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Artificial Intelligence in HRM: A Scientometric Review of Global Publications

Loso Judijanto
IPOSS Jakarta

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ABSTRACT

The integration of Artificial Intelligence (AI) into Human Resource Management (HRM) has triggered a significant transformation in how organizations attract, manage, and retain talent. This study aims to map the intellectual structure, thematic trends, and collaborative patterns of global research on AI in HRM using a scientometric approach. Drawing data from the Scopus database and utilizing VOSviewer software, the analysis covers co-authorship networks, institutional collaborations, keyword co-occurrences, temporal trends, and density distributions. The results reveal that core themes revolve around AI-enabled decision-making, employee engagement, job satisfaction, and performance enhancement, while strategic topics such as innovation, technology adoption, and sustainable development are gaining momentum. India, the United States, and Malaysia emerge as leading contributors, highlighting strong regional clusters and international partnerships. This study provides actionable insights for practitioners, outlines theoretical pathways for scholars, and identifies emerging areas that merit further investigation. It serves as a foundational reference for understanding the evolving intersection between AI technologies and HRM practices in the digital age.

Corresponding Author:

Name: Loso Judijanto
Institution: IPOSS Jakarta
e-mail: losojudijantobumn@gmail.com

1. INTRODUCTION

The integration of Artificial Intelligence (AI) into the realm of Human Resource Management (HRM) represents one of the most profound shifts in modern organizational practices. As the digital economy continues to evolve, AI technologies such as machine learning, natural language processing, and predictive analytics are increasingly being deployed to optimize HRM functions, from recruitment and onboarding to performance appraisal, training, and employee engagement [1], [2], [3]. Traditional HRM processes, which once relied heavily on human intuition and manual labor, are being reengineered through automation and data-driven decision-making. In particular, AI offers the potential to eliminate bias in hiring, improve talent management systems, forecast workforce trends, and enhance employee satisfaction, thereby transforming HRM from a support function into a strategic driver of business value [4].

The acceleration of AI applications in HRM is fueled not only by technological advancements but also by the changing

demographics of the global workforce. As organizations strive to manage multigenerational, geographically dispersed, and digitally native employees, the demand for more responsive and personalized HRM systems grows. AI allows HR professionals to harness vast amounts of unstructured data from resumes, social media profiles, employee surveys, and performance metrics to gain actionable insights [5]. For example, chatbots powered by AI are increasingly used for answering employee queries, scheduling interviews, and conducting initial candidate screenings, activities that were traditionally time-intensive. Additionally, AI can aid in developing employee retention strategies by predicting attrition risks and identifying early warning signals of disengagement [6].

Despite these promising applications, the deployment of AI in HRM raises several ethical, legal, and organizational challenges. Concerns about privacy, surveillance, algorithmic bias, and the dehumanization of work processes are frequently cited in academic and practitioner circles. For instance, an over-reliance on AI in recruitment may perpetuate existing biases if the training data reflects historical discrimination [7]. Similarly, employees may resist AI-powered monitoring tools due to fears of surveillance and loss of autonomy. These concerns underscore the importance of establishing robust governance frameworks and ethical guidelines to ensure responsible AI use in HRM. Consequently, scholarly interest in AI-HRM intersections is rapidly growing, encompassing multidisciplinary perspectives from management, computer science, psychology, ethics, and law [8], [9].

In recent years, a burgeoning body of literature has emerged to examine the implications, practices, and outcomes of AI in HRM across diverse organizational contexts and geographic settings. However, the rapid pace of development and the fragmented nature of the research landscape pose significant challenges for scholars and practitioners seeking to gain a holistic understanding of this domain. Studies often vary widely in their theoretical frameworks, methodological approaches, and focal areas. This growing complexity calls for systematic synthesis and mapping of the global knowledge base to identify key trends, influential authors, collaborative networks, and future research frontiers [10], [11].

In this context, scientometric analysis offers a powerful methodology to quantitatively and visually explore the intellectual structure and thematic evolution of AI-related HRM research. Scientometric methods allow for the identification of core publications, citation patterns, keyword co-occurrence, institutional affiliations, and cross-country collaborations, thereby revealing the epistemic communities shaping the discourse. Furthermore, such an approach enables researchers to detect emerging topics, assess the impact of seminal works, and uncover knowledge gaps that warrant further inquiry. By leveraging bibliometric tools like VOSviewer and Scopus-indexed data, this study aims to provide a comprehensive overview of how AI is reshaping HRM scholarship on a global scale.

