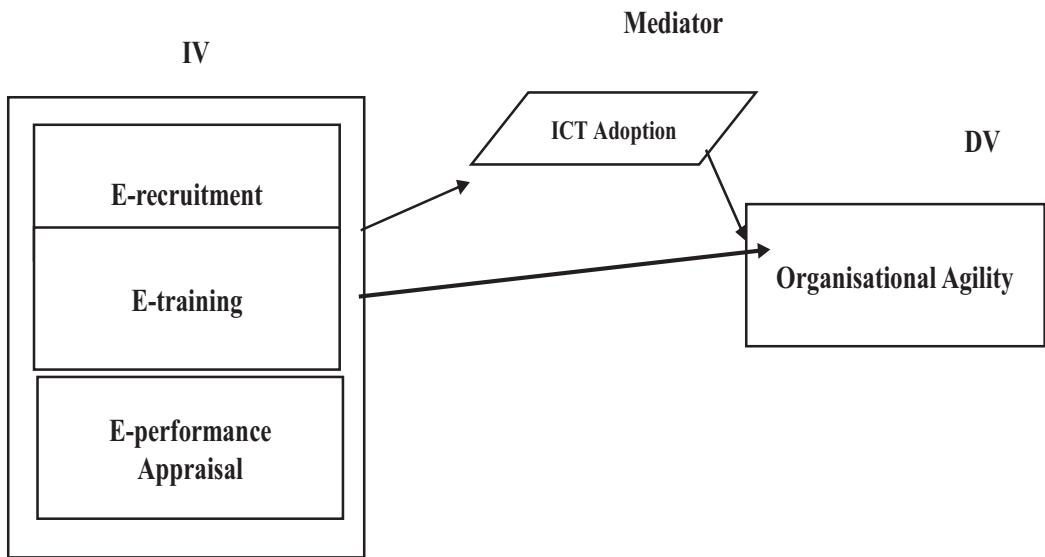


Fig. 1 Proposed Framework

3. Methodology

This study adopts a conceptual research design, focusing on an in-depth review and synthesis of existing literature related to Electronic Human Resource Management (E-HRM), Information and Communication Technology (ICT) adoption and organizational agility. The research relies on secondary sources, including peer-reviewed journal articles, books, and credible online databases. The literature was systematically reviewed to identify theoretical perspectives, empirical findings, and conceptual gaps relevant to the study variables. A systematic literature review approach was employed to critically analyze and synthesize key studies published between 2018 and 2025. The selected studies were evaluated based on their relevance, methodological rigor, and contribution to understanding the nexus between HR digitalization and organizational agility. Through thematic analysis, relationships among constructs were examined to develop a conceptual framework illustrating the mediating role of ICT adoption.

4. Findings and Results Based on the Reviewed Literature

The reviewed literature demonstrates that Electronic Human Resource Management (E-HRM) practices play a significant role in enhancing organizational agility by streamlining HR processes, improving efficiency, and fostering

adaptability within the workforce. Studies such as those by Nematollahi et al. (2024), Khammadee (2023), and Asfahani (2021) reveal that digital HR practices particularly e-recruitment, e-training, and e-performance appraisal contribute to faster decision-making, and alignment of human capital strategies with dynamic business needs. These studies collectively suggest that E-HRM enables organizations to respond promptly to environmental and technological changes, thereby fostering agility. However, the effectiveness of E-HRM in driving agility is highly dependent on the extent of Information and Communication Technology (ICT) adoption, which acts as a bridge between HR digitalization and organizational responsiveness.

Furthermore, findings from the literature indicate that ICT adoption mediates the relationship between E-HRM practices and organizational agility by enhancing data accessibility, knowledge sharing, and communication across organizational units (Gadzali et al., 2023; Almasradi et al., 2022; Waheed et al., 2020). ICT integration enables HR functions to become more proactive, facilitating continuous learning, innovation, and flexibility which are key attributes of an agile organization. The literature also emphasizes that institutions, particularly in the public sector, lag in ICT adoption due to infrastructural and resource limitations, which hinder the realization of HR-driven agility. Consequently, it is evident from the reviewed studies that organizations with strong ICT infrastructures and a culture that supports digital transformation are more capable of leveraging E-HRM practices to enhance organizational agility. Thus, ICT serves as a vital enabler, strengthening HRM's strategic role in achieving adaptability, resilience, and competitive advantage in the digital age.

