



Human resource development and training in the digital transformation era

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ABSTRACT

Digital transformation has significantly reshaped the paradigm of Human Resource Management (HRM), compelling organizations to adapt their training methods, work structures, and managerial strategies to remain competitive in the technological era. This study aims to analyze the dynamics of digitalization in HRM, focusing on four main aspects: the impact on training and education, challenges faced, emerging opportunities, and strategic responses that HRM can adopt. The research employs a Systematic Literature Review (SLR) method, involving the stages of identification, screening, eligibility assessment, and study inclusion. Data were collected from academic databases, Watase UAKE, and Scite, using keywords relevant to HRM in the digital era. After applying inclusion and exclusion criteria, ten relevant articles were selected for in-depth analysis. The synthesis process was conducted through a full-text reading and thematic coding approach. The findings reveal that digitalization has a positive impact, increasing work efficiency, enabling data-driven decision-making, and expanding flexibility in work systems and training methods. In conclusion, digitalization in HRM brings significant changes to training practices, organizational structures, and strategic planning by promoting the adoption of technology that fosters both efficiency and innovation.

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ABSTRAK

Transformasi digital telah mengubah paradigma pengelolaan sumber daya manusia (SDM), menuntut organisasi untuk menyesuaikan metode pelatihan, struktur kerja, dan strategi manajerial agar tetap kompetitif di era teknologi. Penelitian ini bertujuan untuk menganalisis dinamika digitalisasi dalam pengelolaan SDM, dengan fokus pada empat aspek utama: dampak terhadap pelatihan dan pendidikan, tantangan yang dihadapi, peluang yang tersedia, serta strategi yang dapat diterapkan oleh MSDM. Penelitian ini menggunakan metode Systematic Literature Review (SLR) dengan tahapan identifikasi, skrining, evaluasi kelayakan, dan inklusi studi. Data dikumpulkan dari basis data Watase UAKE dan Scite, dengan kata kunci yang relevan terhadap pengelolaan SDM di era digital. Setelah melalui proses seleksi berbasis kriteria inklusi dan eksklusi, diperoleh 10 artikel yang dianalisis secara mendalam. Proses sintesis dilakukan melalui pembacaan penuh dan pengkodean tematik. Hasil penelitian menunjukkan bahwa digitalisasi membawa dampak positif dalam bentuk peningkatan efisiensi proses kerja, pengambilan keputusan berbasis data, serta perluasan fleksibilitas dalam sistem kerja dan pelatihan. Kesimpulannya, digitalisasi dalam pengelolaan SDM membawa dampak signifikan terhadap transformasi pelatihan, struktur kerja, serta strategi organisasi melalui adopsi teknologi yang mendorong efisiensi dan inovasi.

Kata Kunci: industri 4.0; pelatihan; pengelolaan SDM; pendidikan; transformasi digital

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INTRODUCTION

Digitalization has had a significant impact on Human Resource Management (HRM), highlighting the need for continuous innovation to ensure organizational competitiveness and to explore the effects of digital transformation on various HR components, including talent acquisition, performance management, employee training and development, and compensation management (Sangapan *et al.*, 2025). The digital era has fundamentally reshaped the landscape of human resource development. Rapid technological advancements demand that employees continuously learn and acquire new skills through reskilling and upskilling to remain relevant in the workforce (Nufuz *et al.*, 2025).

As digitalization becomes increasingly widespread, research on human resource management and training in this era has grown rapidly. Numerous studies have emphasized that conventional approaches to Human Resource Development (HRD) are becoming inadequate, especially as organizations are required to swiftly adapt to emerging technologies (Wahyudi *et al.*, 2023). For instance, training methods that were previously conducted face-to-face have shifted toward digital approaches such as e-learning, blended learning, virtual classrooms, and online platforms that offer greater flexibility and accessibility (Iswandi & Kuswinarno, 2025). Moreover, HRM functions such as recruitment and performance evaluation have begun to adopt data-driven and AI-based technologies to enhance decision-making efficiency and accuracy (Prabowo *et al.*, 2024).