Although the integration of Artificial Intelligence into HRM has sparked growing academic and professional attention, the literature remains scattered and lacks a consolidated understanding of its evolution, key contributors, and thematic directions. Existing studies tend to focus on specific AI applications or HR functions in isolation, without offering a comprehensive picture of the broader research landscape. Moreover, there is limited insight into which countries, institutions, or scholars are leading the discourse, what collaborative networks are forming, and how research themes have shifted over time. This gap hinders both theoretical advancement and practical implementation of AI in HRM. Therefore, there is a pressing need to systematically map the global research output on this topic to identify dominant themes, intellectual influencers, and emerging trends. This study aims to conduct a scientometric review of global publications on Artificial Intelligence in Human Resource Management using data extracted from the Scopus database.

2. METHODS

This study employs a scientometric approach to analyze the global landscape of research on Artificial Intelligence (AI) in Human Resource Management (HRM). Scientometric analysis enables the objective mapping of scientific literature by identifying patterns, structures, and trends within a specific research field [12]. The method is particularly suited to explore the evolution and intellectual structure of interdisciplinary domains such as AI and HRM. For this purpose, the Scopus database was chosen due to its comprehensive indexing of peer-reviewed journals, conference proceedings, and book chapters across disciplines. The search strategy involved querying relevant keywords such as "Artificial Intelligence," "AI in HRM," "Human Resource Management," "machine learning in HR," and "AI recruitment" in the title, abstract, and keyword fields. Only publications written in English and published between 2000 and 2025 were included to ensure relevance and comparability.

The bibliographic data retrieved from Scopus were exported in RIS and CSV formats, containing information on authors, affiliations, publication years, titles, keywords, abstracts, citation counts, and references. These data were then processed and analyzed using VOSviewer software, which specializes in constructing and visualizing bibliometric networks. Key techniques applied in this study include co-authorship analysis (to identify collaborative patterns among authors, institutions, and countries), keyword co-occurrence analysis (to detect research themes and emerging topics), and citation analysis (to highlight influential publications and intellectual roots of the field). The threshold values for inclusion in visualization maps were determined based on minimum occurrence or citation levels to maintain clarity and focus on the most impactful contributions.

The analysis proceeded in several stages. First, a general overview of publication trends over time was generated to observe the temporal growth of interest in AI and HRM. Second, the co-authorship and institutional collaboration networks were visualized to identify core research hubs and international partnerships. Third, keyword clustering was conducted to classify the thematic structure of the field into major research domains.

3. RESULTS AND DISCUSSION

Co-Authorship Analysis

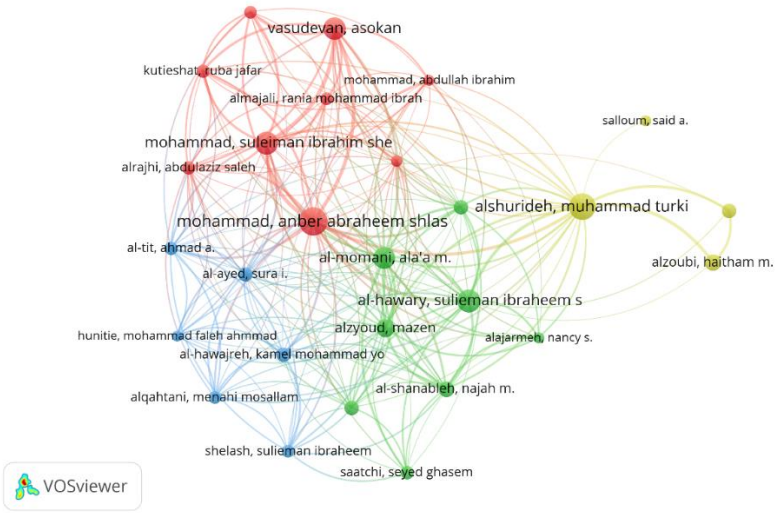

Figure 1. Author Visualization
Source: Data Analysis

Figure 1 illustrates a visualization of a co-authorship network in the field of Artificial Intelligence in Human Resource Management (AI in HRM).

