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Application of AI in Talent Management: A Systematic Review of Benefits, Challenges, and Prospects

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Abstract

This systematic literature review explores the current state, advantages, disadvantages, and potential future of using artificial intelligence in talent management. A total of 29 articles published in 2015- 2024 suggest that 33% of the organizations have implemented AI/ML tools, and only 16% are optimally using HR technologies for organizational results. The review identifies four key domains of AI implementation: recruitment and selection, performance analysis, development and training of employees, and strategic implementation. Benefits include increased operational effectiveness, improved decision-making, organizational talent management, and workforce planning processes. That said, technical difficulties, ethical issues on the use of artificial intelligence, privacy, and some organizational individuals' reluctance towards using artificial intelligence remain major hurdles. The results show an increase in the number of publications in recent years, focusing on 2023 and occupying the majority share of journals (83%). More future directions focus on developing a strong theoretical foundation, implementation proposals, and improved ethical standards. These observations indicate that AI holds the potential to revolutionize TM practices but also that organizations need to be cautious of the challenges pertaining to technology integration keeping in view the ethical and human aspects of organizational functioning to effectuate successful implementation.

Keywords

Artificial intelligence
Employee development
Human resource management
Systematic review
Talent management

INTRODUCTION

The advancement of artificial intelligence in organizations has increased very rapidly, and thus has transformed Human Resource Management (HRM) very much. With these advantages, the ability of AI to enhance the processes of talent management through the automation of recurrent activity, minimizing the incidences of an erroneous conclusion while enhancing the effectiveness in the areas of recruitment, talent acquisition, performance, and employee turnover. Unlike other practices in Industry 4.0, data-driven technologies are central to workforce planning and talent management (Chamorro-Premuzic et al., 2017) and the continued digitization of HR. These AI applications include, among others, machine learning, NLPs, and predictive analytics, which are prevalent in the use to enhance talent management plans (Kaur et al., 2021; Rezzani et al., 2020; Rodgers et al., 2023).

These tools assist organizations to improve their recruitment strategies, estimate fit match levels and develop viable employee learning-teaching interventions. As the volume of data rises, which companies must face, the role of AI in assisting talent management to make decisions remains vital. In practice, AI has already been integrated into some parts of talent management, for example, recruitment, training, and performance management (Kar et al., 2021; Popo-Olaniyan et al., 2022), although there is no agreement on the efficiency of AI in all dimensions of talent management. However, problems of the lack of human oversight, algorithmic bias, and potential gains in scalability and efficiency continue despite the potential of improving efficiency, scalability, and objectivity.

Problem Statement

By using AI in human HR processes, improving hiring procedures through predictive analytics, customizing staff development programs, and detecting early indicators of disengagement or unemployment, artificial intelligence (AI) can significantly impact this area. HR departments may greatly lower administrative workloads, increase talent matching accuracy, and cultivate a more engaged and productive staff by utilizing AI, which will eventually boost organizational performance and employee retention.

Research Objectives

Additionally, recent research pays less attention to the impact of AI on HR long-run outcomes: employee satisfaction, engagement, and retention. Given these lacunae, this SLR aims to fill these gaps by administrating the applications of AI regarding talent acquisition, retention, and performance evaluation in the domain of talent management. AI adoption in the context of talent management will be reviewed to assess the state of the affairs, benefits, and harm of adopting AI. It describes how AI will help improve talent management processes in all stages or aspects, while dealing with the ethical implications, data privacy issues, and the organization's readiness concerns.

Research Questions

The questions addressed in this review are as follows:

- To evaluate the status of AI applications in talent management across industries, identifying key trends and technological developments
- To analyse the benefits of AI in talent management processes, such as recruitment, employee engagement, retention, and performance management
- To explore the challenges associated with AI adoption in talent management, including ethical concerns, data privacy, and organizational readiness
- To identify prospects for AI-driven innovations in talent management and predict emerging trends and potential advancements in the field

Significance of the Study

As AI becomes more and more integral to decisions made in HR, we must examine how these technologies influence talent management practices and what issues they face. While the literature on AI and talent management is diverse and fragmented, a review of the literature is needed to consolidate the findings of the studies in the field. This review closes this gap between theory and practice through insights about the status and future AI for the practices. This review discusses how AI is shaping the future of talent management, provides concrete recommendations for HR practitioners, and outlines some areas for future research. In addition to that, it will further the conversation on the ethical, legal, and social implications of AI in talent management and inform future innovation.

METHODOLOGY

Building on a rigorous methodology, this systematic literature review (SLR) provides a comprehensive and unbiased synthesis of the existing literature on using Artificial Intelligence (AI) in talent management. This SLR was undertaken by the PRISMA guidelines, with specific inclusion and exclusion criteria, to ensure that results are transparent and replicable.

