

# Empowering human resource management through artificial intelligence: a systematic literature review and bibliometric analysis

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## Abstract:

Drawing on a systematic literature review and bibliometric analysis, this article examines the burgeoning field of Artificial Intelligence (AI) integration into Human Resource Management (HRM) practices. By evaluating 77 selected articles from two extensive databases, Scopus and Web of Science, this study illuminates the dynamic intersection of AI technologies and HRM, encapsulating the profound implications for organisational and individual aspects of HR practices. This analysis delineates three primary thematic areas: AI's transformative role in HRM, the emerging paradigm of human-AI collaboration, and the nuanced challenges and opportunities presented by AI in HR practices. This research contributes to the academic discourse by mapping the current state of AI applications in HRM, identifying gaps and proposing directions for future research, emphasising the need for ethical frameworks and the strategic integration of AI to enhance HR practices. Through this scholarly endeavour, we aim to offer a comprehensive overview that aids practitioners and researchers in navigating the complexities of AI's role in reshaping HRM towards more efficient, ethical, and innovative practices.

## Key words:

Artificial Intelligence, Human Resource Management, Human-AI collaboration, Machine Learning, Deep Learning, AI-powered chatbots.

## 1. Introduction

The integration of Artificial Intelligence (AI) within Human Resource Management (HRM) marks a pivotal shift towards redefining organisational dynamics and workforce management strategies. At its core, HRM embodies a strategic framework designed to enhance employee performance and foster a competitive edge in the marketplace through effective personnel management, training and development, and recruitment (Ancarani et al., 2019). As AI technologies progressively infiltrate these traditional spheres of HR practices, they introduce transformative potentials along with complex challenges, signifying a profound impact on both organisational structures and the individual employee experience.

The advent of AI in HRM, characterised by the adoption of intelligent information systems, underscores a transition towards enhanced operational efficiencies and novel modes of human interaction and communication. This evolution reflects a broader trend of technological innovation within HR functions, promising significant advancements in HR planning, selection and retention, talent management, employee lifecycle management, compensation, social benefits, and assessment of job candidates (Malik et al., 2020; Abraham et al., 2019; Suen & Hung, 2024; Morshidi et al., 2024). Companies also have the flexibility to pursue their objectives without being bound by time constraints. Amidst this backdrop, the academic landscape has witnessed a burgeoning interest in the ramifications of AI-driven HRIS, with research highlighting

**To cite this article:** Benabou, A., Touhami, F. (2025). Empowering human resource management through artificial intelligence: a systematic literature review and bibliometric analysis. *International Journal of Production Management and Engineering*, 13(1), 59-76. <https://doi.org/10.4995/ijpme.2025.21900>

the positive contributions of online recruitment platforms, automated skills' management, and digital training solutions to the quality of HR services (Zhai et al., 2024).

Despite the growing body of literature exploring the intersection of AI and HRM, a holistic understanding of AI's comprehensive impact across various HR practices remains fragmented. Addressing this gap, this study employs a systematic literature review to gather academic contributions so far, elucidating the multifaceted effects of AI on HRM. This effort delineates the current state of AI applications in HRM, identifies emerging themes and research gaps, thereby providing a robust foundation for future empirical investigations.

Structured to navigate the intricate landscape of AI in HRM, this research is guided by pivotal enquiries that seek to uncover the academic contributions of AI in HRM, explore the transformations within HR practices due to AI integration, and pinpoint future research directions. Through this scholarly journey, this study provides a comprehensive synthesis of AI's role in HRM, positioning it as a crucial factor in advancing HR practices and navigating the challenges of human-machine collaboration.

The structure of the paper is organised as follows: Initially, the research methodology, emphasising the approach to integrating AI within HRM. This is followed by an analysis of AI's impact on HR practices, uncovering both opportunities and challenges. The manuscript then transitions to exploring ethical considerations, advocating for responsible AI deployment. An examination of AI-human collaboration highlights potential synergies and hurdles. Finally, the paper addresses existing research gaps and formulates recommendations, underscoring the need for ethical, efficient, and innovative AI utilisation in HRM.

## 2. Methodology

In advancing the scholarly discourse on AI's integration into HRM, this study rigorously adopts a systematic literature review, aligning with the protocols delineated by Needleman (2003) and Crossan & Apaydin (2010), with a bibliographic coupling analysis. The methodological rigour, essential for the integrity and transparency of this review, ensures a replicable framework for examining publications (Kocka et al., 2020). Using Biblioshiny

for conducting science mapping analysis through the primary functionalities of the Bibliometrix R package, and VOSviewer for network data visualisation, this analysis meticulously evaluates the collected articles, setting a foundation for future research directions in the AI-HRM nexus (Qamar & Samad, 2020).

