

Artificial Intelligence (AI) in Human Resource Management (HRM), Research Development and Implementation Barriers: A Systematic Literature Review

Windi Aulia¹ Wina Nurlisyana², Santi Nururly³

^{1,2,3}Master of Management, University of Mataram, Mataram, Indonesia

*Corresponding author: aulliawindy@gmail.com

ABSTRACT

The advancement of Artificial Intelligence (AI) has transformed various Human Resource Management (HRM) functions, from recruitment and selection to data-driven decision-making. Despite the growing number of studies, findings remain fragmented across different contexts, and comprehensive syntheses linking research trends, benefits, and implementation barriers remain limited underscoring the novelty of this study in offering an integrated, PRISMA-based synthesis of the field. This study aims to map the development of AI research in HRM, identify the benefits of AI adoption, and analyze implementation barriers through a Systematic Literature Review (SLR) based on the PRISMA 2020 guidelines. A systematic search was conducted in the ScienceDirect and Google Scholar database. After applying predefined inclusion and exclusion criteria covering relevance to AI-HRM integration, publication type (peer-reviewed journal articles), and methodological quality the articles were screened through title, abstract, and full-text review, resulting in ten studies selected for descriptive and thematic synthesis. The findings reveal a growing research trend, characterized by the dominance of quantitative approaches and a focus on AI-based recruitment and selection, AI adoption, and HR analytics. AI implementation improves HRM efficiency, enhances data-driven decision-making, and supports employee competency development. However, organizations continue to face challenges, including algorithmic bias, limited data quality, insufficient organizational readiness, inadequate digital competencies, and concerns regarding ethics and trust. The study concludes that successful AI implementation in HRM depends on balancing technological capabilities, organizational readiness, and human resource competencies. These findings provide practical implications for organizations in developing effective AI implementation strategies and offer directions for future research by expanding investigations into developing-country contexts, broader HRM functions, and ethical issues related to AI adoption.

Keywords: Artificial Intelligence, Human Resource Management, HR Analytics, Algorithmic Bias, Human Capital.

1. INTRODUCTION

The advancement of digital technology has driven the widespread adoption of Artificial Intelligence (AI) across various organizational functions, including human resource management (HRM). The implementation of AI has transformed HR processes that were previously dominated by administrative activities into processes grounded in data, automation, and intelligent analytics. This transformation has enabled the HR function to evolve beyond its traditional administrative role into a strategic partner that supports the achievement of organizational competitive advantage (Budhwar et al., 2022).

The application of AI in HRM has been utilized across a wide range of activities, including recruitment, employee selection, performance appraisal, career planning, and turnover prediction. The use of this technology enables organizations to accelerate decision-making while producing processes that are more consistent and efficient. Numerous organizations have

begun leveraging AI to generate predictive analyses that support the formulation of more accurate human resource management strategies (Tambe et al., 2019). These developments indicate that AI is increasingly regarded as an integral component of modern human resource management strategy.

Despite offering considerable benefits, the implementation of AI in HRM also gives rise to several challenges that remain subject to debate. The use of algorithms may generate decision-making bias when the training data employed reflects historical discrimination, while AI-driven decision-making processes are frequently difficult to interpret owing to their black-box characteristics. Such conditions raise concerns regarding transparency, accountability, privacy, and the diminishing humanistic dimension of human resource management practices (Charlwood & Guenole, 2022).

Research on AI in HRM has shown a marked increase in recent years. However, the resulting findings remain scattered across various HRM functions and have yet to provide a comprehensive picture of research development and implementation barriers. Moreover, the majority of existing studies originate from developed countries, leaving empirical evidence from developing countries relatively limited. This condition points to a literature gap that requires systematic synthesis.

In light of these limitations, this study adopts a Systematic Literature Review (SLR) approach following the PRISMA 2020 guidelines (Page et al., 2021). The objective of this study is to map the development of research on AI implementation in HRM, identify the benefits of its application across various HRM functions, and analyze the barriers to its implementation.

2. METHODS

This study employs a Systematic Literature Review (SLR) approach, referring to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines developed by Page et al. (2021). The SLR approach was selected because it provides a systematic procedure for identifying, selecting, evaluating, and synthesizing prior research findings. The use of the PRISMA 2020 guidelines helps ensure that the literature search and selection process is conducted transparently, systematically, and can be replicated by other researchers.