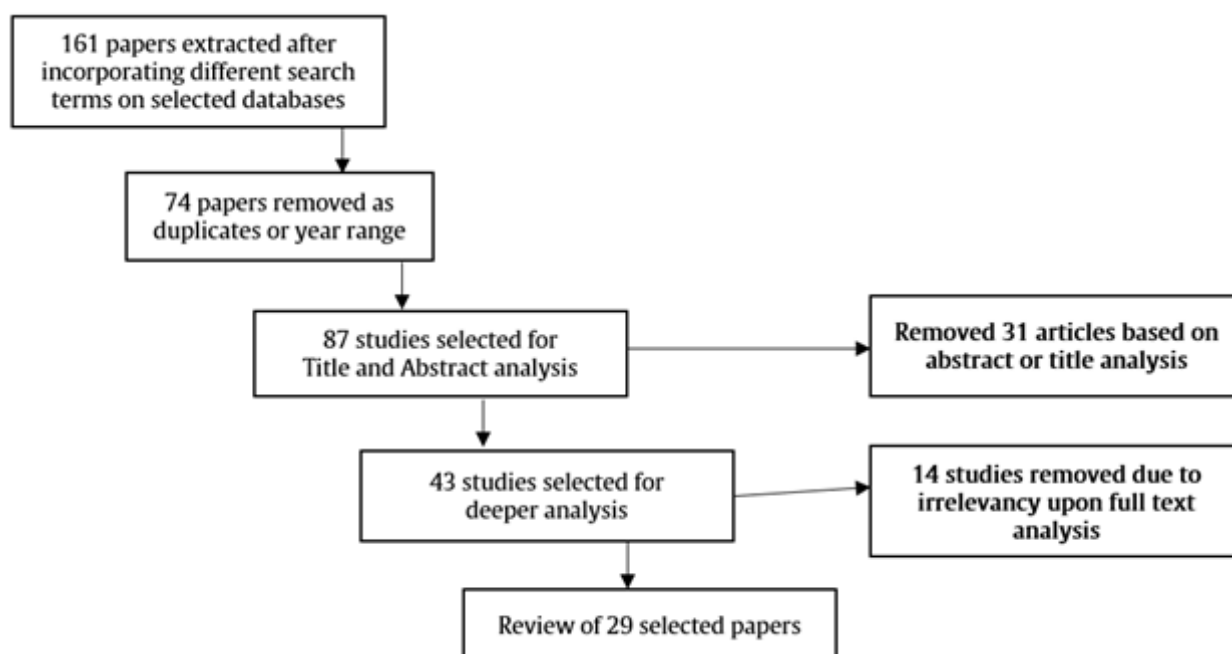


Fig. 1. Pictorial Summary of Review Process

A review process started by searching various academic databases using search terms such as “Artificial Intelligence,” “Talent Management,” “Recruitment,” “Employee Retention,” and “Performance Management.” Initially, 161 papers were retrieved. 87 articles were selected for title and abstract screening after removing duplicates and those outside the specified year range (2015 to 2024) (Figure 1). Of these, 31 articles were removed for irrelevance based on abstract or title content, and 43 studies remained for closer examination. Eligible 29 articles came from further full text screening to eliminate 14 studies which did not fit the specific criteria of relevance to use of AI in talent management (Figure 1).

Table 1

Search Results

| Search Items | Database | Search Limiters | Hits |
|--|--|-----------------------------------|------|
| "Artificial Intelligence" AND ("Talent Management" OR "Human Resource Management") | Scopus, Web of Science, IEEE Xplore, ScienceDirect | Peer-Reviewed Journals: 2015-2024 | 97 |
| "AI" AND ("Recruitment" OR "Training" OR "Talent Acquisition" OR "Talent Retention" OR "Performance Management") | Scopus, Web of Science, IEEE Xplore, ScienceDirect | Peer-Reviewed Journals: 2015-2024 | 64 |
| Total articles before screening | | | 161 |
| Articles after removing duplicates | | | 87 |
| Articles after title and abstract screening | | | 74 |
| Articles excluded based on quality assessment | | | 43 |
| Final articles included in the review | | | 29 |