## 3. Selection of relevant articles

### 3.1. Articles collection

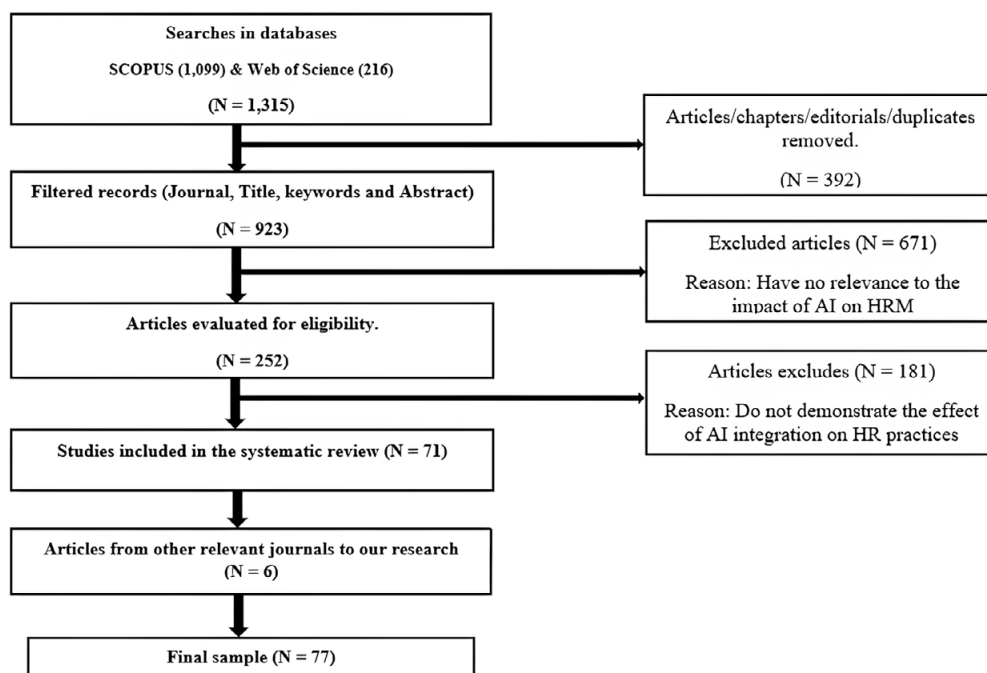
To accrue relevant scholarly articles for our study into AI's integration into HRM practices, we harnessed two preeminent multidisciplinary databases: Elsevier Scopus and Clarivate's Web of Science. The selection of these databases, renowned for their expansive journal, article, and discipline inclusivity, is in alignment with scholarly conventions for conducting comprehensive systematic literature reviews in the field of management (Mariani & Borghi, 2019).

To perform targeted searches, we used specific keywords, specifically for "AI applied to HR management". To enhance precision in the Scopus and WOS databases, we examined keywords from recent review articles (Qamar & Samad, 2020; Kaushal et al., 2023; Hamouche et al., 2023), empirical and conceptual studies (Malik et al., 2021; Makarius et al., 2020). A preliminary bibliographic sweep enabled the refinement of our search strategy, employing Boolean operators (AND, OR, NOT) to craft a nuanced search algorithm, delineating the methodology in Table 1. Focused exclusively on peer-reviewed journal articles within the realms of management, computing, and social sciences, we set a temporal framework to encapsulate the contemporary dialogue on AI's integration into HR practices.

Mirroring the standard systematic review protocol, this selection hinged on scrutinising titles, keywords, and abstracts, with ambiguous cases advancing to a secondary full-text review. In a bid for comprehensiveness, we perused the reference lists of chosen articles, seeking additional relevant literature. As delineated in Figure 1, initial data extractions from Scopus and WOS were conducted independently, resulting in two datasets. The convergence of data yielded 1,099 Scopus-indexed and 216 WOS-indexed articles. The elimination of duplicate entries through R's methodical algorithms left a body of 923 articles subject to

**Table 1.** Search Syntax for AI in HRM Literature: Scopus and WOS Databases (Source: Authors).

Databases	Query Structure Elements	Search Algorithm Expressions
Scopus	Field Tag Boolean  Document Type, Language, Subject Area, Years and exact keywords	TITLE-ABS-KEY ((“AI” OR “Artificial Intelligence” OR “Chatbots” OR “Conversational Agent” OR “Machine Learning” OR “deep learning”) AND (“HRM” OR “Human Resource Management” OR “HR” OR “HR Practices” OR “Hiring” OR “HR Training” OR “Career Management” OR “Talent Acquisition” OR “Performance Management” OR “recruitment” OR “employee integration” OR “HR Planning” OR “Human-AI Collaboration” OR “Employee Motivation”)) AND PUBYEAR > 2017 AND PUBYEAR < 2025 AND PUBYEAR > 2017 AND PUBYEAR < 2025 AND (LIMIT-TO (SUBJAREA, “COMP”) OR LIMIT-TO (SUBJAREA, “BUSI”)) AND (LIMIT-TO (DOCTYPE, “ar”)) AND (LIMIT-TO (LANGUAGE, “English”)) AND (LIMIT-TO (EXACTKEYWORD, “Deep Learning”) OR LIMIT-TO (EXACTKEYWORD, “Artificial Intelligence”) OR LIMIT-TO (EXACTKEYWORD, “Machine Learning”) OR LIMIT-TO (EXACTKEYWORD, “Human Resource Management”) OR LIMIT-TO (EXACTKEYWORD, “Recruitment”) OR LIMIT-TO (EXACTKEYWORD, “Employment”) OR LIMIT-TO (EXACTKEYWORD, “Workers”) OR LIMIT-TO (EXACTKEYWORD, “Human-AI Collaboration”) OR LIMIT-TO (EXACTKEYWORD, “Personnel Training”) OR LIMIT-TO (EXACTKEYWORD, “Job Analysis”) OR LIMIT-TO (EXACTKEYWORD, “Human Resources”) OR LIMIT-TO (EXACTKEYWORD, “Human Experiment”) OR LIMIT-TO (EXACTKEYWORD, “Training”))
WOS	Field Tag Boolean  Document Type, Language, Subject Area, Years	(TS=(“Artificial Intelligence” OR “AI” OR “Chatbots” OR “Conversational Agent” OR “Machine Learning” OR “Deep Learning”) AND TS=(“Human Resource Management” OR “HRM” OR “HR” OR “HR Practices” OR “Hiring” OR “HR Training” OR “Career Management” OR “Talent Acquisition” OR “Performance Management” OR “Recruitment” OR “Employee Integration” OR “HR Planning” OR “Human-AI Collaboration” OR “Employee Motivation”)) AND PY=(2024 OR 2023 OR 2022 OR 2021 OR 2020 OR 2019 OR 2018) AND DT=Article AND LA=English AND (WC=(Management) OR WC=(Computer Vision & Graphics) OR WC=(Social Psychology) OR WC=(Robotics) OR WC=(“Artificial Intelligence & Machine Learning”) OR WC=Economics OR WC=(“Dynamical Systems & Time Dependence (Citation Topics Meso”))



**Figure 1.** Research protocol applied in this study (Source: Authors).

subsequent appraisal. A cursory evaluation of journal specialisation, alongside an examination of article titles, keywords, and abstracts, led to the sidelining of 671 entries, while technologically relevant, diverged from our HR-centric interrogatives. Collating PDFs of the remaining journal articles, we embarked on an in-depth analysis of content and methodologies relevant to this review. In cases where complete access was elusive, we relied on abstracts for our analyses, distilling our collection to 252 articles poised for detailed evaluation. A cursory perusal of the remaining full texts, aligned against our inclusion rubric, yielded a curated selection of 77 articles for extensive examination.