The literature search was conducted through two academic databases, namely Google Scholar and ScienceDirect. Both databases were selected because they provide broad publication coverage relevant to the fields of management, information technology, and the social sciences. The search process employed a combination of the keywords "Artificial Intelligence," "Human Resource Management," "AI recruitment," "HR analytics," and "Digital HRM," assisted by Boolean operators (AND, OR, and NOT). To ensure the relevance and recency of the reviewed literature, the search was restricted to articles published between 2021 and 2025.

The retrieved articles were subsequently screened using predetermined inclusion and exclusion criteria. The inclusion criteria comprised empirical research articles written in English or Indonesian, available in full-text format, focusing on the application of Artificial

Intelligence (AI) in Human Resource Management (HRM), and published during the 2021–2025 period. Meanwhile, articles were excluded if they were unrelated to AI in HRM, were literature reviews, editorials, or conceptual papers, lacked a clear empirical research method, or constituted duplicate records.

The literature selection process followed the four stages outlined in the PRISMA 2020 guidelines, namely identification, screening, eligibility, and inclusion. During the identification stage, all records retrieved from Google Scholar and ScienceDirect were compiled to establish the initial dataset. Duplicate records were then identified and removed to ensure that each study was assessed only once. In the screening stage, the titles and abstracts of the remaining articles were reviewed to determine their relevance to the research topic based on the predefined inclusion and exclusion criteria. Articles that did not meet these criteria were excluded from further assessment.

The articles that passed the screening stage subsequently underwent a full-text review during the eligibility stage. At this stage, each article was carefully evaluated to assess its relevance to the research objectives, methodological appropriateness, publication period, language, and compliance with the inclusion and exclusion criteria. Only studies that satisfied all eligibility requirements were retained in the inclusion stage and incorporated into the final qualitative synthesis. The entire study selection process is illustrated in the PRISMA 2020 flow diagram presented in Figure 1.

Data from each selected article were extracted into a synthesis matrix containing information on author, year of publication, research objective, method, sample characteristics, research variables, and key findings. This information was used to facilitate comparison and the identification of patterns across studies. The data were subsequently analyzed using a thematic synthesis approach to group the findings into major themes consistent with the objectives and research questions of this study.