Table 2
Summary of Empirical Articles Included in Review

| Reference | Main Findings | Recommendations |
|---------------------------------------|--|---|
| Chamorro-Premuzic et al., (2017) | AI enhances talent identification accuracy and candidate engagement | Need to explore ethical implications and accuracy of AI assessments in real-world HR |
| Rajesh et al., (2018) | AI increases efficiency in talent acquisition and allows HR to focus on strategic initiatives. | Assess the long-term effects of AI on talent management and employee experience. |
| Albert (2019) | Companies are reluctant to adopt AI despite its proven efficiency and benefits. | Research needed on barriers to AI investment in recruitment |
| Gonzalez et al., (2019) | AI/ML can enhance assessment processes when implemented fairly | Increase collaboration among professionals; emphasize research on AI/ML tool validation |
| Maity (2019) | AI enables personalized learning experiences | Investigating long-term impacts on training effectiveness |
| Tambe et al., (2019) | Combined AI and EI approach improves employee retention | Research integrated approaches combining AI with emotional intelligence |
| Acikgoz et al., (2020) | AI-based interviewing is perceived as less fair; it lacks two-way communication. | Examine AI fairness across different contexts and industries. |
| Pillai & Sivathanu (2020) | Privacy concerns hinder AI adoption in talent acquisition | Explore practical implementations and long-term impacts |
| Black & van Esch (2021) | AI tools enhance recruitment efficiency and reduce costs | Focus on both short-term and long-term AI recruitment strategies |
| Hmoud & Várallyai (2021) | Perceived advantages lead to positive attitudes towards AI adoption | Enhance education and training on AI tools for HR professionals |
| Liu et al., (2021) | AI enhances efficiency in talent management | Organizations should adopt intelligent practices |
| van Esch et al., (2021) | AI improves candidate identification and attraction | Explore the indirect effects of technology on recruitment |
| Chen et al., (2022) | AI optimizes talent selection through performance prediction | Validate AI competency model in different organizational contexts |
| Chitrao et al., (2022) | AI simplifies recruitment processes but may not capture human complexity | Research AI's role in expanding global talent pools |
| Abdurakhmanov et al., (2023) | AI enhances human capital development | Explore AI-human partnerships across industries |
| Agnihotri et al., (2023) | AI contributes to efficient talent acquisition | Expand research on AI's role in talent intelligence across regions |
| Chalutz-Ben Gal & Tursunbayeva (2023) | AI improves managerial efficiency but faces adoption challenges | Explore multi-level AI adoption factors in HRM |
| Chowdhury et al., (2023) | AI creates value when integrated with human skills | Develop non-technical resources and integrate AI with employee roles |
| Faqihi & Miah (2023) | AI improves assessment and planning in talent management | Develop a framework for organizational readiness assessment |
| França et al., (2023) | AI enhances talent identification efficiency | Develop frameworks for ethical AI use in HRM |
| Kamaruddin et al., (2023) | AI helps bridge the skills gap between education and industry | Explore academia-industry collaborations |
| Prikshat et al., (2023) | AI enhances operational and financial performance | Encourage more empirical research linking AI applications to performance |
| Qin et al., (2023) | AI enables real-time decision-making in talent management | Focus on open challenges in AI-driven talent analytics |
| Saxena et al., (2023) | Data-driven decisions can improve management practices | Adopt experimental approaches in HR data analytics |
| Jha & Janardhan (2024) | AI enhances candidate experience and recruitment effectiveness | Develop ethical frameworks and address privacy concerns |
| Yanamala (2024a) | AI enhances talent forecasting and operational efficiency | Address data quality challenges and ensure AI readiness |
| Yanamala (2024b) | AI enables personalized development opportunities | Validate findings in real-world settings |
| Tusquellas et al., (2024) | AI improves talent retention and skills development prediction | Address bias in AI algorithms and ensure skilled personnel recruitment |

Based on several predefined categories, data were extracted from the selected studies, including study design, key findings, AI applications in HR functions and challenges of AI adoption. Thematic analysis was employed to synthesize these data to identify the most frequent applications and emerging trends in AI

for talent management. Areas of interest in critical areas like AI talent acquisition, employee engagement, and performance evaluation were identified so that further exploration could be made. Details of the search results and empirical studies included in the review are provided in Tables 1 and 2, respectively. To assess the studies' quality, quality assessment tools, such as the Critical Appraisal Skills Program (CASP) framework, were employed to filter the studies further. Thus, only those papers featuring high-quality research were synthesized in this review (Tranfield et al., 2003). Using this approach, we have laid out a robust basis for considering AI's contribution to talent management and how the review is conducted, which is systematic and comprehensive.

RESULTS & FINDINGS

The systematic review yielded several notable patterns in the literature on AI applications in talent management.

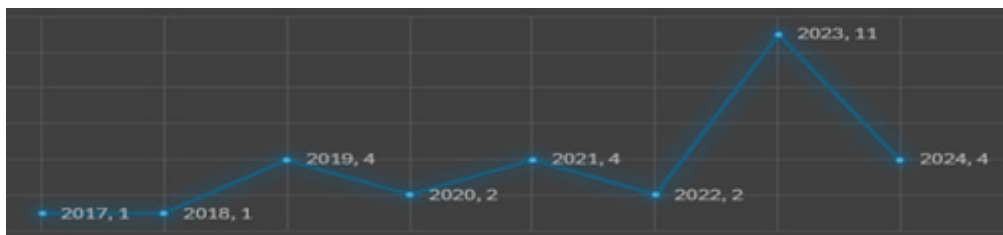


Fig. 2. Timewise distribution of reviewed papers

The temporal distribution of publications (Figure 2) shows a clear upward trend from 2017 to 2023, with a significant spike in 2023 (11 papers), followed by an expected decrease in 2024 (4 papers) due to the review's cutoff date. This pattern suggests growing academic interest in AI applications for talent management, particularly in recent years, with 2023 marking a substantial increase in research output.

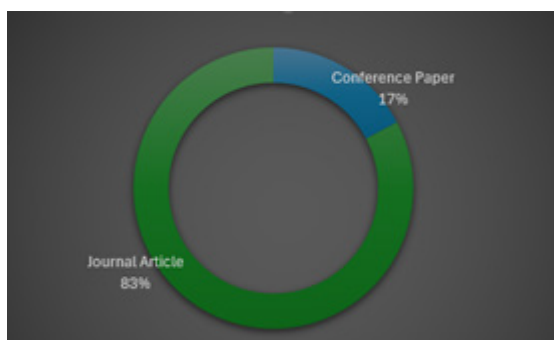


Fig. 3. Type of Paper distribution

The distribution of publication types (Figure 3) reveals that journal articles dominate the literature, comprising 83% of the reviewed papers, while conference papers account for 17%. This distribution suggests that research in this field has matured sufficiently to warrant extensive peer-reviewed journal publications rather than preliminary conference presentations. The predominance of journal articles also indicates a robust theoretical foundation and empirical validation of AI applications in talent management.