### 3.2. Data analysis

Figure 2 showcases the trajectory of annual publication volumes captured within the Scopus and Web of Science databases, charting AI's integration into HR practices, with a notable upsurge post-2019. The publication frequency burgeoned from 32 articles in 2018 to 89 in 2019 and sustained an upward curve, peaking at 411 articles in 2023. The 2024 data, currently standing at 125 articles, merely reflect the output of the initial two months, hinting at an annual trend that could potentially underscore a steeper increase. This trend accentuates the growing academic commitment to scrutinising the opportunities and challenges of AI employment in HR, driven by technological innovation, organisational adoption, and the ramifications of the COVID-19 pandemic. These developments underscore the imperative for ongoing research to unravel the practical and theoretical ramifications of AI on HR management strategies.

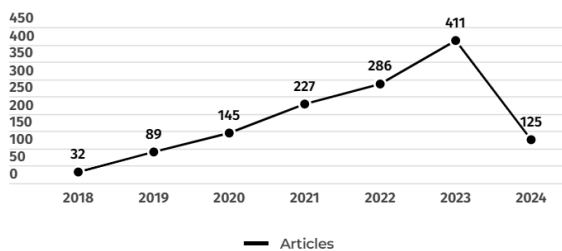


Figure 2. Trend of publication in Scopus and WOS databases (2018 - February 2024) (Source: Authors).

### 3.3. Publications mapping on AI in HR

Through Biblioshiny, our survey of publications on the integration of AI in HR practices from 2018 to February 2024 has unveiled the most prolific

journals in our research field. Our findings point to a significant clustering of articles within esteemed journals such as “Proceedings of the ACM on Human-Computer Interaction,” “AI and Society,” and “Human Resource Management Review” (refer to Figure 3). This concentration underscores an amplified scientific pursuit of AI within management and applied sciences, indicative of a trend towards innovative, technologically advanced HR practices.

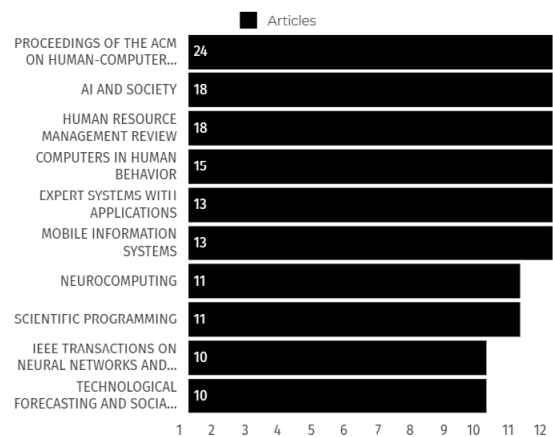


Figure 3. Top 10 most-cited journals on AI in HRM practices (Source: Authors).

### 3.4. Bibliometric mapping of AI in Human Resource Management

We applied bibliographic coupling analysis using the VOSViewer software to create a visualisation map of various clusters or themes, assessing the relationships and associative strengths of terms (Tuffaha & Perello-Marin, 2021). The VOSViewer network map (see figure 4), built from bibliographic data, distills the dominant themes within the corpus of research on AI integration in HRM from 2018 to February 2024.

“Human resource management” and “artificial intelligence” anchor the network, underscoring their critical intersection as a primary domain of research. The convergence of “big data” and “data analytics” unveils AI’s ascendance in talent recruitment and management, where data-driven strategies bolster employee performance. Connections with “training” and “development” highlight the growing significance of AI in skill enhancement initiatives, while terms like “ethics” and “employment” reflect considerations of AI’s social implications. Collectively, these themes

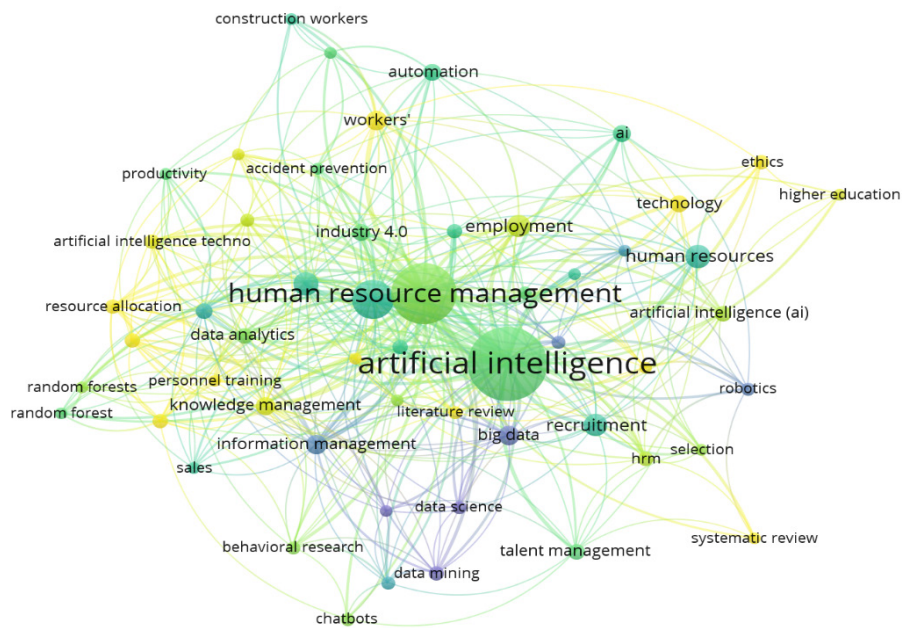


Figure 4. Keywords Co-occurrences in Scopus and WOS Databases (Source: Authors).

weave a research tapestry that maps the current landscape and projects future directions for AI as a transformative tool in HR practices.