Each node represents an individual author, and the links between them are joint publications. Colors mark various clusters of collaboration, indicating research communities or thematic clusters. The red cluster, led by central figures like vasudevan, asokan and mohammad, suleiman ibrahim she, appears to represent a close collaboration network possibly geared towards applied AI technologies in HRM. The green cluster, with alshurideh, muhammad turki and al-hawary, suleiman ibraheem s. at the center, suggests another firm research team, possibly based in Jordan or the Gulf. The blue and yellow clusters, however, suggest smaller but linked research teams. The mid-positioning of authors like mohammad, anber abraheem shlas indicates a bridging role between clusters, serving as a conduit for cross-disciplinary knowledge transfer.

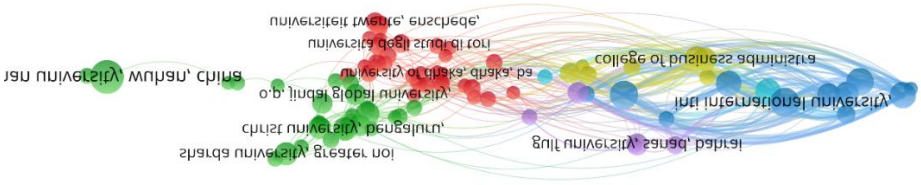

Figure 2. Affiliation Visualization
Source: Data Analysis

Figure 2 describes a co-authorship network of institutional collaboration in the area of Artificial Intelligence in Human Resource Management (AI in HRM). Every node represents an academic institution or research institution, and the edges indicate co-publication relationships. The network has multiple color-coded clusters, marking collaborative communities. The blue cluster, led by INTI International University and supported by College of Business Administration, demonstrates high intra-regional connectivity, possibly rooted in Southeast Asia. The green cluster, with Wuhan University, China as the hub, demonstrates important contributions from East Asia, though with relatively fewer external connections. The red cluster features universities like University of Dhaka and O.P. Jindal Global University, demonstrating high South Asian academic presence. Concurrently, regional institutions like Università degli Studi di Torino and Universiteit Twente are also present and create cross-regional partnerships. The network suggests more globalization of AI in HRM research through intercontinental partnerships, yet some institutions tend to be more regional in nature.

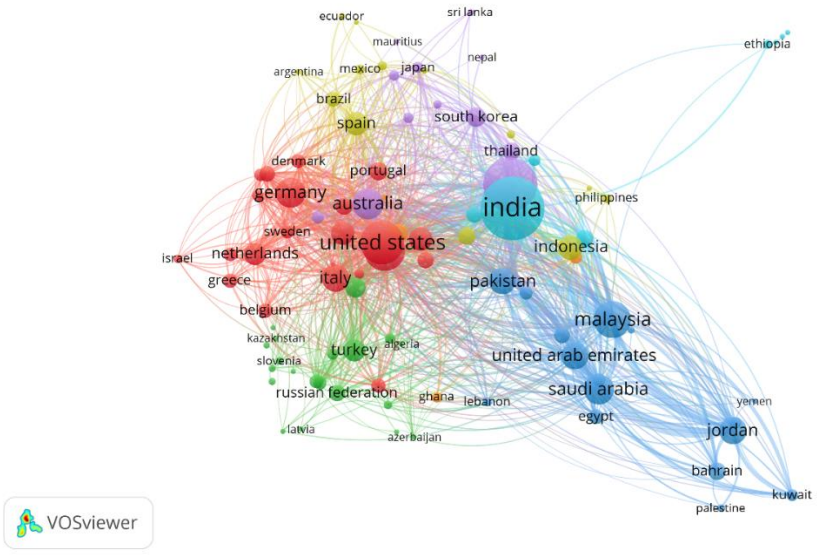

Figure 3. Country Visualization

Source: Data Analysis

Figure 3 demonstrates a country-level co-authorship network in Artificial Intelligence in Human Resource Management (AI in HRM) research, representing international research collaborations. Each node represents a country whose size indicates the volume of publications and links indicate the strength of co-authorship relationships. India, United States, and Malaysia are the top producers and are positioned centrally with high collaborative linkages dispersed across regions. The red group, dominated by the United States, Germany, and Western European countries, reveals strong transatlantic academic cooperation. The blue group, comprising Malaysia, Saudi Arabia, Jordan, and the United Arab Emirates, manifests vigorous inter-regional partnerships in Southeast Asia and the Middle East. India, on the other hand, is situated at the intersection of a number of groups, playing a vital global node role, connecting Western and Asian research networks. The presence of countries like Ethiopia, Nepal, and Azerbaijan, though smaller in node size, illustrates a growing geographic diversification of research participation.