Over the past five to ten years, research developments in HRM digitalization have reflected not only technological advancements but also a shift in scholarly focus. In its early stages, studies primarily addressed process efficiency through digitalization and the impact of technology on organizational productivity, such as the use of Human Resources Information Systems (HRIS) and administrative automation. However, current research trends and methodologies have begun to move toward more complex directions, encompassing mixed-method studies, big data analysis, and in-depth qualitative explorations to better understand the human-technology relationship within the workplace context.

This shift in orientation indicates that the focus of research is no longer solely on efficiency, but has expanded to strategic aspects such as digital leadership development, digital literacy, employee experience, and the phenomenon of technostress. Recent studies have even emphasized the importance of cultivating an adaptive and sustainable organizational culture that places humans at the center of digital transformation. Accordingly, the scientific novelty of this research lies in its approach, which positions HRM digitalization not merely as a technological shift, but as a comprehensive transformation encompassing strategic, cultural, and humanistic dimensions in human resource development amid the digital disruption era.

Based on the above discussion, several key issues emerge that warrant deeper investigation. First, what are the actual implications of HRM digitalization for human resource training and education? Second, what challenges are encountered in managing human resources amid digital transformation? Third, what strategic opportunities can organizations leverage in navigating this era? And fourth, what HRM strategies should be implemented to effectively respond to these challenges?

Based on these considerations, this study aims to analyze the dynamics of digitalization in human resource management, focusing on four key aspects: its impact on training and education, the challenges faced, the available opportunities, and the strategies that HRM can implement. Through this approach, the study is expected to provide both scientific and practical contributions toward strengthening human resource capacity in the continuously evolving era of digital transformation.

LITERATURE REVIEW

The adoption of new technologies and the digitalization of organizational processes have driven a rapid evolution in Human Resource Management (HRM) practices, necessitating the development and implementation of new HR competencies, emerging job forms, and agile HR processes (Sani *et al.*, 2024). Most current HR practices were originally designed to support stable, long-term employment structures, which poses challenges for organizations attempting to apply these practices to new job formats—such as permanent contracts based on project-based principles (Cichosz *et al.*, 2020; Grech, 2019). Consequently, as technological change accelerates, the rise of increasingly flexible job arrangements also impacts competency development and career planning practices, reflecting a dynamic and shifting work environment (Rachinger *et al.*, 2019).

To understand the technological transformation and its impact on organizational functions, it is essential to distinguish between the concepts of digitalization and digital transformation (Parviainen *et al.*, 2017; Wulandari *et al.*, 2023). *Digitalization* refers to the act or process of converting analog data into digital formats (Prasetyo, 2019). Meanwhile, the term *digital transformation* encompasses the reconfiguration of business functions and models into digital forms (Legner *et al.*, 2017; Rachinger *et al.*, 2019; Trzaska *et al.*, 2021). Digitalization is also used to describe the integration of digital technologies across various domains within a business (Harto *et al.*, 2023).

Considering the impact of digital transformation on organizational processes, the ability of organizations to adopt more flexible work patterns in order to renew and develop their organizational culture will become a top priority in human resource management (Taufik *et al.*, 2023). Cultural transformation, as a consequence of digital transformation, presents an unusual challenge for modern human resource management practices. It requires the integration of HR strategies with organizational strategies and goals, as well as the development of procedures and standards that support employees in adapting to changing work conditions and evolving customer demands (Branca *et al.*, 2020; Marler *et al.*, 2016).

METHODS

The research method employed in this study is the Systematic Literature Review (SLR). The research process consists of several key stages: identification, screening, eligibility, and inclusion of studies. In the first stage, the researchers conducted an initial identification using academic databases, namely Watase UAKE and Scite, by setting specific search parameters. Watase UAKE is an application designed to assist researchers in planning and conducting research systematically. It offers collaborative features, facilitates the systematic literature review process, and supports research analysis through various tools such as article search,

reference management, and data visualization. Scite is an application that helps researchers understand the context and quality of scientific citations, enabling them to assess not only the number of citations but also their meaning and relevance within the academic landscape.