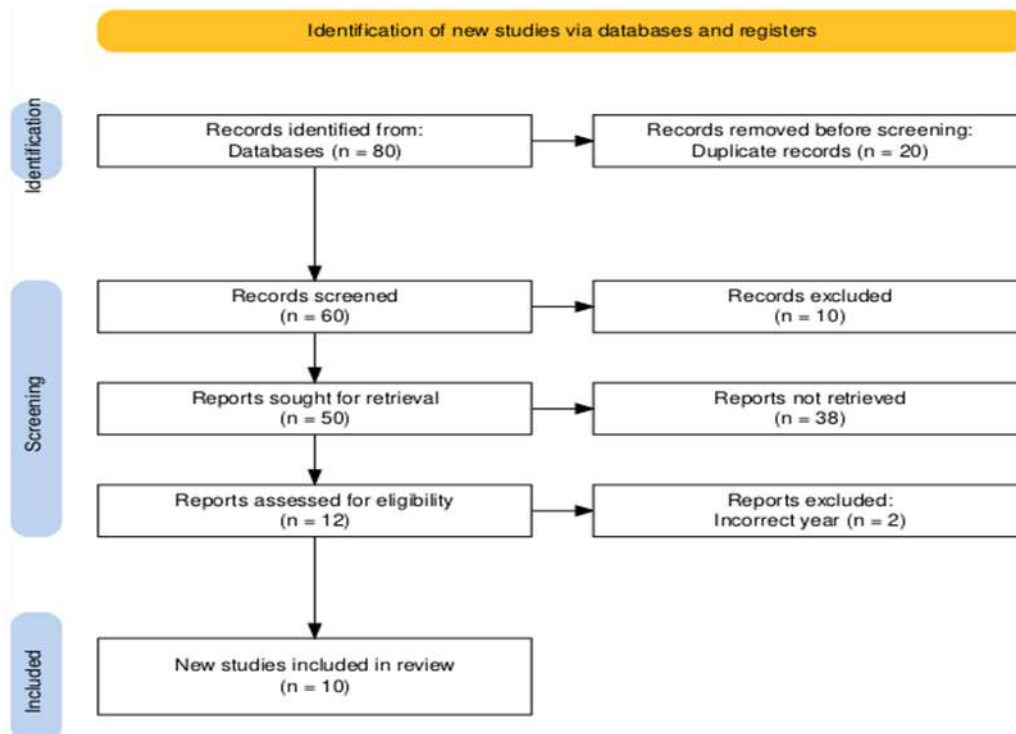


Figure 1. PRISMA Flowchart Search Method

Figure 1 illustrates the study selection process following the PRISMA 2020 framework. The literature search identified 80 records from the ScienceDirect and Google Scholar databases. After removing 20 duplicate records, 60 unique articles remained for title and abstract screening. During the screening stage, 10 articles were excluded because they did not meet the predefined inclusion criteria, including studies unrelated to Artificial Intelligence (AI) in Human Resource Management (HRM), review articles, editorials, conceptual papers, or studies lacking empirical research methods. The remaining full-text articles were then assessed for eligibility, and two articles were excluded because they were published outside the predefined publication period (2021-2025). As a result, 10 empirical studies met all inclusion criteria and were included in the final qualitative synthesis.

3. RESULTS AND DISCUSSIONS

3.1 RESULTS

Based on the process of identification, screening, and selection of the literature using the PRISMA 2020 guidelines, ten articles meeting the inclusion criteria were obtained for further analysis. These articles were drawn from national and international journals published during the 2021–2025 period and address various aspects of the application of Artificial Intelligence (AI) in Human Resource Management (HRM). Table 1 therefore presents a summary of the research characteristics, methods employed, variables examined, and key findings of each article, which serve as the basis for discussing the development of AI-HRM research, the

benefits of its application, and the various implementation barriers formulated in the research questions.

Table 1. Selected Articles

No.	Author (Year)	Title	Method	Key Variables	Key Findings
1	Muehlemann (2025)	Artificial Intelligence Adoption and Workplace Training	Quantitative; company panel data analysis	AI adoption, job training, competency development	Sustained AI adoption encourages firms to increase internal training and employee competency development.
2	Nawaz et al. (2024)	The Adoption of Artificial Intelligence in Human Resources Management Practices	Quantitative; SEM survey	AI accuracy, computational capacity, AI personalization, HRM efficiency	AI implementation improves HRM efficiency through savings in operational time and cost.
3	França et al. (2025)	Beyond Algorithms: Artificial Intelligence-Driven Talent Identification with Human Insight	Mixed methods; survey and interviews	AI-based talent identification, selection objectivity, human insight	AI enhances the efficiency and objectivity of the selection process but remains unable to optimally assess candidates' emotional intelligence and qualitative attributes.
4	Hmoud (2021)	The Adoption of Artificial Intelligence in Human Resource Management	Quantitative; CFA and SEM	Management support, performance expectancy, AI adoption intention	Top management support is the primary factor driving successful AI adoption in HRM.
5	Al Qahtani & Alsmairat (2023)	Assisting Artificial Intelligence Adoption Drivers in Human Resources Management: A Mediation Model	Quantitative; SEM-PLS survey	Trust, perceived usefulness, AI adoption	Trust and perceived usefulness of AI positively influence organizational decisions to adopt AI.
6	Tanantong & Wongras (2024)	A UTAUT-Based Framework for Analyzing Users' Intention to Adopt Artificial Intelligence in Human Resource Recruitment: A Case Study of Thailand	Mixed methods; interviews and PLS-SEM survey	Performance expectancy, social influence, facilitating conditions, intention to use AI	UTAUT model factors influence HR professionals' intention to adopt AI in the recruitment process.
7	Horodyski (2023)	Recruiter's Perception of Artificial Intelligence	Mixed methods; survey and	AI recruitment, recruiter perception,	AI helps improve recruitment process efficiency, although

No.	Author (Year)	Title	Method	Key Variables	Key Findings
		(AI)-Based Tools in Recruitment	hierarchical regression	intention to use AI	recruiters still show hesitancy toward fully automated decisions.
8	Brey & van der Marel (2024)	The Role of Human Capital in Artificial Intelligence Adoption	Quantitative; cross-country data analysis	Human capital, workforce education, AI adoption	Workforce education level and human resource quality are important factors driving AI implementation in organizations.
9	Shafie et al. (2024)	A Cluster-Based Human Resources Analytics for Predicting Employee Turnover Using Optimized Artificial Neural Networks and Data Augmentation	Quantitative; machine learning and cluster algorithms	HR analytics, machine learning, employee turnover	Machine learning algorithms can effectively predict employee turnover probability, thereby supporting data-driven decision making.
10	Panda et al. (2025)	Artificial Intelligence and Digital Human Resource Management: Empirical Evidence from ICT Adoption	Quantitative; cross-sectional survey	AI, Applicant Tracking System (ATS), HRM efficiency	The use of AI and ATS accelerates the recruitment process, reduces recruitment costs, and improves the efficiency of human resource management.