Keyword Co-Occurrence Analysis

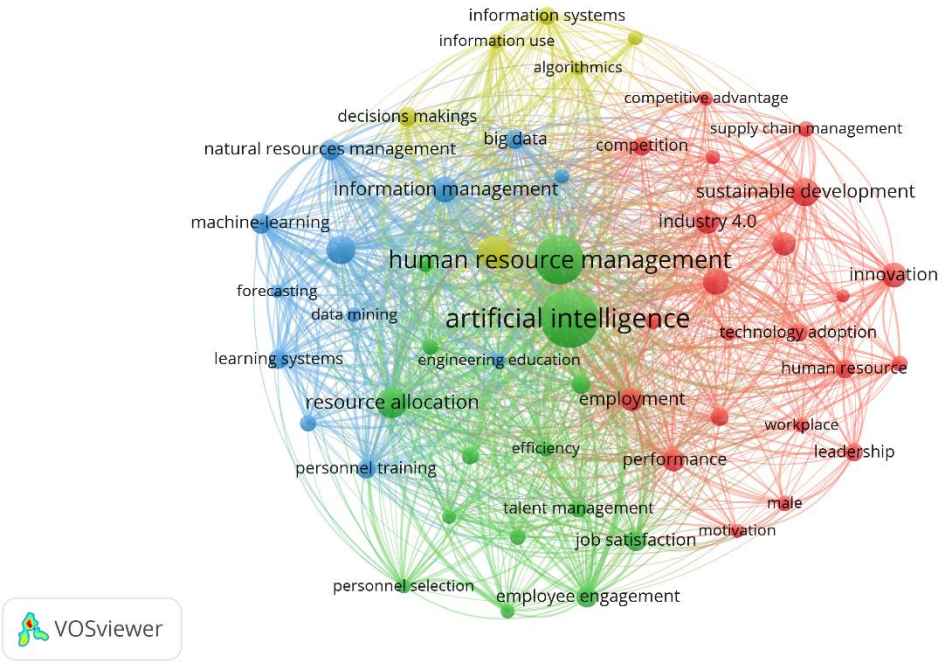

Figure 4. Network Visualization

Source: Data Analysis

Figure 4 illustrates a keyword co-occurrence network in AI in HRM, showing the intellectual structure and thematic clusters of the discipline. Central keywords such as artificial intelligence and human resource management occupy the center of the network, indicating their central role in the literature. The size of each node is directly proportional to the frequency of the keywords. The lines connecting them represent co-occurrence relationships—i.e., how frequently two terms co-occur in the same documents. The colors are different thematic clusters representing different research areas in this multidisciplinary field.

The green cluster, located at the center lower part of the map, appears to focus on human-centered AI applications in HRM, such as employment, job satisfaction, employee engagement, talent management, and efficiency. It reflects a strong research interest in applying AI tools to enhance workforce management, people decision-making, and HR outcomes like satisfaction and performance. It highlights the intersection of AI with psychological and

organizational behavior theories, mirroring HRM's growing alignment with data-driven and employee-centered initiatives. Sections on personnel selection, resource allocation, and training also reflect how AI supports both strategic recruitment and internal workforce skilling. The red cluster, on the other hand, covers strategic and technological topics like innovation, technology adoption, leadership, industry 4.0, sustainable development, and competitive advantage.

This cluster is more future-oriented, with a stress on the macro-level implications of AI use in HRM and overall organizational transformation. Also included are keywords like workplace, performance, and motivation, which link innovation to internal labor force processes. That supply chain management and competition are included suggests an interest in aligning HRM efforts with overall operational goals, positioning AI as a catalyst for competitive and sustainable human capital practices. The blue cluster is technically oriented, with terms such as machine learning, data mining, forecasting, information management, and learning systems. This cluster emphasizes the computational basis of AI in HRM, with an emphasis on tools and techniques used to examine big data, predict employee behaviors, and automate decision-making.