In the initial stage, the researchers defined the search boundaries, limiting the scope to articles related specifically to human resource management. The initial search through academic databases yielded a total of 90 articles. The second step involved screening, in which articles were filtered based on their titles, abstracts, and keywords. The keywords used included "Industry 4.0," "Education and Training," "Human Resource Management," "Human Resources," and "Digital Transformation." Based on these keywords, 3 articles were excluded due to limited access, 62 articles were deemed irrelevant, and 25 articles were selected for further processing. The articles that passed the screening stage proceeded to the eligibility phase, which involved a more in-depth analysis of the full text, including the title, abstract, and article summary. This step aimed to determine whether each article was truly relevant to the research topic and to identify which articles met the inclusion criteria and which did not. The inclusion criteria were: studies discussing HR training in the digital era, articles published within the last five years, and those employing qualitative methods. The exclusion criteria were: studies not available in full-text and articles categorized as reviews, editorials, or opinion pieces (i.e., not original research).

A total of 19 articles were deemed relevant and eligible for inclusion in the review. After the final filtering process, 10 articles remained that were closely aligned with the research topic. The researchers then conducted an in-depth reading of the selected articles for further evaluation. Relevant information from each article was systematically compiled and synthesized to develop a comprehensive understanding of the research topic. By employing this systematic literature evaluation method, the study aims to generate deeper and more holistic insights into various modern human resource management techniques within the context of digital transformation, while also providing a solid foundation for future research or the development of effective practices in the field. Additionally, the researchers applied coding techniques to previous studies to facilitate the classification of articles.