#### 4. Literature review

Human Resource Management, fundamentally, engages with the myriad practices central to optimising the human element within organisations. It is a discipline that systematically manages human skills and competencies, facilitating talent acquisition, employee administration, and the enhancement of workforce performance (Cheng & Hackett, 2021). Within the ambit of this section, our scholarly exploration delves into the literature on AI’s application across a diverse array of HR functionalities ranging from strategic planning, talent management, development initiatives to performance evaluation. It critically examines how AI influences employee motivation and engagement, navigates through the ethical and legal frameworks impacting HR practices. Furthermore, this research illuminates the transformative effects on recruitment and explore the synergistic potential of collective intelligence through human-AI collaboration.

##### 4.1. Integration of AI in HRM

Integrating AI into HRM is pivotal for advancing organisational efficiency and strategic management. Artificial intelligence, characterised

by its ability to mimic human intellect and perform complex tasks autonomously, is increasingly recognised for its potential to predict and understand human behaviour, thereby enhancing productivity and HR management (Premnath & Chully, 2019). This integration empowers HR managers to act as strategic leaders, utilising AI for automating routine tasks such as recruitment, selection, and training, which allows for a focus on more analytical endeavours (Merlin & Jayam, 2018; Lengnick-Hall et al., 2018). The adoption of AI in HRM practices, as illustrated by recent research, emphasises its significant impact on improving accuracy, personalisation, cost and time efficiency of HR processes, confirming AI’s role in revolutionising HR functions towards more data-driven approaches (Nawaz et al., 2024). By replacing outdated methods with AI’s capabilities, HRM can achieve a transformative shift, enhancing both operational efficiency and strategic decision-making (Tambe et al., 2019). Furthermore, to address the challenges of algorithmic opacity in AI-driven HRM practices, a focus on developing transparent and understandable AI systems becomes crucial. This entails adopting multi-stakeholder engagement strategies to reduce opacity and ensure ethical AI utilisation, fostering trust and accountability in automated HR processes (Langer & Konig, 2023).

#### 4.1.1. HR Planning

Strategic planning is imperative in HRM, necessitating a comprehensive analysis of previous work and close attention to the organisation's growth model to cultivate a culture of strategic planning, awareness, and innovation (Samarasinghe & Medis, 2020). The effective use of AI in analysing employee activity data significantly enhances HR managers' ability to navigate the complexities of HR planning (Upadhyay & Khandelwal, 2018). For instance, Deloitte employs AI-driven tools for workforce planning and succession planning, using predictive analytics to anticipate future workforce needs and develop strategies for employee development (Huang et al., 2023).

Given the challenge of achieving precise demand planning and forecasting due to inadequate data management, HR planning requires considerable time and resources, underscoring the importance of AI in improving efficiency through predictive algorithms (Singh & Shaurya, 2021; Gulliford & Dixon, 2019). AI's role extends to solving intricate engineering and financial challenges via artificial neural networks and fuzzy systems, contributing to more precise workforce predictions and resource allocation (Pereira et al., 2023). This progression towards a strategic, data-driven approach is essential for companies contending with the digital era's demands. It encapsulates the necessity of integrating advanced technology, engaging stakeholders effectively, and prioritising the development of employee skills and leadership. Such strategic HR planning, attuned to sustainable development goals, adeptly addresses challenges like change resistance and technological uncertainty, while also preparing companies to anticipate future skills requirements. This fosters an adaptable, innovative company's culture, ready to meet the evolving landscape of HR needs (Adiazmil et al., 2024).

#### 4.1.2. Talent acquisition and management

As AI takes a central role in the strategic initiatives of HR departments, the ability to attract and secure top talent has become a critical responsibility for HR managers (Pillai & Sivathanu, 2020). This evolution stems from digital technology's transformation of talent search into an efficient, streamlined process, significantly mitigating the time and financial costs traditionally associated with recruitment (Palos-Sánchez et al., 2022). Empowered by sophisticated tools, HR departments now swiftly evaluate and acquire talent, applying AI to candidate screening

and leveraging advanced analytics for more effective decision-making. This approach shortens hiring cycles and reduces the risks of unsuitable hires, ensuring that the right candidates are identified promptly (Sakka, 2022).

Beyond Talent Acquisition, AI's influence extends to talent development, underscoring the importance of technological adoption for maintaining a competitive edge in the evolving talent management domain (Bano et al., 2022). Furthermore, talent management involves systematic methods to improve professional development, retain talent, and meet organisational needs. A talent management programme focusing on long-term goals and current employee needs is essential. AI assists HR in attracting and developing talent, minimising time by automating routine tasks, such as leave requests, allowing HR managers to concentrate on nuanced issues (Mauro et al., 2018; Abdeldayem & Aldulaimi, 2020; Sattu et al., 2024). AI also enhances workforce predictions, employee engagement, aiding in swift accurate decision-making regarding personnel needs, identifying suitable employees for tasks and organisational planning (Bhardwaj et al., 2020).

The strategic deployment of AI in managing and retaining talent accentuates the need for HR managers to proactively leverage AI technologies. This ensures the alignment of tech tools with organisational objectives, enriching HR strategies with a holistic view of talent management for a sustained competitive edge (França et al., 2023; Khan, 2024). In this context, a study developed a competency model for HR management jobs at Company C using a genetic algorithm optimised BP neural network (GA-BP), achieving a 91.16% classification accuracy in predicting employee competency, thereby enhancing talent evaluation and management (Cao & Zhang, 2022).