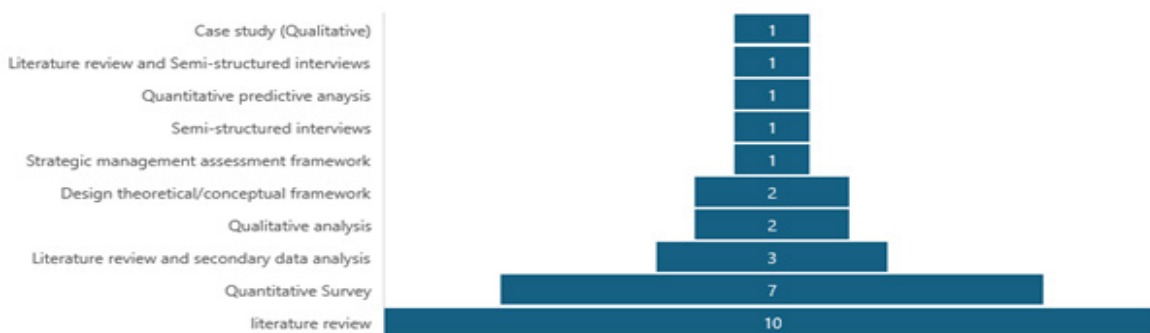


Fig. 4. Methodology distribution of reviewed papers

The methodological approaches employed across the reviewed papers (Figure 4) demonstrate diverse research strategies. Literature reviews were the most common methodology (10 papers), followed by quantitative surveys (7 papers), indicating a field still consolidating its theoretical foundations while gathering empirical evidence. The presence of literature review and secondary data analysis (3 papers), qualitative analysis (2 papers), and design theoretical/conceptual framework (2 papers) suggests a balanced approach between theoretical development and practical application. The less frequent methodologies, including case studies and semi-structured interviews, indicate opportunities for more in-depth qualitative research in specific organizational contexts.

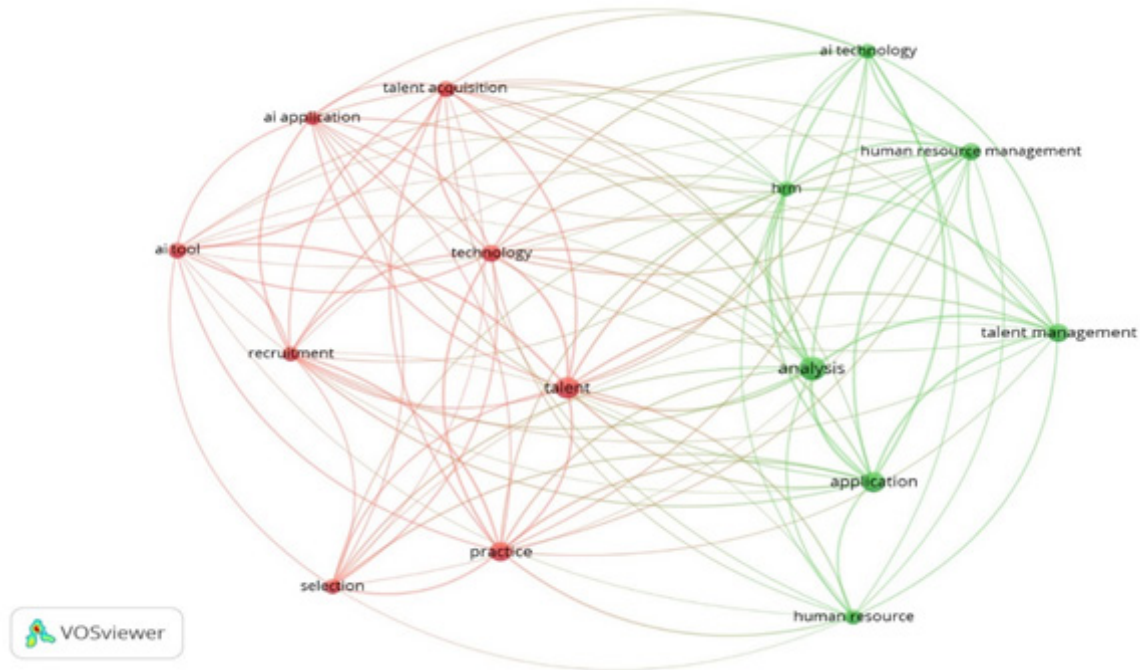


Fig. 5. Keyword Co-Occurrence Analysis

The keyword co-occurrence analysis (Figure 5) reveals two distinct but interconnected clusters of research focus. The red cluster canters around operational aspects, including recruitment, selection, and AI tools, while the green cluster emphasizes strategic elements such as human resource management and talent management. The central position of terms like “talent” and “analysis” between these clusters suggests their role as bridging concepts. The network visualization also highlights the strong connection between AI technology and practical applications, particularly in recruitment and talent acquisition processes. This analysis reveals that while AI applications in talent management span operational and strategic domains, there is strong interconnectivity between these areas, indicating an integrated approach to AI implementation in HR practices.