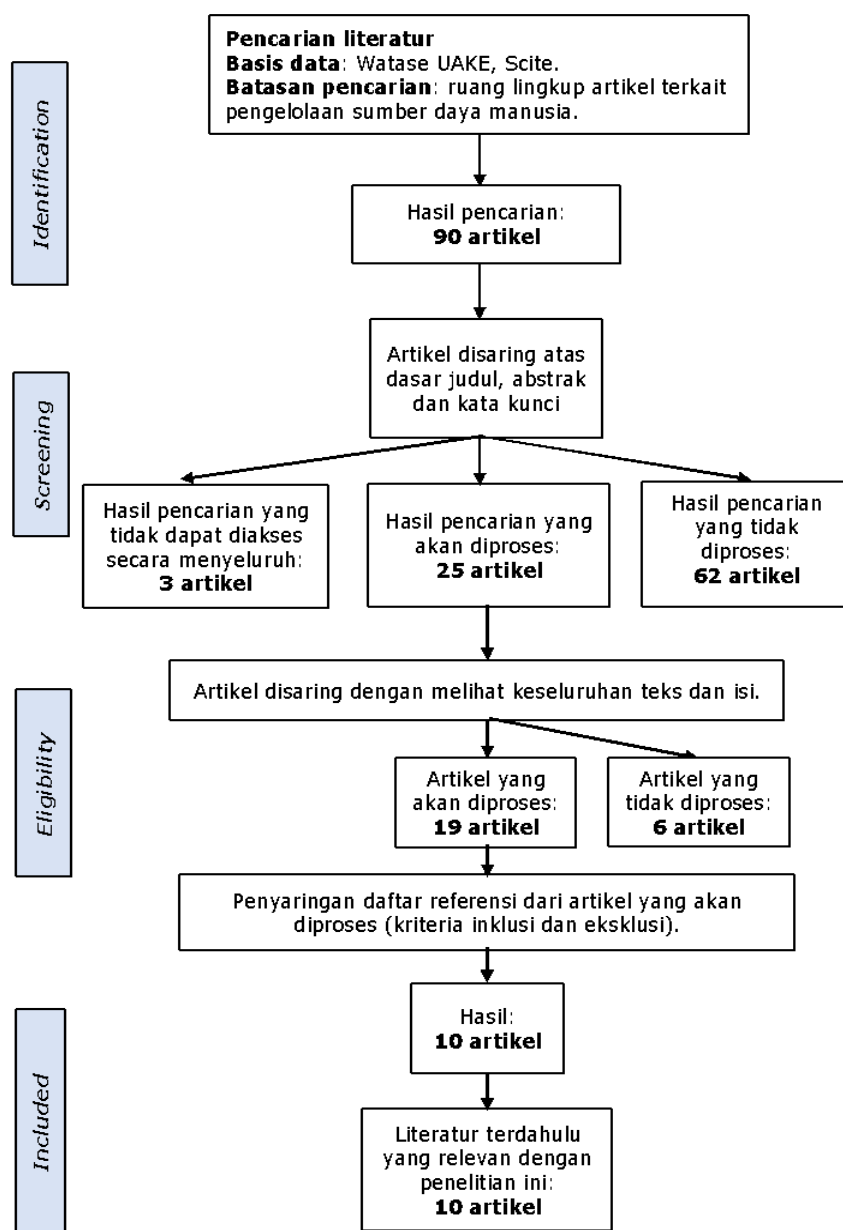


Figure 1. PRISMA Flow Diagram
 Source: 2025 Research Study

The following figure illustrates the flowchart of the literature review process and the data analysis techniques.

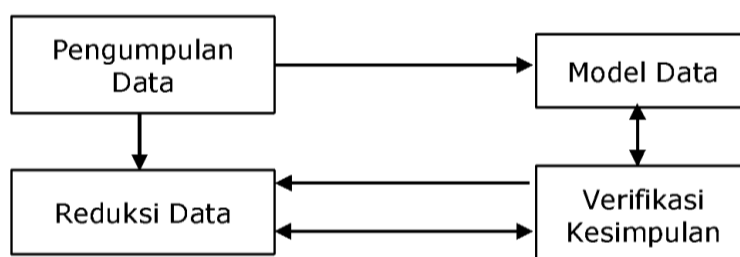


Figure 2. Data Analysis Techniques
 Source: Miles and Huberman in (Diyati and Muhyadi, 2019).

RESULTS

Literature Review Findings

Presented below is a detailed overview of the literature review derived from the analysis of 10 articles.

Table 1. Summary of Analytical Findings

No	Researcher	Objective	Analytical Findings
1	(Barišić <i>et al.</i> , 2021).	Discusses various domains of Human Resource Management (HRM) such as HR planning, reward management, performance, engagement, training and development, health and safety, and employee relations, along with their changes due to digital transformation.	Digital transformation has reshaped organizations and the way employees work, including the role of HRM in performance measurement, which now focuses more on outcomes than working hours. The use of technologies such as big data and Artificial Intelligence (AI) drives digitalization, changes in organizational structure, work environments, and modern working methods. This transformation also significantly impacts business performance. However, not all organizations are ready to adopt digital technologies due to cultural factors and resistance to change. Forced transformation without critical consideration may lead to negative consequences. Therefore, it is essential to identify data security risks and develop protection strategies through improved infrastructure and security processes.
2	(Bahiroh & Imron, 2024).	Explains how Human Resource Management (HRM) can adapt, innovate, and contribute strategically in response to business changes driven by digital technology.	Digital transformation requires HRM not only to automate processes but also to innovate and act as a strategic change agent. HRM must develop new capabilities, leverage technology for functions such as recruitment, training, and performance management, and foster an adaptive culture and continuous learning to effectively meet the challenges of the digital era.