The occurrence of information systems and natural resource management signals interdisciplinary overlap with information and environmental sciences. Such technical focus is instrumental in enabling the operability of AI in HR, as these methods enable pattern recognition, anomaly detection, and real-time analysis across employee datasets. The yellow cluster is less prominent but identifies conceptual and methodological concerns, with terms including information use, decisions makings, algorithmics, and information systems. This category likely encapsulates scholarly efforts at understanding how AI-based knowledge is integrated into strategic planning and managerial decision-making. It may also involve examinations of transparency, explainability, and ethical use of algorithms for HR functions.

The dispersed location of the cluster in both technical and strategic domains reflects that these issues cut across both areas, emphasizing the need for accountable and interpretable AI systems in human resource management.

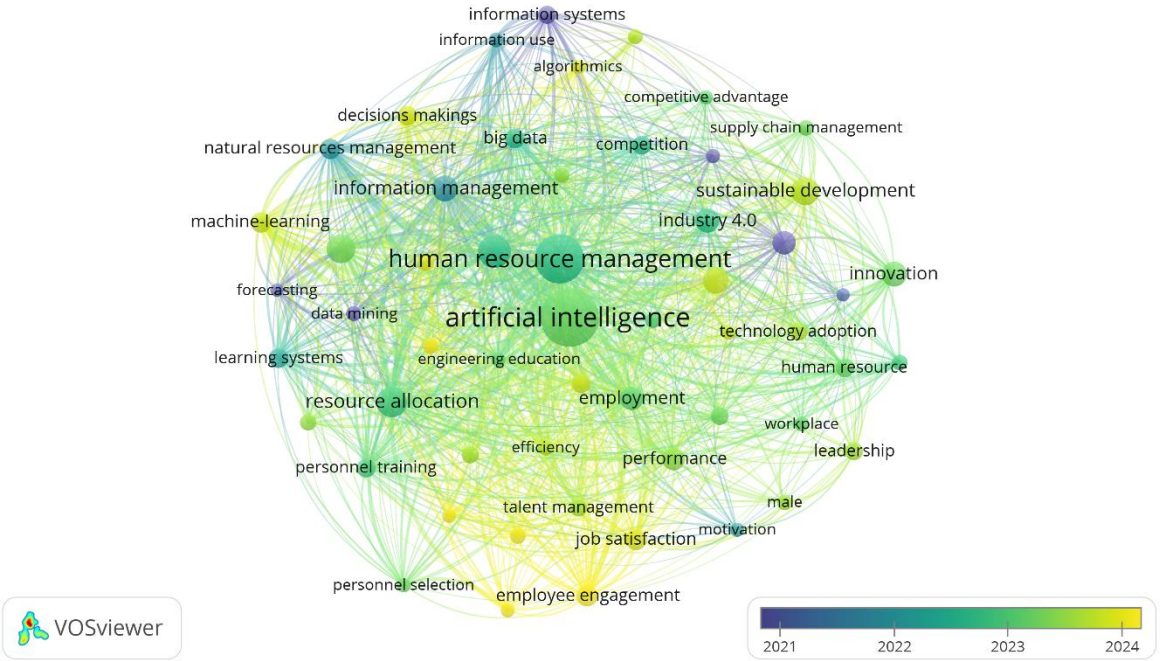

Figure 5. Overlay Visualization
Source: Data Analysis

Figure 5 is a keyword co-occurrence overlay visualization for the theme space of Artificial Intelligence in Human Resource Management (AI in HRM) with temporal consideration. The color gradient of purple to yellow represents the average year of publication for each keyword, from earlier themes near the year 2021 to newer themes near 2024. Core concepts such as artificial intelligence, human resource management, and employment are always core-centered across time, symbolized in green—indicating they have been dominant across the timeline but especially in 2022–2023. Their core positioning and node size indicate their core and enduring importance in the literature. Emerging and newly emerging concepts are symbolized in yellow, with growing interest across recent years (2023–2024). These terms consist of employee engagement, staff selection, job satisfaction, efficiency, and talent management. The chronological clustering of these terms indicates increasing