5. Conclusion

In conclusion, this conceptual study highlights the important role of ICT adoption as a mediator in enhancing the effectiveness of E-HRM practices specifically, e-recruitment, e-training, and e-performance appraisal on organizational agility within the digital age. As organizations face rapid technological advancements ICT adoption enables E-HRM practices to be more responsive and efficient thereby fostering a workforce capable of adapting to dynamic changes. The integration of ICT in EHRM functions not only supports more agile operations but also promotes continuous learning, efficient recruitment, and performance management, aligning employees with organizational goals and agility.

Therefore, the proposed framework emphasizes that while E-HRM practices individually contribute to organizational agility, their impact is significantly enhanced through ICT adoption, which bridges gaps between traditional HRM processes and the need for real-time adaptability. By effectively implementing ICT solutions, organizations can better leverage E-HRM practices to foster agility, leading to a competitive advantage in today's fast-paced environment. Future empirical research could further validate this framework, providing deeper insights into how ICT adoption strengthens the connection between E-HRM practices and organizational agility across various industries and sectors. This study, therefore, sets a foundation for understanding how ICT adoption in HRM can serve as a facilitator for organizational agility in the digital age.

6. Recommendations

Based on the reviewed literature, this study made the following recommendations:

1. Organizations should strategically integrate ICT into all facets of Electronic Human Resource Management (E-HRM) to strengthen organizational agility in the digital age.
2. Management should prioritize investments in digital infrastructure and provide continuous training to HR professionals to enhance their technological competencies. This will ensure that ICT tools are effectively utilized to support e-recruitment, e-training, and e-performance appraisal processes, thereby improving operational efficiency, responsiveness, and workforce adaptability.
3. Furthermore, organizations particularly public higher institutions should adopt policies that foster a culture of innovation, digital learning, and collaboration. Establishing frameworks that encourage employee participation in ICT-driven HR initiatives can improve engagement and performance while supporting organizational transformation.
4. Finally, future empirical research should examine the proposed framework using quantitative or mixed methods to validate the mediating role of ICT adoption and to provide deeper insights into how digital HR practices can sustainably enhance agility and competitiveness across different sectors.

References

Aguinis, H. (2019). *Performance management* (4th ed.). Chicago Business Press.

Akkaya, B., & Mert, G. (2022). Organizational agility, competitive capabilities, and the performance of healthcare organizations during the COVID-19 pandemic. *Central European Management Journal*, 30(1), 2–25.

Alamro, M. Q., Hosseini, S. B., & Farooq, A. (2019). Organizational agility and HRM practices: Theoretical framework and perspective. *Restaurant Business*, 118(12), 177.

Almasradi, A., Alzahrani, S., & Alghamdi, M. (2022). The role of ICT in enhancing organizational agility and digital transformation. *Journal of Digital Innovation*, 15(3), 245–263. <https://doi.org/10.1016/j.jdi.2022.08.009>

Alrawashdeh, N., Zaki, N., Yusof, J., & Mat, N. (2021). Electronic human resource management practices, information technology capability, and organizational performance: A review paper toward conceptual framework. *Turkish Journal of Computer and Mathematics Education*, 12(13), 874–884.

Asfahani, A. (2021). The impact of modern strategic human resources management models on promoting organizational agility. *Academy of Strategic Management Journal*, 20(2), Article 722.

Bondarouk, T., & Brewster, C. (2016). Conceptualising the future of HRM and technology research. *The International Journal of Human Resource Management*, 27(21), 2652–2671.

Boudlaie, H., Kenarroodi, M., Ebadi, H., & Bahmani, A. (2021). Digital human resource management: An approach to creating organizational agility in the public sector in the digital economy era (A study on the public sector banking network in Iran). *Journal of Public Administration*, 13(4), 766–785.