No	Researcher	Objective	Analytical Findings
3	(Triyatun, 2024).	Analyzes Human Resource Management (HRM) in general and the challenges it faces, based on an analysis of several relevant sources up to the year 2023.	Human Resource Management (HRM) is a critical process in workforce planning that significantly influences organizational success, especially in the era of digital revolution. HRM involves controlling, executing, and organizing human resources to achieve organizational goals efficiently. HRM challenges stem from external factors (technology, demographics, socio-cultural shifts, economy, law, politics, including the Fourth Industrial Revolution) and internal factors (information systems, budgeting, strategic planning). The effectiveness of HRM functions in addressing these challenges depends heavily on managerial competence and employee adaptability. Core pillars of HRM include job analysis, planning, recruitment, selection, training, performance appraisal, motivation, promotion, and various welfare programs. Continuous employee development through training aligned with current demands is essential. However, many HR managers still lack understanding of digitalization, despite its growing importance. Digitalization presents new opportunities for competent professionals, and technologies such as digital marketing can be leveraged. The article also discusses managerial functions (planning, organizing, directing, controlling) and operational HRM functions (procurement, development, compensation, integration, maintenance, discipline, and termination).
4	(Iswandi & Kuswinarno, 2025).	This article examines the transformation of Human Resource Development (HRD) in response to the digital era, analyzing the impact of technological advancements on HRD processes, methods, and strategies, while identifying the challenges and opportunities arising from these changes.	The article highlights that the digital era has fundamentally reshaped Human Resource Development (HRD). Rapid technological progress requires employees to continuously reskill and upskill to remain relevant, rendering traditional HRD approaches insufficient. Training has shifted from face-to-face formats to digital methods such as e-learning, blended learning, virtual classrooms, and online platforms, offering broader and more flexible access. The competencies now required include digital skills and soft skills such as adaptability, critical thinking, virtual collaboration, and digital literacy. HRD professionals must evolve into digital learning facilitators, learning experience designers, data analysts, and strategic partners, with a strong understanding of educational technologies. Technology is integrated throughout the HRD process from identifying training needs and delivering content to evaluating and personalizing learning through AI. Organizations are encouraged to foster a culture of continuous learning as a shared responsibility. Key challenges include the digital divide, resistance to change, privacy and data security concerns, and the quality of online learning.

No	Researcher	Objective	Analytical Findings
5	(Kirana <i>et al.</i> , 2023).	Analyzes the impact of digital transformation on organizational Human Resource Management (HRM), with a focus on its role in enhancing corporate capabilities. Explores the relationship between digital adoption in HR functions and improvements in performance and competitiveness in the modern era.	The article argues that digital transformation brings fundamental changes to the roles and functions of Human Resources (HR), beyond mere technology adoption—it represents a paradigm shift in talent management. This transformation requires HR to adapt and develop new skills, both digital and soft skills, while facilitating upskilling and reskilling initiatives. HRM processes have transitioned to digital platforms, including online learning systems and HR analytics. HR now acts as a change agent, supporting cultural transitions and aligning digital business strategies with HR practices. Technology also enhances employee experience and engagement, particularly in virtual or hybrid work environments. With competent HR professionals and data-driven processes, organizations become more innovative, adaptive, and competitive. The article emphasizes that successful digital transformation in HR is key to boosting competitiveness, despite challenges such as employee resistance, technological investment, and the need for strong leadership.
6	(Saragih <i>et al.</i> , 2023).	This article examines the phenomenon of digital disruption and its impact on technological development in Indonesia. It analyzes the characteristics of the disruption era, its influence across various sectors, and Indonesia's response to rapid and disruptive technological advancements.	The article highlights that the digital disruption era in Indonesia is marked by rapid and fundamental changes driven by technologies such as IoT, Big Data, AI, and cloud computing, which have transformed business models, social interactions, and economic structures. The impact spans multiple sectors, including the economy (e-commerce, fintech), industry (automation), society (communication methods), education (online learning), and government (e-government). It also discusses the adoption of technology, the growth of digital startups, digital infrastructure, and government policies, as well as challenges such as the loss of traditional jobs, the need for new skills, cybersecurity issues, and the digital divide. Nevertheless, this disruption presents opportunities for innovation, job creation, efficiency, and improved access to information. The article emphasizes the importance of adaptation by individuals, organizations, and the government in terms of skills, business models, regulations, and mindset to effectively navigate the transformative nature of digital disruption in Indonesia
7	(Rahman <i>et al.</i> , 2024).	This article identifies and formulates effective Human Resource Development (HRD) strategies for addressing Information Technology (IT) disruption. It explains how IT	The article analyzes how IT disruption creates uncertainty and rapid change, impacting HRD needs and management approaches. HRD strategies must be proactive and adaptive. Traditional skills are becoming obsolete, while digital expertise, adaptability, creativity, and problem-solving are increasingly essential making it crucial to identify skill gaps. A culture of continuous learning among employees is vital, supported by the organization but driven by individual responsibility. The use of IT tools such as e-learning, data analytics, gamification, and integrated Learning Management Systems (LMS) is key to HRD. Employee adaptability and