Table 3**Results summary for RQ1: Status of AI Applications in Talent Management**

| | | |
|---|--|--|
| 1 | Current Implementation Status | 33% of organizations have adopted AI/ML tools |
| | | Only 16% effectively utilize HR technology for organizational outcomes |
| 2 | Recruitment and Selection Applications | Early stages of talent analytics adoption |
| | | AI-driven resume screening and analysis |
| | | Video interview systems |
| | | Candidate-organization fit assessment |
| | | Industry 4.0 job advertisement optimization |
| | | New job profile creation |
| | | Automated initial screening processes |
| | | Machine learning-based candidate evaluation |
| 3 | Performance Analysis Systems | Mathematical programming for competency optimization |
| | | Predictive modelling for work performance |
| | | Recruitment decision models (acceptance/rejection prediction) |
| | | •AI-enabled biometrics in recruiting |
| | | Performance tracking and analysis tools |
| 4 | Development and Training Systems | Personalized learning platforms |
| | | •Training effectiveness assessment tools |
| | | Customized development pathway creation |
| | | •Skill gap analysis systems |
| 5 | Strategic Implementation Areas | Big data processing capabilities |
| | | Resource optimization systems |
| | | Rapid decision-making tools |
| | | Data-driven strategic planning |
| | | Integration with existing HR systems |

Table 3 presents a comprehensive overview of AI applications' status in talent management, organized into five key domains to answer RQ1. The diagram illustrates that 33% of organizations have adopted AI/ML tools, and only 16% effectively utilize HR technology for organizational outcomes. The implementation areas span from recruitment and selection (featuring AI-driven screening and video interviews) to strategic implementation (including big data processing and resource optimization). Each domain shows specific applications, demonstrating the breadth of AI integration across talent management functions.

Table 4
Results summary for RQ2: Benefits of AI in Talent Management

| | | |
|---------------------------|--------------------------------------|--|
| 1 | Operational Efficiency | Massive data processing capability |
| | | Reduced time-to-hire metrics |
| | | Cost reduction in hiring processes |
| | | Automated resume screening |
| | | Enhanced candidate pool management |
| | | Resource allocation optimization |
| 2 | Decision Quality Improvements | Standardized assessment processes |
| | | Enhanced reliability in evaluations |
| | | Consistent evaluation criteria |
| | | Sophisticated predictive analytics |
| | | Performance prediction capabilities |
| | | High-potential identification |
| 3 | Personalized Development | Succession planning support |
| | | Customized training programs based on Current skill levels |
| | | Learning preferences |
| | | Career aspirations |
| | | Performance data |
| | | Development potential |
| | | Enhanced learning outcomes |
| | | Improved employee engagement |
| | | Knowledge-sharing platform effectiveness |
| Higher satisfaction rates | | |
| 4 | Strategic Workforce Planning | Lower turnover rates |
| | | Predictive workforce needs analysis |
| | | Proactive skill gap identification |
| | | Real-time engagement monitoring |
| | | Retention strategy development |
| | | Early intervention capabilities |
| | | Data-driven decision making |
| Resource optimization | | |

The benefits of AI in talent management are shown in Table 4, which visualizes interconnectedly the four categories of benefits. Improvements in data processing, reduced time-to-hire metrics, and cost reduction in hiring processes are considered operational efficiency. Standardized assessments and better predictive capabilities are emphasized as decision quality improvements. The Customized training category presents the customized training program designed based on career aspirations and skill levels. Predictive needs analysis and proactive retention strategies are the last two benefits of strategic workforce planning by AI on talent management.

Table 5
Results summary for RQ3: Challenges in AI Implementation

| | | |
|----------------------------|-----------------------------------|--------------------------------------|
| 1 | Technical Challenges | AI system complexity |
| | | "Black box" decision-making |
| | | Lack of interpretability |
| | | Transparency issues |
| | | Integration difficulties |
| | | System maintenance requirements |
| | | Data quality concerns |
| 2 | Ethical and Trust Issues | Algorithmic bias risks |
| | | Discrimination concerns |
| | | Legal compliance issues |
| | | Privacy regulation adherence |
| | | GDPR compliance |
| | | Transparency requirements |
| | | Trust deficits |
| 3 | Human Dimension Challenges | Decision control concerns |
| | | Resistance to change |
| | | Employee scepticism |
| | | Cultural resistance |
| | | Loss of human touch |
| | | Empathy concerns |
| | | Interpersonal connection maintenance |
| | | Cultural fit assessment accuracy |
| | | Training requirements |
| Resource allocation issues | | |
| 4 | Implementation Barriers | Professional training needs |
| | | System alignment with goals |
| | | Resource constraints |
| | | Change management requirements |
| | | Stakeholders buy-in |
| | | Integration with existing processes |
| | | Cost considerations |

Table 5 depicts how AI is treated in four critical arenas. System complexity and “black box” decision-making issues are technical challenges. Concerns around ethical and trust issues around algorithmic bias and privacy regulations are another important aspect. Challenges with the human dimension include resistance to change, employee skepticism, and cultural barriers. Professional training needs and alignment with organizational goals will present barriers to implementation. This comprehensive framework provides organizations with insight on potential obstacles in adopting AI and how to address them.