#### 4.1.3. Performance evaluation

HR managers are responsible for performance management, ensuring productivity aligns with organisational objectives. Traditional performance metrics often lack the depth to fully evaluate productivity, efficiency, and participation. AI enhances evaluation accuracy through data analysis, identifying unseen patterns and correlations that may not be immediately apparent to human observers (Bhardwaj et al., 2020), and rather than limiting the process of matching performance to objectives at the beginning and end of a specified period, it facilitates real-time performance comparison with

goals (Sakka, 2022). AI's continuous process update significantly refines data precision for managerial decisions (Williams, 2019). For instance, Unilever, a multinational consumer goods company, uses AI to analyse employee data and identify factors that impact employee performance and satisfaction. This analysis helps Unilever tailor its HR strategies to better meet the needs of its employees, leading to improved engagement and retention (Thakur, 2024).

Furthermore, advanced analytics and ML mark a shift towards data-driven decision-making, enriching workforce understanding and talent management strategy (Hasan et al., 2024). This approach to performance evaluation, considering both organisational goals and employee satisfaction, aligns with insights suggesting a more holistic evaluation framework that supports worker well-being alongside productivity (Tweedie et al., 2018). In this context, Google deployed HR analytics through its People and Innovation Lab (PiLab) to identify critical talents and improve managerial practices. Project Oxygen identified attributes of successful managers and integrated these findings into managerial training, resulting in significant improvement in 75% of low-performing managers (Shrivastava et al., 2018).

#### 4.1.4. Training and development

Development focuses on elevating employee qualifications and career growth, utilising continuous training to equip employees with necessary skills, including stress and conflict management. The integration of AI tools in training design allows for customised development opportunities, contributing to job satisfaction and productivity improvements (Colley et al., 2019). Implementing career development plans can also decrease absenteeism. Intelligent computer agents act as effective virtual coaches, providing real-time learning updates and incorporating external information, addressing engagement and isolation challenges in traditional methods. AI has the potential to partially replace traditional coaching, offering personalised training programmes and enhancing performance through predictive talent assessment and decision-making models. Mobile coaching applications assist in understanding employee needs, guiding career and team development. However, AI's role is to supplement, not replace, human instructors, reinforcing training effectiveness (Yuldoshev et al., 2018). For instance, IBM's Watson leverages AI for personalised learning and career advancement,

demonstrating AI's capability to tailor training to individual needs, significantly enhancing workforce skills and adaptability (Cho et al., 2023).

Recent advancements underscore AI's transformative potential in training, transitioning from conventional methods to personalised and adaptive learning strategies. AI's application in creating dynamic, knowledge-based training environments facilitates individualised learning experiences, aligning with modern pedagogical approaches that prioritise personalised training needs (Chen, 2023a). Furthermore, With the advent of Machine Learning, leading organisations are now enhancing employee engagement and driving organisational success by leveraging these technologies for competitive learning strategies (Ramachandran et al., 2022). Moreover, AI plays a critical role in facilitating effective training transfer, recommending strategies for adapting to rapidly changing work environments, ensuring timely and impactful learning applications, and enhancing both employee performance and organisational outcomes (Park, 2024). Additionally, businesses have embraced tools like Microsoft 365 to save time and increase workplace productivity by supporting employees in their roles. Some of the AI tools employed include Engazify for feedback, Obie and Niles for knowledge exchange, Wade and Wendy for career advancement, and Duolingo for language learning.

#### 4.1.5. Employee Motivation and Engagement

Some managerial practices, such as a lack of communication and setting unattainable goals, can trigger stress, leading to demotivation among employees (Berhil et al., 2020). Emotional analysis emerges as a crucial HR task, analysing data from employees' activities, including social media, to assess their positive or negative emotions and potential biases (Williams, 2019), alongside categorising responses to identify emotions (Dhanpat et al., 2020). In this sense Sysco used HR analytics to connect HR processes to employee attitudes and business outcomes. By linking work climate surveys, employee satisfaction, customer loyalty, and revenue, Sysco improved employee retention from 65% to 85%, saving \$50 million in hiring and training costs (Madhani, 2023).

AI personalised training also plays a significant role in actively engaging employees, enhancing motivation and adaptability (Passalacqua et al., 2024). Moreover, the awareness of AI's presence has

been found to simultaneously drive and challenge employee motivation, highlighting the nuanced role of AI in fostering an environment conducive to innovation and employee development (Liang et al., 2022). Lowe's used HR analytics to link HR processes, employee engagement, and store performance. They found that highly engaged employees led to 4% higher average customer ticket sales per store (Madhani, 2023).

#### 4.1.6. AI-driven recruitment

HR departments receive more job applications each year, making manual evaluations overwhelming. Automated systems, powered by AI, streamline the recruitment process by efficiently extracting and analysing CV information (Upadhyay & Khandelwal, 2018). Implementing ML enhances selection processes, promoting objectivity and reducing bias (Sajjadiani et al., 2019). Leading organisations like Accenture, Unilever, and Hilton Hotels have employed AI in their recruitment, significantly improving effectiveness. For instance, Hilton Hotels reduced hiring time by nearly 90%, while Unilever doubled its internship applicants, showcasing AI's impact on recruitment efficiency and diversity (Stone et al., 2024). Similarly, IBM's AI application efficiently identifies suitable candidates by analysing vast data sets, streamlining selection with a focus on organisational alignment and candidate suitability (Cho et al., 2023). These AI-enabled tools are at least 25% to 100% more effective than humans in distinguishing between good and bad candidates (van Esch & Mente, 2018).

Chatbots and robotic systems like Vera and Sophia assess candidates' verbal and non-verbal cues, automating recruiting processes (Garg et al., 2019). These technologies help HR review application histories and establish fair compensation packages, predicting candidate suitability and performance while minimising human bias (Cooke et al., 2019; van Esch et al., 2019).

The conventional method of publishing job openings on websites and searching for suitable candidates can be a time-consuming process. Nvidia uses AI chips to analyse speech patterns and behaviours, matching candidates with suitable job roles. Firms like eBay, IBM, and Intel utilise AI technology to compare candidates against an extensive database of professional profiles, ensuring a thorough assessment of potential hires. However, AI-powered platforms like LinkedIn, Indeed, Glassdoor, and Naukri use

ML for job recommendations, streamlining job posting and candidate searches based on profiles and relevant keywords (George & Thomas, 2019).