No	Researcher	Objective	Analytical Findings
		disruption affects HRD needs and approaches, and outlines organizational strategies to ensure that human resources remain competent and adaptive amid rapid change.	resilience are critical in navigating change. Leaders must be visionary, supportive of learning, and encourage innovation and experimentation within HRD environments. HRD should promote cross-team collaboration and employee-driven innovation. In the era of IT disruption, HRD strategies must be agile, technology-based, personalized, and focused on developing adaptive capacity and lifelong learning to maintain human resources as a strategic asset for the organization.
8	(Pradana <i>et al.</i> , 2023).	This article analyzes the impact of technology and digitalization on the functions and practices of Human Resource Management (HRM) within organizations. It explores the transformation of various HRM aspects from recruitment to performance management and compensation and discusses the implications for organizations and HR practitioners.	<p>The article highlights that rapid technological advancement and digitalization trends have driven the evolution of HRM. Digitalization is not merely about automation; it fundamentally changes workflows, employee interactions, and HR's contribution to business strategy. Key points discussed include:</p> <p>Transformation of HR processes: Technology has digitized recruitment (social media, online interviews), onboarding (digital portals, e-learning), training (Learning Management Systems, webinars), performance management (digital platforms), compensation, and administration (HR self-service tools).</p> <p>Efficiency and effectiveness: Digitalization reduces administrative burdens, allowing HR to focus on talent development.</p> <p>HR analytics: Technology enables employee data analysis for evidence-based decision-making.</p> <p>Enhanced employee experience: Digital HR processes improve access and communication, making them more personalized.</p> <p>Changing roles of HR professionals: HR now acts as strategic partners, data analysts, and change agents, requiring strong digital literacy.</p> <p>Challenges of HR digitalization: These include costs, the need for digital skills, data security concerns, and resistance to change.</p>
9	(Nazarudin & Kuswinarno, 2024).	Examines the impact of digital transformation on human resource management functions and identifies the challenges and opportunities for practitioners and organizations in the era of Industry 5.0. Discusses the implications of digital technology	The article analyzes that digital transformation in human resource management represents a fundamental shift that is increasingly critical in the Industry 5.0 era, where human machine collaboration, sustainability, and resilience are key priorities. It emphasizes a human centric approach that integrates technology while focusing on employee well-being, environmental sustainability, and organizational resilience. HR processes are being digitized, including recruitment, data driven performance management, personalized talent development, integrated compensation systems, and automated administration all within the context of Industry 5.0. The transformation also brings new skill requirements (both technical and soft skills), ethical and data privacy concerns, cultural shifts, cybersecurity challenges, and digital inequality.

No	Researcher	Objective	Analytical Findings
		adoption in HR, particularly in relation to human machine collaboration, sustainability, and resilience in advanced industrial contexts.	Benefits include enhanced work experiences, data informed decision making, continuous learning, improved human technology collaboration, and the emergence of resilient and sustainable organizations. Digital HR transformation in Industry 5.0 must balance human values, sustainability, and resilience, positioning HR as a key driver in ensuring that technology supports human development and a better working environment.
10	(Kambamu, 2024).	This article describes and analyzes the digital transformation process in Indonesian higher education institutions, identifying its stages, challenges, driving factors, and key areas of digital technology implementation, while highlighting specific dynamics within the context of Indonesian higher education.	The article examines digital transformation in Indonesian universities as a complex process that reshapes operational, academic, and managerial aspects. This transformation is influenced by multiple factors and faces unique challenges within the Indonesian context. Key transformation areas include: digitalization of learning (LMS, e-learning), administration (academic and financial systems), research (digital databases, repositories), and student services (portals, online counseling). The transformation stages range from initiation and planning, technology implementation, user adaptation, to full integration and continuous innovation. Driving factors include government policies, demands for modern services, technological advancements, and the need to enhance competitiveness. Challenges involve uneven infrastructure, limited digital human resources, funding constraints, data security, cultural shifts, and regulatory gaps. Opportunities include operational efficiency, broader access to education, improved quality of learning and research, and greater transparency. Overall, the article portrays digital transformation in Indonesian higher education as a journey involving technology, people, and institutions, and highlights the key success factors for effective implementation