Table 6
Results summary for RQ4: Prospects and Emerging Trends

| | | |
|-----------------------------|---------------------------------------|---|
| 1 | Theoretical Development Needs | Enhanced theoretical frameworks |
| | | Performance linkage models |
| | | Empirical research on Tool reliability, Validity measures, Fairness assessments |
| | | Long-term impact studies |
| | | AI-human partnership research |
| 2 | Practical Implementation | Non-technical resource development |
| | | AI-employee role integration |
| | | Organizational readiness frameworks |
| | | Integration strategies |
| | | Context-specific applications |
| 3 | Future Development Areas | Ethical implementation guidelines |
| | | Enhanced accountability systems |
| | | Data-driven decision frameworks |
| | | Privacy protection mechanisms |
| | | Bias mitigation strategies |
| | | Quality assurance systems |
| | | Professional development programs |
| 4 | Strategic Planning Elements | Industry-academia collaboration |
| | | Short-term strategy alignment |
| | | Long-term implementation planning |
| | | Competitive advantage development |
| | | Resource optimization |
| | | Performance metric development |
| | | Global talent pool expansion |
| 5 | Educational and Training Focus | Cross-industry applications |
| | | HR professional development |
| | | AI tool training programs |
| | | Skill gap bridging initiatives |
| | | Industry-academia partnerships |
| | | Curriculum development |
| | | Professional certification programs |
| Continuous learning systems | | |

Table 6 outlines prospects and emerging trends in AI-driven talent management through five strategic areas to answer RQ4. Theoretical development emphasizes the need for enhanced frameworks and empirical research. Practical implementation strategies focus on organizational readiness and integration frameworks. Future development areas address accountability systems and privacy protection. Strategic planning elements cover both short—and long-term strategy alignment. The educational focus highlights the importance of HR professional development and industry-academia partnerships, providing a roadmap for future advancement.

DISCUSSION

Current Status of AI Applications to Talent Management

The transformation of traditional HRM into intelligent talent management is driven by the convergence of artificial intelligence, big data, and Internet technologies (Agnihotri et al., 2023; Liu et al., 2021; Rajesh et al., 2018). The current landscape of AI applications in talent management reveals promising developments and significant challenges (Acikgoz et al., 2020; Black & van Esch, 2021). Unlike traditional approaches, AI-enabled systems can analyse data from existing top performers to identify candidate attributes and talents that correlate with superior job performance without the need for predefined goal variables (França et al., 2023; Qin et al., 2023). Research indicates that approximately 33% of organizations have adopted AI/ML tools for talent identification, recruitment, and selection (Gonzalez et al., 2019). However, with just 16% of businesses effectively utilizing HR technology to connect human capital metrics to crucial organizational outcomes, talent analytics still needs to be in its early stages (Chamorro-Premuzic et al., 2017). The primary applications of AI in talent management currently encompass several key areas, discussed below.

Recruitment and Selection

From initial candidate screening to final selection decisions, recruitment is now being revolutionized by AI driven tools (Black & van Esch, 2021). These systems use machine learning algorithms to analyse resumes, video interview candidates, and review the fitness between the candidate and the organization (Jha & Janardhan, 2024). Recently, AI has been used in the industry 4.0 job advertisement and new job profiling (Albert, 2019; Pillai & Sivathanu, 2020), showing that technology is always evolving to play a part in talent acquisition.

Performance Analysis and Assessment

Mathematical programming and modelling techniques are becoming increasingly applied by organizations to optimize competency elements and predict work performance (Chen et al., 2022). These systems generate recruitment decision models which predict candidate acceptance, conditional acceptance and rejection using demanding data analysis (Agnihotri, et al., 2023; Chitrao, et al., 2022; Yanamala, 2024b). Additionally, AI-driven biometrics in recruiting help managers gain new insights about candidate assessment (van Esch et al., 2021).

Development and Training

Personalized learning experiences and an assessment of training effectiveness using an AI-powered platform are transforming employees' development (Yanamala, 2024a). This technology allows organizations to create a custom development path for employees and the organization's needs.

Strategic Implementation

The use of AI in talent management is strategic based on the ability to process huge data, resource constraints, and the need for fast decision-making (Black & van Esch, 2021; Chitrao et al., 2022; Jha & Janardhan, 2024; Prikshat et al., 2023). With huge data leveraging and quick decision-making, AI is becoming an increasingly apt tech that helps organizations make superior decisions than humans do.

Benefits of AI in Talent Management

Integrating AI in talent management brings substantial benefits and transformative advantages spread across different dimensions of organizational performance. These benefits can be analysed across many critical domains, pulling an organization abreast towards increasing its ability to attract, develop and retain talent and enhancing its operational efficiency and strategic decision-making capabilities.

Operational Efficiency and Process Enhancement

Regarding its primary advantage over other applications, the use of AI helps eliminate time consumed in analysing massive amounts of applicant data and being able to manage a greater number of applicants in accelerated timeframes (Chalutz-Ben Gal & Tursunbayeva, 2023; Chen et al., 2022; Pillai & Sivathanu, 2020). In several ways, this important operational efficiency is shown. The first is that AI-driven tools can analyse, and screen resumes at scale, reducing time to hire metrics while maintaining consistent evaluation criteria. Second, NLP capabilities allow for automated analysis of several data sources, ranging from resume content to online social media activity to open-ended application responses. Time savings are, of course, benefits, but there are other efficiency gains. According to Chowdhury et al., (2023), organizations utilizing AI-driven recruitment tools, including recruiting chatbots and CV screening software, experience considerable cost reduction in their recruitment process. These tools help speed up the identification of who is a good fit for your firm, remove humans from the equation, and allow humans to be better at some of the more strategic aspects of talent management.

Enhanced Decision Quality and Objectivity

AI systems make decisive contributions to improving the quality and objectivity of talent-related decisions. AI tools can standardize the assessment processing, which, according to research (Chamorro-Premuzic et al., 2017; Pillai & Sivathanu, 2020), could lead to more dependable measurement than humans, whose judgments are likely to fluctuate among and across evaluators. In particular, standardization is particularly valuable in applying consistent evaluation criteria in the first screening stages. Besides helping organizations leverage sophisticated predictive analytics, integrating AI into decision-making processes also brings in value. Studies have shown that AI can predict employee performance and identify high-potential employees using several data points (Rajesh et al., 2018; Tambe et al., 2019). In that respect, this goes as far as succession planning, where AI tools can find and monitor future leaders based on measures of their performance and their trajectories for improvement.

