

Artificial Intelligence in Talent Acquisition: A Systematic Review of Intelligent Recruitment Systems and Emerging Trends

Rambhau Dadarao Ghuge¹, Dr. Manisha Purohit²

¹ Ph.D. Scholar, Department of Master of Business Administration (MBA),
Lotus Business School, Savitribai Phule Pune University, Pune, India

² Associate Professor, Department of Master of Business Administration (MBA),
Lotus Business School, Savitribai Phule Pune University, Pune, India

Corresponding author:

Rambhau Dadarao Ghuge

Abstract:

With the fast development of Artificial Intelligence (AI) technology, the recruitment process has become more effective with automated recruitment processes, higher hiring accuracy and strategic workforce planning for companies working under Industry 4.0. The use of AI technologies such as Machine Learning, Natural Language Processing, Predictive Analytics, Generative AI, Large Language Models (LLMs), Agentic AI, Resume Parsing, and chatbots provides more efficiency in the recruitment process, lower costs and better candidate experience. Challenges regarding AI use include algorithmic bias, lack of transparency, explainability, privacy issues, and ethical governance among others. This Systematic Literature Review (SLR) will explore the role of AI in talent acquisition through an analysis of 23 peer-reviewed studies written from 2022 to 2026 applying the PRISMA methodology. It will analyze the impact of AI on the recruiting process considering its application in resume screening, candidate matching, interview scheduling, talent analytics, predictive hiring, and workforce planning. Emerging trends in Generative AI, LLMs in recruitment and Agentic AI will be considered as well.

Keywords: Artificial Intelligence, Talent Acquisition, Industry 4.0, Human Resource Management, Machine Learning, Natural Language Processing, Large Language Models, Generative AI, Agentic AI, Predictive Analytics, Talent Analytics, Systematic Literature Review.

1. Introduction

Artificial Intelligence (AI) has revolutionized talent acquisition practices in Human Resource Management (HRM) by introducing a transition from traditional, manual recruitment approaches to advanced intelligent and analytical systems. Within the framework of Industry 4.0, organizations make use of various techniques such as machine learning, natural language processing (NLP), predictive analytics, generative AI, and large language models (LLMs) to match candidates, automate recruitment procedures, minimize bias and optimize hiring decisions (Albassam, 2023; Kaushal et al., 2023; Ali & Kallach, 2024). AI-based recruitment is also utilized to optimize workforce planning via predictive analytics, automated screening, and interaction of candidates with chatbots (Jatobá et al., 2023; Qin et al., 2023; Ekuma, 2024; Swain & Malik, 2025). However, there exist many challenges associated with potential algorithmic biases, lack of transparency, privacy issues, explainability, and accountability when using AI (Hunkenschroer & Luetge, 2022; Mountassir & Benyassine, 2026). Thus, this paper is a systematic literature review of the existing research related to AI-driven talent acquisition in Industry 4.0.

1.1 Background

In talent acquisition, it is customary to utilize recruiters for advertising positions, reviewing resumes, interviewing, and hiring candidates. Conventional recruitment processes tend to be time-consuming, expensive, and biased (Albassam, 2023). The emergence of Industry 4.0 has revolutionized recruitment as it has been able to automate repetitive tasks and improve the hiring process using data analytics (Jatobá et al., 2023; Kurniawan et al., 2024). Machine learning, natural language processing, large language models, and generative AI have enabled semantic matching of resumes, conversational interviews, generation of job descriptions, and prediction of hire candidates (Yuksel et al., 2026; Kurchellapati & Challapalli, 2026). Although these innovations have brought many

advantages to recruitment, issues around fairness, transparency, compliance, and ethical governance necessitate AI to be an aid and not replacement of human judgment (Hunkenschroer & Luetge, 2022; Maake et al., 2026).

1.2 Need for the Study

The study of AI-enabled recruiting has advanced greatly, although this research area continues to be very fragmented in many disciplines. Modern technology, like generative AI, large language models, agentic AI, and predictive analytics, have moved recruiting from mere automation to intelligent assessment of candidates and collaboration between people and artificial intelligence (Gupta et al., 2025; Sarmiento Orna et al., 2026). Meanwhile, organizations need help solving such issues as algorithmic bias, transparency, explainability, privacy, and compliance with regulations (Benabou & Touhami, 2025; Mountassir & Benyassine, 2026). Thus, this systematic literature review will summarize current studies, identify existing trends, research gaps, and outline future research areas.