Sumber: Penelitian 2025

Discussion

Implications of Human Resource (HR) Digitalization on HR Training and Education

Digital transformation across organizations has significantly impacted human resource capacity development. Based on the analysis in the first article, digitalization has reshaped organizational structures and work environments, prompting the need for continuous training to enhance employees' adaptability to rapid technological changes (Barišić *et al.*, 2021). Furthermore, literature in the third article emphasizes that digital-based training has become essential for improving competitiveness and work efficiency. Organizations are required to update their training systems to meet the challenges of the digital industrial revolution, such

as through online training and the use of HR management information systems (Triyatun, 2024).

The fourth article also highlights that technological advancements have transformed training methods entirely. Learning models now increasingly adopt digital approaches such as e-learning, blended learning, and virtual training platforms, offering greater flexibility for participants (Iswandi & Kuswinarno, 2025). Meanwhile, the fifth article identifies a shift in HR training focus toward mastering digital skills, utilizing information technology in learning, and developing adaptive skill strategies to navigate the digital work era (Kirana *et al.*, 2023). Consequently, education and training are key to supporting the success of digital transformation in HR management.

Challenges in Human Resource Management Amid Digital Transformation

Human Resource Management (HRM) faces significant challenges in navigating the dynamic process of digitalization. Rapid technological changes compel organizations to adapt their systems and workflows to remain relevant and competitive (Ryketeng & Syachbrani, 2023). At the same time, organizations must ensure the development of new competencies, including digital literacy, data utilization, and virtual collaboration (Putra *et al.*, 2024).

However, this transformation is not always smooth. Many organizations encounter resistance from both employees and leaders who are unprepared for change. Psychological barriers, fear of technology, and limited training opportunities hinder progress (Puspitasari & Aslan, 2024). Additional challenges arise from shifts in communication patterns, leadership styles, and the need for more collaborative and transparent work systems (Praditya *et al.*, 2025).

Another pressing issue is performance measurement in digital work environments. Fair and data-driven evaluation systems must be developed to maintain productivity, even in non-face-to-face settings. Employee experience also requires attention, as workers increasingly expect personalized, flexible, and digitally connected work environments (Faugoo, 2024). Literature indicates that the rapid advancement of technologies such as AI, big data, and blockchain adds complexity to HR challenges. HR professionals must adapt to these technologies and integrate them into recruitment, training, and decision-making processes (Rahman *et al.*, 2024). Despite the strategic potential of digitalization, many HR managers still lack a comprehensive understanding of its benefits.

Another key challenge lies in identifying existing skill gaps. Organizations must design effective training strategies for reskilling and upskilling, while also managing resistance to digital systems. Digital transformation brings significant implications for data security, which has become a critical issue in HR management (Nazarudin & Kuswinarno, 2024). Moreover, digitalization demands a shift toward more agile and adaptive organizational structures. This requires a redesign of work systems and organizational culture to support continuous learning, innovation, and technology adoption (Kirana *et al.*, 2023). Performance evaluation systems also need to be updated to ensure fairness and accountability in remote or flexible work arrangements. Employees increasingly expect optimal digital work experiences. The challenge for HR is to create meaningful and engaging employee experiences through digital platforms that support recruitment, career development, and workplace well being (Pradana *et al.*, 2023).