Personalized Talent Development and Learning

Levels of personalization in talent development approaches are unprecedented and facilitated by AI. Current emerging AI can design individual training programs based on attributes of each employee such as present level of skills and competencies, learning preferences and styles, career goals and objectives, prior data in performance, future development perspective and so on (Faqihi & Miah, 2023; Tusquellas et al., 2024). The ability to personalize things has worked wonders for learning outcomes and employee engagement. According to Maity (2019), organizations implementing AI-based personalized learning programs experience much higher engagement rates and higher outcomes with respect to talent development. Studying further, the AI-enabled knowledge-sharing platform provides a higher employee satisfaction rate and lower employee turnover in innovation-driven industries (Yanamala, 2024a, 2024b; Saxena et al., 2023).

Strategic Workforce Planning and Retention

Another major benefit is that AI affects strategic workforce planning. The use of AI-enabled analytics has enabled organizations to predict workforce needs with improved precision, to identify skills gaps before they become critical to develop proactive strategies for retaining employees, monitor and respond to employee engagement levels in real time (Chowdhury et al., 2023; Faqihi & Miah, 2023; Kamaruddin et al., 2023; Pillai & Sivathanu, 2020). Early intervention in potential turnover situations is provided through implementing AI driven retention strategies, based on predictive analytics, and pulse surveys (Faqihi & Miah, 2023). This is a radical step up from the usual reactive approach to talent retention.

Table 7
Comprehensive Benefits of AI in Talent Management

| Benefit Category | Specific Advantages | Impact Metrics |
|------------------------|-------------------------------|-------------------------------|
| Operational Efficiency | Automated screening | Reduced time-to-hire |
| | Faster processing | Cost savings |
| Decision Quality | Reduced administrative burden | Increased throughput |
| | Standardized evaluation | Improved hire quality |
| | Predictive insights | Better performance prediction |
| Talent Development | Reduced bias | Increased objectivity |
| | Personalized learning | Higher engagement rates |
| | Adaptive training | Improved learning outcomes |
| Strategic Planning | Skill gap analysis | Better skill alignment |
| | Workforce forecasting | Reduced turnover |
| | Retention modelling | Improved succession planning |
| | Engagement tracking | Better resource allocation |

Challenges Associated with AI in Talent Management

Despite its transformative potential, implementing AI in talent management faces numerous significant challenges that organizations must carefully navigate. At the technical level, organizations struggle with the inherent complexity of AI systems, particularly the “black box” nature of AI predictions (Gonzalez et al., 2019). This lack of interpretability poses significant challenges in maintaining transparency in selection processes and justifying hiring decisions (Agnihotri et al., 2023). Furthermore, as highlighted by Abdurakhmanov et al., (2023). Organizations face substantial barriers to training HR professionals to use AI tools effectively and align these systems with organizational goals. Ethical considerations and trust issues represent another crucial challenge cluster in AI implementation. The risk of algorithmic bias remains a persistent concern, with studies indicating that AI systems can potentially introduce biases that disproportionately affect underrepresented groups. Such biases can lead to discrimination and potential legal issues, causing irreparable brand damage. Organizations must also navigate complex privacy regulations, including GDPR, while maintaining transparency in AI-driven decision-making processes (Chalutz-Ben Gal & Tursunbayeva, 2023; Gonzalez et al., 2019; Hmoud & Várallyai, 2021). Trust deficits complicate implementation, as research indicates widespread scepticism towards AI due to limited understanding of its functionality and reluctance to relinquish decision control.

The human dimension of AI implementation presents its own set of challenges. Organizations frequently encounter resistance to change, manifesting as employee scepticism towards AI-driven decisions and cultural resistance to technological change (Kamaruddin et al., 2023; Pillai & Sivathanu, 2020; Yanamala, 2024b). The potential erosion of human qualities like empathy in talent management processes raises concerns about maintaining meaningful interpersonal connections and accurate cultural fit assessments. Implementation barriers extend to resource allocation concerns and the comprehensive training requirements for HR professionals to utilize AI systems effectively. Organizations are developing various mitigation strategies to address these challenges. Educational initiatives focus on providing statistical training for talent management leaders and comprehensive user education on AI tool engagement. A hybrid approach has emerged as a promising solution, maintaining human oversight in decision-making while allowing minimal control over final decisions, particularly in objective domains. Organizations also establishing clear governance frameworks and ethical guidelines, complemented by regular monitoring and assessment of AI systems.