scholarly interest in using AI to improve employee experiences and maximize HR functions like recruitment, motivation, and retention. This trend follows on from increased usage of AI in individuals' analytics, performance tracking, and customized employee development plans, indicating a shift towards fewer purely operational applications of AI and more strategic, people-oriented objectives. By contrast, blue and purple tinted keywords such as information systems, tech adoption, innovation, and algorithmics are terms that were higher in earlier articles (circa 2021–2022). These terms generally point toward the technology infrastructure, initial adoption processes, and theoretical underpinnings of AI systems in HRM. Their past dominance reflects that groundwork research initially focused on technological readiness and system design before moving to operational HR applications.

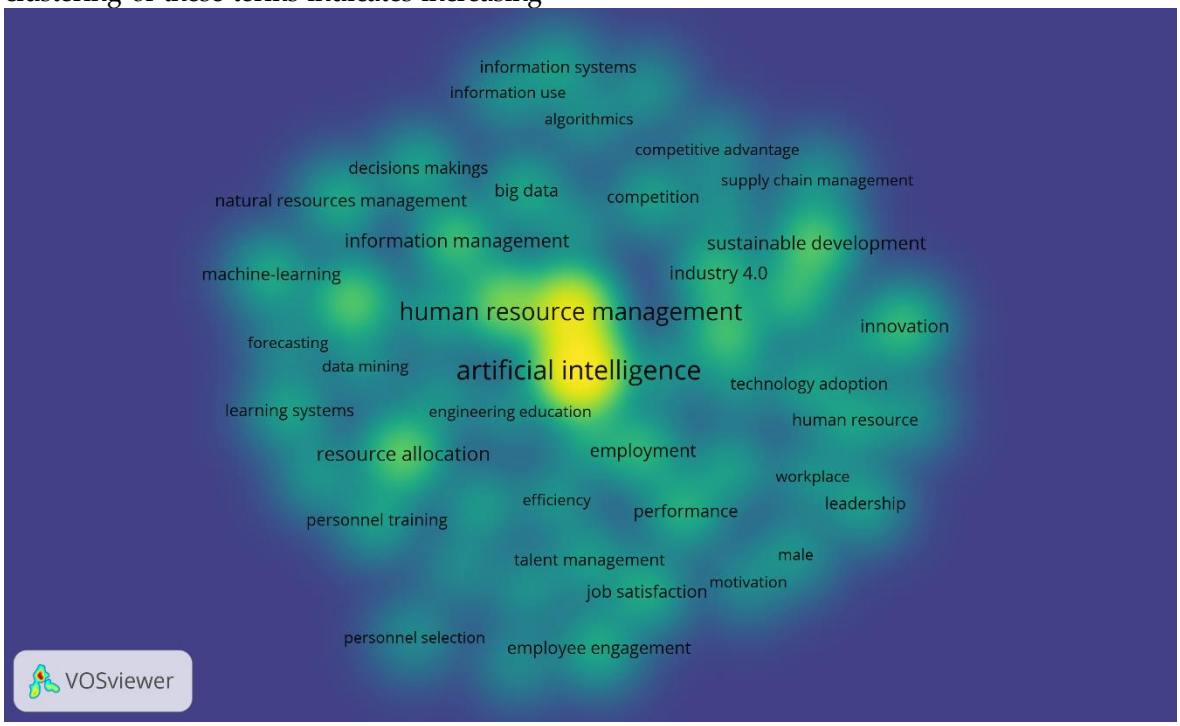

Figure 6. Density Visualization
Source: Data Analysis

Figure 6 illustrates the intensity and frequency of keyword usage within the field of Artificial Intelligence (AI) in Human Resource Management (HRM). The bright yellow zones signify areas of high keyword density, meaning these terms frequently appear across a large number of publications. At the center, artificial intelligence and human resource management dominate the landscape, reflecting their foundational role and centrality to the research domain. Closely linked concepts such as employment,

resource allocation, and information management also appear in lighter green zones, indicating substantial academic attention and consistent co-occurrence with central themes. In contrast, terms located on the outer edges of the map such as employee engagement, motivation, leadership, supply chain management, and competitive advantage appear in darker blue or greenish zones, indicating relatively lower frequency and density in the literature. This suggests that while these topics are present in the research field, they are either emerging areas or receive less emphasis compared to the core topics.