After selecting suitable candidates for a position, the next step is often the interview, and sometimes job interviews can be stressful for candidates. This is due to the presence of conditions such as the presence of other humans, the lack of smiling, rolling eyes, raising eyebrows, judging humans, etc., which can create a lot of tension and anxiety. Even the most competent candidate may be confused by this reaction and lose their chance of success in the interviews (Majumder & Mondal, 2021). Therefore, the use of chatbots and robots for preliminary interviews addresses interview anxiety, making the process less stressful for candidates. Utilising platforms like HireVue for video interviews, Unilever expanded its reach from 840 to 2600 universities, thereby increasing the diversity and quality of candidates while simultaneously reducing costs (van Esch and Black, 2019). Similarly, companies such as CVS Health, Delta, and Staples employ an AI-powered assistant named Olivia to interact with candidates via mobile and social media channels, effectively guiding them through the recruitment process (van Esch and Black, 2019).

Moreover, AI's impact extends beyond recruitment to foster HR operational improvements and the adoption of modern talent management strategies, crucial for maintaining competitiveness in the digital age. This demonstrates AI's capacity to enhance overall HR strategies, emphasising efficiency and strategic management (Batra, 2023). AI-driven automated selection and assessment systems offer more accurate outcomes, while a strong social media presence and interactive career pages enhance employer branding (Faqihi & Miah, 2023). For instance, Leap.ai's AI-driven recruitment system matches job seekers with suitable positions, reducing recruitment costs by 71% and increasing efficiency threefold (Jia et al., 2018).

With a reduction in the workload of HR managers, they can simply observe and decide whom to call without taking hundreds of interviews. As a result, chatbots reduce employees' time by optimising communications, allowing HR to focus on strategic tasks (Danylevych et al., 2021). However, collaboration between recruiters and AI aids in removing human prejudices, further refining the recruitment process, and ensuring a more equitable and effective talent acquisition approach



(Chen, 2023b). By removing personal information from resumes, AI minimises human biases and fosters a fairer recruitment process. Additionally, AI and data-driven algorithms enhance transparency regarding organisational diversity by assessing and monitoring diversity metrics in real-time (Mer, 2023)

#### 4.2. Legal Implications of AI Adoption in HR

The integration of AI into HR operations presents substantial legal challenges. As AI plays a role in crucial employment decisions, it raises questions of potential workplace discrimination, emphasising the need for transparency in AI-driven decisions (Stefano, 2019). Discrimination introduced by AI in recruitment, rewards allocation, and other HR processes requires that decisions avoid reliance on sensitive characteristics like sex or ethnic origin. Privacy and ethical concerns in the use of digital records for psychometric testing or predicting work-related issues highlight the need to safeguard against unjust outcomes (Bhave et al., 2019; Varma et al., 2022). Moreover, the use of AI in decision-making processes related to employment could lead to disparities, for instance, if ML algorithms identify a correlation between gaps in previous employment records and absenteeism or turnover, this may appear to be a valid reason for disqualifying a candidate. However, it could have a disproportionately negative impact on women, who are more likely to have fragmented careers, highlighting the need for measures that ensure decisions made by machines are reviewable by courts (Hamilton & Davison, 2021). In this context, Amazon abandoned its AI recruitment algorithm due to its biased treatment of female applicants, demonstrating the risk of discriminatory outcomes from biased training data (Akter et al., 2021).

To foster diversity and prevent workplace discrimination, employers must adopt AI programmes that promote ethical standards (Rana, 2018). The necessity for a decision-making framework that underlines the ethical use of AI in HR management is essential, aiming for responsible AI technology integration to address legal and ethical challenges (Bankins, 2021). For example, the Australian Robo-Debt scheme, highlighted algorithmic bias targeting marginalised populations, leading to unjust debt recovery actions without human oversight (Akter et al., 2021). Further exploration into ensuring these frameworks address fairness, transparency, and accountability in HR practices contributes to a more equitable employment landscape (Andrieux

et al., 2024). In this context, integrating ethical frameworks, specifically the Throughput Model, provides a structured approach to reinforce AI systems' accountability and bias mitigation in HR, underscoring the shift towards ethically driven AI employment decisions that uphold legal standards, and moral excellence in fostering workplace equality (Rodgers et al., 2023).

#### 4.3. Collective intelligence and human-AI Collaboration

The significant progress in the AI field raises concerns about employability in developed economies, with AI potentially rendering individuals jobless or "unemployable" as tasks shift to machines (Cano-Kollmann et al., 2018). This shift necessitates rethinking job creation, the evolving roles and responsibilities of human workers, and the dynamics of human-AI collaboration. While AI poses risks to employment, it also offers collaborative opportunities between humans and machines (Vrontis et al., 2021). The computational power of AI, its aptitude for analysing large quantities of data (Big Data), and its proficiency in extracting valuable insights from diverse data sources can enhance human intelligence by supporting data-driven decision-making processes, rather than replacing human intuition and intellect (Jarrahi, 2018; Wilson & Daugherty, 2018).

Trust, clarity, and role understanding in human-AI partnerships enhance collective intelligence, fostering valuable organisational outcomes and the development of strategies for business processes (Chowdhury et al., 2022). Perceptions of algorithmic management's fairness and trust hinge on the task's nature, suggesting a nuanced integration of AI to respect the human elements of decision-making. This balance is crucial for fostering a workplace where algorithmic and human insights coalesce, enhancing both trust and collaboration in AI-driven environments (Lee M. K., 2018). Transitioning towards AI as a co-partner enriches workforce tools beyond mere task automation, involving both in holistic problem-solving complexes, notably in outlining the problem, identifying underlying causes, suggesting and evaluating potential solutions, choosing appropriate action plans, formulating strategies, implementing measures, leveraging knowledge from previous interactions, and participating in post-analysis evaluations (Chowdhury et al., 2023; Seeber et al., 2020).