Bushey, N. (2019). *Enhancing organizational agility within the human resources function* (Doctoral dissertation, Pepperdine University). <https://digitalcommons.pepperdine.edu/etd/1093>

Dessler, G. (2020). *Human resource management* (16th ed.). Pearson.

Gadzali, R., Fakhri, A., & Tan, K. (2023). Knowledge sharing and collaboration: The role of ICT in building agile organizations. *International Journal of Knowledge Management*, 12(4), 450–467. <https://doi.org/10.4018/ijkm.2023.12.4.450>

Heffernan, M., Cafferkey, K., Harney, B., Townsend, K., & Dundon, T. (2022). HRM system strength and employee well-being: The role of internal process and open systems. *Asia Pacific Journal of Human Resources*, 60(1), 171–193.

Khammadee, P. (2023). The relationship between E-HRM practices and organizational performance: The mediating role of organizational agility and sustainable competitive advantage. *Asian Administration and Management Review*, 6(1), 82–94. <https://doi.org/10.14456/aamr.2023.8>

Khuzaini, I., Muttaqin, I., Setiadi, B., Irpan, M., & Shaddiq, S. (2024). Human resource management in the transformative digital era. *International Journal of Religion*, 5(11), 4006–4021. <https://doi.org/10.61707/h58ygw76>

Kwasek, A., Kocot, M., Gąsiński, H., & Nowakowski, K. (2024). The role and use of ICT in agile organizations. *European Research Studies Journal*, 27(3), 568–582.

Nath, V., & Agrawal, R. (2020). Agility and lean practices as antecedents of supply chain social sustainability. *International Journal of Operations and Production Management*. <https://doi.org/10.1108/IJOPM-08-2019-0561>

Nematollahi, H., Mohammadi, H., Gholipour, A., & Mohammad Esmaeili, N. (2024). Impact of digital human resource management practices and digital transformation on human resource management system strength: Evidence from insurance industry. *Interdisciplinary Journal of Management Studies*, 17(4), 1077–1096. <https://doi.org/10.22059/ijms.2024.369569.676449>

Noe, R. A., Hollenbeck, J. R., Gerhart, B., & Wright, P. M. (2021). *Human resource management: Gaining a competitive advantage* (11th ed.). McGraw Hill.

O'Brien, J. A., & Marakas, G. M. (2021). *Management information systems* (12th ed.). McGraw-Hill.

O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *The Academy of Management Perspectives*, 27(4), 324–338.

Ruel, H, Bondarouk T. (2014) *E-HRM research and practice*: facing the challenges ahead. In: *Handbook of strategic e-business management*. Springer, 633–653

Saha, P., Choudhury, R., & Gupta, S. (2019). HRM practices and their role in enhancing organizational agility: A cross -industry analysis. *International*

Journal of HRM and Organizational Development, 5(1), 47–62.
<https://doi.org/10.1080/ijhrmod.2019.5.1.47>

Stone, D. L., Deadrick, D. L., Lukaszewski, K. M., & Johnson, K. R. (2020). The influence of technology on the future of human resource management. *Human Resource Management Review*, 30(1), 1-14.

Tallon, P. P., Queiroz, M., Coltman, T., & Sharma, R. (2019). Information technology and the search for organizational agility: A systematic review with future research possibilities. *The Journal of Strategic Information Systems*, 28(2), 218–237.

Theres, C., & Strohmeier, S. (2023). Consolidating the theoretical foundations of digital human resource management acceptance and use research: A meta-analytic validation of UTAUT. *Management Review Quarterly*, 1-33.

Venkatesh V, Morris MG, Davis GB, Davis FD (2003) *User acceptance of information technology: toward a unified view*. MIS Q 27(3):425–478.
<https://doi.org/10.2307/30036540>

Waheed, A., Xiaoming, M., Waheed, S., Ahmad, N., & Tian -tian, S. (2020). E-HRM implementation, adoption and its predictors: A case of small and medium enterprises of Pakistan. *International Journal of Information Technology and Management*, 19(2–3), 162–180.

Yu, Z., & Jinajun, N. (2020). How to achieve HRM digital transformation. *Sohu*.
https://www.sohu.com/a/400600846_343325