Citation Analysis

Table 1. Top Cited Literature

Citations	Author	Title
791	[6]	Artificial intelligence in human resources management: Challenges and A path forward
684	[13]	Artificial intelligence, robotics, advanced technologies and human resource management: a systematic review
535	[14]	Unlocking the value of artificial intelligence in human resource management through AI capability framework
457	[15]	Human resource management in the age of generative artificial intelligence: Perspectives and research directions on ChatGPT
409	[1]	Artificial intelligence–challenges and opportunities for international HRM: a review and research agenda
367	[16]	An Internet of Things-enabled BIM platform for on-site assembly services in prefabricated construction
330	[17]	Long text generation via adversarial training with leaked information
317	[18]	Intelligent Agent Transparency in Human-Agent Teaming for Multi-UxV Management
317	[19]	A fuzzy AHP approach to personnel selection problem
297	[20]	The Potential of Generative Artificial Intelligence Across Disciplines: Perspectives and Future Directions

Source: Scopus Database

Practical Implication

This study provides a valuable roadmap for HR professionals, policymakers, and organizational leaders seeking to integrate Artificial Intelligence into Human Resource Management strategies. By identifying the most influential themes such as employee engagement, job satisfaction, performance, and talent management, the findings offer actionable insights for prioritizing AI-driven HR initiatives. Organizations can better align their technological investments with strategic HR goals by understanding emerging trends like the increasing use of machine learning in recruitment or predictive analytics in retention strategies. Additionally, the collaborative network data can guide institutions and firms toward potential academic or international partnerships, especially with leading research hubs in countries like India, the United States, and Malaysia. For practitioners, this scientometric overview demystifies the rapidly evolving AI-HRM interface and supports evidence-based decision-making in talent analytics, workforce planning, and automation of routine HR functions.

Theoretical Contribution

This study contributes significantly to the theoretical understanding of AI in HRM by mapping the intellectual structure, thematic evolution, and scholarly networks of the field. It bridges multiple disciplines—management, computer science, organizational behavior, and information systems—revealing how AI concepts are being recontextualized within HRM frameworks. The keyword analysis surfaces core constructs such as performance,

employee engagement, and decision-making, which can serve as foundational elements for building or extending HRM theories in the digital era. Furthermore, the temporal and density visualizations expose how theoretical interest is shifting from technical feasibility toward strategic implementation and human-centric outcomes. By offering a macro-level synthesis of fragmented literature, this study helps shape a more coherent theoretical landscape for future empirical and conceptual work on digital transformation in human capital management.

Limitations

Despite its contributions, this study is subject to several limitations. First, the data source is limited to the Scopus database, which, although comprehensive, may exclude relevant publications indexed elsewhere such as Web of Science, IEEE Xplore, or Google Scholar. Second, the reliance on author-supplied keywords may introduce bias or inconsistency in keyword standardization, potentially affecting the accuracy of co-occurrence clustering. Third, scientometric analysis provides a quantitative and structural overview of research output but does not delve into the qualitative nuances of arguments, methodologies, or theoretical depth within individual papers. As a result, while the study maps broad trends and influential nodes, it does not capture the richness of theoretical debates or empirical findings in detail. Future research could address these limitations through full-text content analysis, systematic literature reviews, or meta-analytical approaches.

4. CONCLUSION

This scientometric review provides a comprehensive overview of the global research landscape on Artificial Intelligence in Human Resource Management, revealing the field's dynamic evolution, dominant themes, and collaborative networks. The analysis demonstrates that AI is increasingly reshaping HRM practices, with research progressively shifting from foundational discussions on technology adoption and information systems toward more human-centric concerns such as employee engagement, job satisfaction, and talent management. The co-authorship and institutional collaboration maps highlight India, the United States, and Malaysia as leading contributors, indicating the global and interdisciplinary nature of the discourse. By synthesizing trends from keyword co-occurrence, temporal developments, and density visualizations, the study not only identifies influential research clusters but also uncovers emerging gaps and opportunities for future exploration.

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