As shown in Table 1, research on the application of Artificial Intelligence (AI) in Human Resource Management (HRM) has demonstrated an increase in publications during the 2021–2025 period, particularly between 2024 and 2025. The majority of studies employ quantitative approaches using Structural Equation Modeling (SEM), panel data analysis, and machine learning, whereas mixed-methods approaches are used in several studies to obtain a more comprehensive understanding of AI implementation. The research context is dominated by organizations in the business sector of developed countries, such as several European countries, as well as developing countries such as Thailand, indicating that AI implementation in HRM has become a relevant issue across diverse organizational contexts.

The most frequently examined variables include AI adoption, AI-based recruitment, HR analytics, human capital, trust in technology, and AI acceptance within organizations. The findings generally indicate that AI contributes to improved efficiency in HRM processes related to recruitment, data-driven decision-making, and employee competency development. Nevertheless, several studies identify challenges related to limitations in assessing humanistic aspects, the potential for algorithmic bias, and the importance of organizational and human resource readiness in supporting successful AI implementation. These characteristics form the basis for further analyzing the development of AI-HRM research, the benefits of its application, and the barriers to AI implementation in HRM in accordance with the formulated research questions.

3.2 DISCUSSION

3.2.1 Development of AI Research In HRM

The synthesis of the ten included articles indicates that research on AI in HRM has undergone significant development during the 2021–2025 period. The increase in the number of publications, particularly between 2024 and 2025, reflects growing scholarly attention to the use of AI in supporting digital transformation across HRM functions. This development indicates that AI has become one of the principal topics in human resource management research. In more detail, this development can be explained as follows:

1) Methodological Development

Research in this field is dominated by quantitative approaches employing Structural Equation Modeling (SEM), panel data analysis, and machine learning (Hmoud, 2021; Nawaz et al., 2024; Qahtani & Alsmairat, 2023). The dominance of quantitative approaches indicates that AI in HRM research primarily tests the relationships among variables influencing AI implementation within organizations. In addition, several studies employ mixed methods approaches to obtain a more comprehensive understanding of AI implementation from both organizational and user perspectives (França et al., 2025; Horodyski, 2023; Tanantong & Wongras, 2024).

2) Development of Research Themes

Based on their thematic focus, studies on AI in HRM can be grouped into three major clusters, namely AI, based recruitment and selection, AI adoption and acceptance within organizations, and the use of AI in HR analytics and human resource development. The recruitment cluster focuses on candidate screening, competency matching, and the automation of the selection process (França et al., 2025; Horodyski, 2023; Panda et al., 2025). Meanwhile, the other clusters examine the factors influencing AI adoption among HR practitioners as well as the use of AI for turnover prediction, competency development, and data-driven decision-making (Hmoud, 2021; Muehlemann, 2025; Qahtani & Alsmairat, 2023; Shafie et al., 2024).

3) Development of Geographical Distribution

The majority of studies were conducted in Europe, the Middle East, and Southeast Asia. Research conducted in Europe generally makes use of large-scale corporate or secondary data to analyze the impact of AI application on productivity and workforce management, whereas research conducted in Asia tends to focus more on the factors influencing AI adoption by organizations. Nevertheless, research on AI implementation in developing countries remains relatively limited, thereby opening opportunities for further research within organizational contexts characterized by different attributes.

3.2.2 Benefits of AI Application in HRM

The synthesis of the included articles indicates that the application of Artificial Intelligence (AI) provides various benefits across HRM functions. These benefits strengthen the quality of decision-making and support human resource development. The benefits of AI application in HRM can be grouped into three main aspects, as follows:

1) Improved Efficiency in Recruitment and Selection

In the recruitment and selection function, AI is used to automate candidate screening, match applicant competencies with organizational needs, and accelerate the selection process (França et al., 2025; Horodyski, 2023; Panda et al., 2025). The use of AI is capable of reducing the administrative burden previously performed manually, thereby making the recruitment process more efficient, consistent, and timesaving. In addition to increasing process speed, AI also helps organizations obtain more suitable candidates through more objective data analysis.