Opportunities of Digital Transformation in Human Resource Management

The developments brought by the Fourth Industrial Revolution present new opportunities alongside various challenges for organizations (Simatupang, 2020). For instance, Human Resource Information Systems (HRIS) and Robotic Process Automation (RPA) enable automated management of leave, payroll, and attendance. The use of people analytics supports data driven decision making, such as identifying turnover trends, training effectiveness, and employee productivity (Pradana *et al.*, 2023). These innovations reinforce HR's role as a strategic partner within the organization. Digital platforms such as MOOCs, e-learning, and virtual reality training offer significant opportunities for personalized, flexible, and needs-based learning. They foster a culture of continuous learning and prepare employees for future roles (Iswandi & Kuswinarno, 2025). Technology adoption also expands recruitment reach. Through online platforms and social media, organizations can attract candidates from diverse regions, including global talent. Artificial Intelligence (AI) is increasingly used for initial applicant screening (Nazarudin & Kuswinarno, 2024). Communication technologies such as HR mobile apps, employee portals, and digital surveys enhance employee engagement and facilitate two-way internal communication. Additionally, flexible work models supported by digital technologies offer strategic advantages in attracting and retaining top talent.

Strategies for Overcoming Digital Transformation Challenges

In addressing the various challenges arising from digital transformation, organizations should formulate comprehensive and long-term strategic measures. One of the key approaches is the implementation of continuous competency development and training programs for all employees (Rauf *et al.*, 2024). These programs should focus on equipping staff with relevant and up-to-date digital knowledge and skills, while also preparing them to adapt to emerging technologies and evolving work systems. In parallel, organizations must cultivate a work culture that promotes innovation, collaboration, and openness to change (Julianti & Frinaldi, 2025). Such efforts will enable companies to remain responsive to digital dynamics and foster a work environment that supports growth and sustainable transformation.

Data protection has become a central concern for organizations undergoing digital transformation. Every digital infrastructure must be built with layered security measures, including advanced encryption technologies and authentication systems to minimize the risk of unauthorized access. Additionally, regular updates to privacy policies are essential to ensure compliance with current data protection standards and regulations. Equally important is the need to educate all employees through periodic training on the importance of safeguarding both personal and organizational information. This helps establish a culture of vigilance and shared responsibility for data security.

CONCLUSION

Based on the findings and discussions presented, it can be concluded that digitalization has significant implications for human resource (HR) training and education. One of the most prominent shifts is the transition from conventional training methods to digital platforms such as e-learning, virtual classrooms, and blended learning. This shift requires organizations to consistently implement reskilling and upskilling programs to ensure that HR competencies remain relevant and competitive in today's dynamic work environment. On the other hand, HR management in the digital era faces several major challenges, including rapid technological advancements, digital skill gaps, internal resistance to change, and growing concerns over data security and privacy. This transformation also demands that organizations adapt to changes in work structures and cultures, particularly in managing performance within flexible, technology driven work settings

Nevertheless, digitalization also presents broad strategic opportunities for human resource management. These include the automation of administrative processes to enhance efficiency, the use of data analytics for more accurate decision-making, improved recruitment effectiveness, the strengthening of organizational culture through continuous learning, and flexible work arrangements that boost employee satisfaction and engagement. Therefore, organizations must adopt HRM strategies that encompass the development of sustainable digital training programs, the cultivation of an innovative and change-adaptive work culture, the reinforcement of comprehensive data security systems, and the establishment of agile and collaborative organizational structures to effectively navigate the complexities of digital transformation.

To explore more deeply the effectiveness of digital training programs across various organizational sectors, both public and private. In addition, it is important to develop studies related to concrete strategies for building an inclusive digital work culture that can embrace the diversity of employee backgrounds and work patterns. Future research is also expected to examine the impact of digitalization on the psychological aspects of employees, develop digital leadership models that are responsive to technological challenges, and formulate indicators that can be used to measure the success of digital transformation in HR management and training in a measurable and sustainable manner.

AUTHOR'S NOTE

This research is an original work independently prepared by the author. All data, analyses, and findings presented in this manuscript have not been previously published or submitted to any journal or conference. Every reference source used has been clearly cited, and there are no elements of plagiarism in the preparation of this research.

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