Empirical evidence reveals a preference for human-majority decision-making in AI partnerships, advocating for a 70-30% human-AI decision weight. This optimises collaboration, ensuring AI's supportive role in enhancing human tasks and boosting organisational efficacy (Haesevoets et al., 2021). Embracing Cobots (collaborative robots) in the workplace facilitates a synergistic partnership, elevating organisational efficiency and innovation by augmenting human capabilities in complex decision-making and Big Data analytics, vital for informed decision-making in today's dynamic business ecosystem (Sowa et al., 2021). Furthermore, AI enhances knowledge management by fostering predictive analytics and pattern recognition, expanding organisational agility. This evolution marks a shift towards a human-AI symbiosis, where Cobots and AI systems collaboratively augment collective intelligence and strategic innovation (Jarrahi et al., 2023). Adapting educational curricula to prioritise people skills alongside technological proficiency prepares future generations for deeper human-AI collaboration, focusing on emotional intelligence and complementarity between humans and AI as essential for the evolving workforce landscape (Huang et al., 2019).

Other insights underscore the importance of managing emotional bonds and subgroup dynamics in human-robot teams to foster enhanced teamwork quality and performance, guiding a nuanced approach to human-robot collaboration in organisational settings (You & Robert, 2023). Recent studies indicate the pivotal role of gender dynamics and the perceived social presence in shaping the effectiveness of human-IVA (intelligent virtual agent) interactions, suggesting a deeper exploration into gendered perceptions and relational dynamics within AI-mediated environments (Lee et al., 2021).

## 5. Discussion and Future Research Directions

### 5.1. AI Applications in HR Practices

AI technologies enhance HR planning by optimising task execution, aligning employee skills with job requirements, and improving team collaboration (Pereira et al., 2023). Predictive analytics help forecast employee turnover and develop retention strategies (Deepa et al., 2024). Additionally, AI supports strategic decision-making by providing

real-time insights into labour market trends and workforce demographics, thus optimising workforce allocation.

In talent acquisition and management, AI improves efficiency and accuracy through automated resume screening and candidate selection, ensuring better matches between candidates and job requirements. Advanced systems such as Applicant Tracking Systems (ATS), intelligent search engines, and chatbots enhance the candidate experience with real-time support and information (Böhm et al., 2024).

Performance evaluation benefits from AI tools that provide continuous monitoring, which enhances the objectivity and fairness of appraisals (Varma et al., 2024). It identifies performance trends and areas for improvement through communication data analysis, leading to detailed and objective appraisals. Predictive analytics forecast employee performance, aiding proactive decisions about promotions, training, and resource allocation (Hasan et al., 2024).

AI enhances training and development by providing personalised learning experiences and skill assessments. AI-driven tools offer tailored training programmes based on individual needs and career goals (Chen, 2022). Virtual reality (VR) and augmented reality (AR) simulate realistic training scenarios, making learning more engaging and effective (Huang et al., 2023). AI-powered chatbots and virtual coaches provide continuous learning and interactive feedback, improving training effectiveness (Majumder & Mondal, 2021).

AI also boosts employee motivation and engagement through personalised, data-driven solutions. It customises engagement strategies with advanced data analytics, designing targeted recognition and reward systems aligned with individual contributions (Goswami et al., 2023). AI systems offer continuous, real-time feedback, supporting ongoing development and engagement (Mittal et al., 2023). AI-driven gamification introduces elements like leaderboards, badges, and rewards, making work more enjoyable and motivating (Garg et al., 2022).

In recruitment, automated screening tools analyse data from resumes and social media profiles to match candidates to job descriptions, reducing preliminary screening time and effort (Balcioğlu & Artar, 2024). AI-driven chatbots and digital interviews engage candidates through chat interfaces and assess suitability using voice and facial recognition

**Table 2.** AI Tools and Technologies in HR Practices (Source: Authors).

HR Practice	AI Tools & Technologies	Sources
HR Planning	ML, deep learning, evolutionary programming, predictive analytics, soft computing, Data mining, knowledge discovery	(Pereira et al., 2023; Deepa et al., 2024; Jia et al., 2018)
Talent Acquisition and Management	Automated resume screening, Applicant Tracking Systems (ATS), intelligent search engines, chatbots, predictive analytics, NLP, facial recognition, video interviews, Pattern recognition in data and natural language understanding, voice recognition, Leap.ai's, JUMP (Job User Matching Forecast).	(Böhm et al., 2024; Faqih & Miah, 2023; Jia et al., 2018; Hasan et al., 2024)
Performance Evaluation	ML, predictive analytics, data mining, neural networks, support vector machines (SVM), Intelligent decision support systems, 360-degree evaluation methods	(Varma et al., 2024; Hasan et al., 2024) (Jia et al., 2018; Gupta et al., 2023; Raza et al., 2022)
Training and Development	Personalized learning systems, virtual reality (VR), augmented reality (AR), AI-powered chatbots, voice recognition, data mining, Generative AI	(Chen, 2022; Huang et al., 2023; Majumder & Mondal, 2021; Jia et al., 2018; Park, 2024)
Employee Motivation and Engagement	AI-driven gamification platforms, real-time feedback systems, sentiment analysis software, emotional intelligence analytics tools, Cognitive Computing (Natural language, speech, and image processing), Virtual assistant systems	(Goswami et al., 2023; Mittal et al., 2023; Garg et al., 2022; Jia et al., 2018; Deepa et al., 2024)
AI-driven recruitment	Automated resume screening, NLP for chatbot interactions, predictive analytics, digital interview platforms, voice and facial recognition, JUMP, OCR (Optical Character Recognition), Cognitive Computing (Natural language, speech, and image processing), ATS	(Balcioglu & Artar, 2024; Hasan et al., 2024; Chen, 2023b)
Employee Performance Prediction	ML, predictive modeling, cluster analysis, natural language processing, neural networks, random forests	(Hasan et al., 2024; Jia et al., 2018; Gupta et al., 2023)

technologies. AI also identifies and engages passive candidates with personalized job offers (Balcioglu & Artar, 2024).