Table 8
Key Challenges in AI-Based Talent Management

| Challenge Category | Description | Impact Areas |
|----------------------|------------------------------|---------------------------|
| Technical Complexity | Black box decision-making | Decision justification |
| | Interpretation difficulties | Stakeholder communication |
| | Algorithm transparency | Process improvement |
| Ethical & Legal | Regulatory compliance | Legal risk |
| | Data privacy concerns | Reputation damage |
| | Algorithmic bias | Fair treatment |
| Human Factors | Negative applicant reactions | Candidate experience |
| | Trust deficits | Employee Acceptance |
| | Resistance to automation | Implementation Success |

Prospects and Emerging Trends in AI-Driven Talent Management

The future of AI in talent management presents exciting opportunities and evolving challenges that will shape organizational practices. Key trends and developments will likely define the landscape in the coming years. Recent studies emphasize the need for a deeper theoretical understanding of AI in talent management. Prikshat et al., (2023) highlight the importance of developing more robust theoretical frameworks linking AI applications to organizational performance. This aligns with calls for increased empirical research on AI tool reliability, validity, and fairness (Gonzalez et al., 2019). Researchers also emphasize the importance of investigating the long-term impacts of AI adoption on training effectiveness (Maity, 2019) and exploring AI-human partnerships across diverse industries (Abdurakhmanov et al., 2023). Organizations face the challenge of translating theoretical understanding into practical applications. Studies suggest developing non-technical resources and integrating AI with employee roles (Chowdhury et al., 2023). This includes frameworks for assessing organizational readiness and AI-integration strategies (Faqihi & Miah, 2023). Research also emphasizes the importance of exploring practical implementations in various organizational contexts (Pillai & Sivathanu, 2020) and developing frameworks for ethical AI use in HRM (França et al., 2023). Future development must address ethical challenges and privacy concerns. Recent research emphasizes the need for enhanced accountability in data-driven decision-making (Saxena et al., 2023) and frameworks for ethical AI use (Tusquellas et al., 2024). Organizations must address data quality and privacy (Yanamala, 2024a) while mitigating bias in AI algorithms (Tusquellas et al., 2024).

Table 9
Future Directions in AI-Driven Talent Management

| Category | Future Direction | Priority Areas |
|---------------------------|--|---|
| Theoretical Development | Enhanced theoretical frameworks Multi-level adoption factors Long-term impact studies | Framework validation Cross-industry studies Performance metrics |
| Implementation Strategies | Organizational readiness assessment Integration frameworks Global talent pool expansion | Practical guidelines Change management Skills development |
| Educational & Training | Enhanced AI education for HR Industry-academia collaboration Skill gap bridging | Training programs Curriculum development Professional development |
| Ethical Considerations | Ethical framework development Privacy protection measures Bias mitigation strategies | Guidelines development Compliance frameworks Fairness measures |
| Technical Innovation | AI competency model testing Data quality improvement Advanced analytics development | Model validation Data management Analytics capabilities |
| Strategic Planning | Short and long-term strategy alignment Competitive advantage development Resource optimization | Strategic frameworks Resource allocation Performance metrics |

CONCLUSION

By analysing 29 peer-reviewed articles published between 2015-2024, this systematic review examines the integration of artificial intelligence into talent management. It reveals complex interactions between traditional talent management practices and AI technologies. The review made several recommendations for key implementation areas: recruitment, performance analysis, training, and strategic planning. It revealed some substantial benefits to adopting AI and areas requiring resolution. Temporal analysis reveals accelerating research interest in 2023 as well as, more generally, signalling increased academic and practical attention to this important juncture between technology and human resource management. This review has wide-ranging implications, theoretical, practical and policy. From a theoretical point of view, the findings imply that further developed frameworks which can better describe the link between AI implementation and organizational outcomes are needed. Comparing the current adoption and utilization state of AI and its effective deployment, existing theoretical models may be insufficient in modelling the complexities of integration of digital technologies in the context

of talent management. From a practical point of view, AI implementation is successful when it goes beyond technological infrastructure and incorporates organizational culture, employee readiness, and ethical implications. Based on these findings, it was concluded that although AI can dramatically improve operational efficiency and decision quality, its benefits truly depend on the extent to which organizations address implementation challenges, including recognizing when data privacy, algorithmic bias, and human factors are not fully addressed in place. The results imply the urgent need to provide for clearer regulatory frameworks in balancing innovation with ethical consideration, particularly regarding how data protection, the transparency of algorithms, and fair employment practices can work or not. As the emerging patterns in AI adoption suggest, organizations also must develop more sophisticated change management strategies that address, for example, resistance to technological transformation with a focus on maintaining human-centric approaches to talent management.

Some practical recommendations for both research and practice are laid out. To better study the long-term impact of AI deployment on organizational outcomes and employee well-being, researchers need to prioritize doing longitudinal studies. However, developing and validating standardized metrics for measuring the effects of AI on talent management should also be the subject of study. To practice, the approach organizations should take to elevate their AI readiness is to aid with developing AI readiness assessment tools across all practitioners that comprehensively cover criteria to take into consideration, declaring clear ethical guidelines for deploying AI, and spending funds on targeted training focused on building both technical and adaptive human resource practitioners' capacity. Instead, policymakers should focus on building a flexible regulatory framework that can be adjusted to quick technological changes while giving distributive protection to employees' rights and personal data. It makes final recommendations such as establishing industry-academia partnerships to bridge the research-practice gap, developing a standardized framework for ethical AI implementation in the domain of talent management and developing industry-specific best practices for organizational adoption of AI through different stages. While AI presents transformative opportunities for talent management, its successful implementation requires a balanced approach considering technological capabilities, human factors, and ethical implications. The future of AI in talent management will likely depend on how well organizations can navigate these complex interactions while focusing on operational efficiency and human-centric values. As the field evolves, ongoing research and practical experimentation will be crucial in developing more effective approaches to AI integration in talent management practices.

Competing Interest

The authors reported no potential conflict of interest.

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