2) Strengthening of Data-Driven Decision-Making

Another benefit identified in the synthesis of the articles is the improved quality of data-driven decision-making. AI is capable of processing large volumes of employee data to generate information that supports various strategic decisions, such as workforce planning, performance evaluation, and talent management (Brey & Marel, 2024; Shafie et al., 2024). This analytical capability enables organizations to reduce decisions based solely on intuition while improving accuracy in human resource management.

3) Development of Employee Competency and Career

AI contributes to the development of employee competencies and career management. Several studies indicate that AI can identify training needs, predict employee development potential, and support the design of more personalized learning programs tailored to individual characteristics (Muehlemann, 2025; Shafie et al., 2024). This approach helps organizations develop employee competencies in a more targeted manner while enhancing readiness to face changing job requirements in the digital era.

3.2.3 Barrier and Efforts to Overcome Barrier in Implementing AI in The Field of HRM

The synthesis of the articles indicates that although Artificial Intelligence (AI) provides various benefits for Human Resource Management (HRM), its implementation still faces a number of barriers that may affect its effectiveness. These barriers relate to technological, organizational, and human resource aspects. In more detail, the barriers to AI application in HRM can be explained as follows.

1) Technological Barriers

One of the principal barriers originates from technological aspects, particularly the potential for algorithmic bias, data quality, and the limitations of AI in assessing humanistic characteristics. Several studies indicate that decisions generated by AI depend heavily on the quality of the data used in the learning process, such that unrepresentative data has the potential to produce biased and less equitable decisions (França et al., 2025; Horodyski, 2023). Furthermore, AI continues to exhibit limitations in evaluating aspects such as empathy, motivation, creativity, and organizational cultural fit, which generally require human judgment.

2) Organizational Barriers

Barriers are also found at the organizational level, relating to implementation readiness, management support, and the availability of digital infrastructure. The findings indicate that organizations with low management support tend to experience difficulty in integrating AI into HRM processes owing to limited investment, planning, and change management (Hmoud,

2021; Qahtani & Alsmairat, 2023). This condition indicates that AI implementation requires organizational commitment in providing resources, building a culture of innovation, and supporting the digital transformation process.

3) Human Resource Barriers

Human resource aspects also constitute an important barrier to AI application. Low trust in technology, resistance to change, and limited digital competency may hinder the acceptance of AI by HR practitioners and employees alike (Nawaz et al., 2024; Tanantong & Wongras, 2024). This condition indicates that the success of AI implementation is determined not only by technological sophistication but also by individual readiness to adapt to changes in work processes.

Efforts to Address AI Implementation Barriers

Various studies identify a number of strategies that can be employed to address the barriers to AI implementation in HRM. Strengthening top management support, improving digital literacy, providing training for HR practitioners, and building trust in AI systems constitute important steps in enhancing implementation success. In addition, the application of the human-in-the-loop principle, namely human involvement in AI-based decision-making processes, is considered capable of minimizing the risk of algorithmic bias while preserving ethics, transparency, and objectivity in human resource management.

4. CONCLUSION

Based on the results of the Systematic Literature Review of ten articles from the 2021–2025 period, this study demonstrates that research on Artificial Intelligence (AI) in Human Resource Management (HRM) has undergone significant development, marked by an increase in publications, the dominance of quantitative approaches, and the expanding research focus on recruitment and selection, AI adoption, and HR analytics. The application of AI provides benefits in improving the efficiency of HRM processes, supporting data-driven decision-making, and developing employee competencies. However, its implementation continues to face various barriers, such as algorithmic bias, data quality limitations, organizational readiness, digital competency, as well as issues of ethics and trust in AI. Accordingly, successful AI implementation requires organizational support, enhanced human resource capacity, and responsible AI governance.

This study contributes by presenting a synthesis of the development, benefits, and barriers of AI application in HRM that may serve as a reference for both academics and practitioners. Nevertheless, this study remains limited by the number of included articles and the 2021–2025 publication period. Future research is therefore recommended to expand the scope of databases, publication periods, and research contexts to organizations in developing countries, in order to obtain a more comprehensive understanding of AI implementation in HRM.

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