The Table 2 summarises the specific AI tools and technologies used across various HR practices.

## 5.2. Strategic Integration and Bridging Research Gaps in AI-Driven HRM

The current literature highlights the capabilities of AI in promoting fairness and transparency by implementing blind hiring techniques, such as removing personal information like names, ages, photos, genders, races, or ethnicities from resumes, thereby minimising human biases (Mer, 2023). Additionally, AI-driven algorithms are praised for their ability to analyse workforce profiles and monitor diversity metrics in real-time, enhancing organisational diversity (Votto et al., 2021). AI applications in HRM functions are designed to facilitate HR decision-making and organisational goals based on massive datasets. These data-driven approaches are seen as superior to human decision-

making due to their ability to interpret large-scale data more objectively. This objectivity helps in promoting fairness and reducing biases in HR practices (Poggenpohl, 2020). Despite these positive aspects, there is a noticeable gap in understanding the long-term implications of these AI applications on employee satisfaction and organisational culture. Many studies focus on the immediate benefits of AI, such as efficiency and bias reduction, but fail to address how these changes impact the overall employee experience and whether the perceived fairness of AI-driven decisions sustains over time.

Furthermore, contradictions arise in the literature concerning the efficacy and ethical implications of AI in HRM. While some research emphasises the objectivity and data-driven nature of AI systems as superior to human decision-making, promoting fairness and reducing biases (Poggenpohl, 2020), other studies highlight the risk of AI replicating existing biases present in training data. This confirmation bias can lead to perpetuating discrimination rather than eliminating it (Chowdhury et al., 2023). Moreover, the transparency of AI algorithms remains a contentious issue. Although

AI can provide clear and data-backed justifications for HR decisions, enhancing trust and reducing perceptions of bias, there are concerns about the opacity of these algorithms (Chowdhury et al., 2023). The lack of transparency in how AI reaches its decisions can undermine trust and pose ethical dilemmas, particularly when these decisions significantly impact employees' careers (Langer & Konig, 2023).

### 5.3. Limitations of this research

This review, while employing a rigorous methodology to filter and analyse articles pertinent to the integration of AI in HRM practices, is subject to limitations. Notably, the exclusion of diverse sources, including books, reports, and editorials, may have overlooked valuable insights, particularly considering the rapid advancements in AI applications within HRM. The keyword search formula and Boolean operators, despite their specificity, might not have captured the entire spectrum of relevant literature. Nonetheless, this review stands as an extensive exploration of AI in HR practices, covering developments from 2018 to February 2024, and sheds light on both the practical applications and the legal and ethical frameworks surrounding them.

### 5.4. Recommendations for future research

Expanding on this study, future research should focus on developing and testing comprehensive frameworks for the effective adoption and strategic implementation of AI in HRM practices. This includes the exploration of AI's impact on talent acquisition strategies and employee engagement methodologies, emphasising the necessity of ethical considerations essential to fostering a trustworthy AI-HRM integration. Such frameworks could guide organisations in deploying AI tools that align with ethical norms and HR objectives, ensuring the technology's benefits are maximised while mitigating potential risks. Another promising research direction involves delving into the differential effects of AI applications across various HRM functions, such as social relations management and training development. Investigating these areas can uncover best practices and identify potential pitfalls, offering insights into optimising AI's contribution to HRM.

Additionally, understanding employee perceptions toward AI's role in HRM, especially regarding job satisfaction, career development opportunities, and workplace inclusivity is crucial. This research could

reveal how AI influences employee experiences and engagement, providing a roadmap for integrating AI technologies that enhance the workplace environment and support employee growth.

Moreover, studies examining organisational culture shifts necessitated by AI integration are vital. Focus should be placed on leadership approaches and change management strategies conducive to successful AI adoption within HRM. This includes assessing how leaders can navigate the transformation AI brings to HR practices, ensuring smooth transitions and maintaining organisational integrity. Finally, broadening the scope of literature review sources, including specialised journals and databases, will enhance the depth of future enquiries. By incorporating diverse perspectives and findings, research will advance our understanding of AI's multifaceted role in HRM, providing a richer, more nuanced understanding of how AI technologies can be leveraged to redefine HR practices in the era of digital transformation.

## 6. Conclusion

In this systematic literature review, we delved into the integration of Artificial Intelligence within Human Resource Management, revealing the profound implications for both organisational strategies and individual employee dynamics. Through an exhaustive analysis of 77 articles, our study identified critical thematic areas, including AI's transformative role in HRM, the burgeoning paradigm of human-AI collaboration, and the intricate challenges and opportunities AI presents within HR practices.

Our findings illuminate the expansive influence of AI across multiple HR functions, extending well beyond the confines of recruitment. We observed significant impacts on performance management, employee engagement, and the strategic planning of HR activities. Notably, AI's application facilitates enhanced decision-making, fosters a more engaged workforce, and streamlines HR operations, underscoring the technology's potential to revolutionise HR practices.

Moreover, our review underscores the essential role of ethical considerations and the strategic integration of AI within HR. As organisations navigate the complexities of AI adoption, our analysis emphasises the importance of developing ethical frameworks and fostering a culture of collaboration between humans and AI to enhance HR practices effectively.

In conclusion, this study charts the current landscape of AI applications within HRM and sets the stage for future research. It highlights the need for a multidisciplinary approach to fully realise AI's potential in reshaping HRM into more efficient and innovative practices. By addressing these comprehensive aspects, this research contributes to a deeper understanding of AI's role in HRM, offering valuable insights for both practitioners and researchers in the field.

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## Ethical considerations

Not applicable.

## Competing Interests

The authors confirm that there are no conflicts of interest.

## Funding

This research did not receive any financial support.

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