1.3 Research Motivation

This research is driven by the increasing importance of AI in talent acquisition processes in the context of increasing efficiency of recruiting while resolving the challenges associated with staff shortage and digital transformation. AI-based solutions make recruitment faster and cheaper, enhance candidate matching and workforce planning (Ekuma, 2024; Ali & Kallach, 2024), while cutting-edge innovations in the form of generative AI, large language models, and agentic AI change the nature of candidate assessment and communication (Kurchellapati & Challapalli, 2026; Yuksel et al., 2026). At the same time, the problem of ethical governance, trustworthiness, explainability, and regulation demands a comprehensive review of the current body of literature.

1.4 Research Challenges

While the use of AI technology has made recruiting more efficient, there are several obstacles to the effective use of AI technology such as algorithmic bias that can cause discrimination in the hiring process (Hunkenschroer & Luetge, 2022). The low degree of explainability of AI tools is another obstacle to the effective implementation of AI in recruitment practices (Benabou & Touhami, 2025). Moreover, the application of AI recruitment involves the safe management of personal information of candidates (Maake et al., 2026).

1.5 AI Technologies Transforming Talent Acquisition

Table 1.1. Artificial Intelligence Technologies and Their Applications in Recruitment within Industry 4.0 Organizations

AI Technology	Description	Role in Recruitment	Key References
Machine Learning (ML)	Uses algorithms to analyze historical recruitment data, identify patterns, and improve predictions through continuous learning.	Predicts candidate success, recommends suitable applicants, optimizes hiring decisions, and enhances talent acquisition strategies.	Qin et al. (2023); Gupta et al. (2025)
Natural Language Processing (NLP)	Enables systems to understand, interpret, and analyze human language in textual documents.	Improves resume screening, semantic skill matching, analysis of job descriptions and cover letters, and automates candidate communication.	Ali & Kallach (2024); Qin et al. (2023)
Generative AI	Creates human-like content based on prompts	Generates job descriptions, interview questions, recruitment advertisements, candidate summaries, onboarding	Gupta et al. (2025); Benabou & Touhami (2025)

	using advanced AI models.	documents, and personalized communications.	
Large Language Models (LLMs)	Advanced AI models capable of contextual understanding, reasoning, and natural language generation.	Supports conversational interviews, contextual resume analysis, competency assessment, personalized candidate interactions, and recruiter assistance.	Yuksel et al. (2026)
Agentic AI	Autonomous AI agents capable of independently executing multi-step recruitment tasks with minimal human intervention.	Searches talent databases, evaluates candidates, schedules interviews, monitors recruitment progress, and supports strategic hiring decisions.	Kurchellapati & Challapalli (2026); Yuksel et al. (2026)
Predictive Analytics	Applies statistical models and machine learning techniques to forecast future recruitment outcomes.	Predicts employee performance, retention, organizational fit, and workforce demand to improve long-term hiring decisions.	Sarmiento Orna et al. (2026)
Resume Parsing	Automatically extracts structured information from resumes using AI and NLP techniques.	Identifies qualifications, skills, certifications, work experience, and achievements, reducing manual screening effort and improving consistency.	Albassam (2023); Ali & Kallach (2024)
AI Chatbots	Conversational AI systems that interact with candidates throughout the recruitment process.	Answers FAQs, collects applicant information, schedules interviews, conducts preliminary assessments, and maintains real-time communication.	Ekuma (2024); Swain & Malik (2025)

1.6 Conventional Recruitment vs AI Recruitment

Recruitment based on traditional methods relies heavily on manual resume filtering, human intuition of the recruiter, interviewing, and decision-making. Although recruiting expertise offers useful context and judgment, traditional recruitment process takes a lot of time and resources, can be inconsistent and biased by subconscious factors. An increase in application numbers has only emphasized this problem making manual recruitment inefficient in modern competitive labor markets (Albassam, 2023).

AI-powered recruitment uses intelligent algorithms, analytics, machine learning, natural language processing, and automation tools to enhance the process of recruitment and make the hiring process more efficient. The use of intelligent technologies allows companies to analyze thousands of resumes within minutes, detect most promising candidates, automate routine recruitment activities, predict future job performance, and offer data-backed hiring decisions (Qin et al., 2023; Gadesha & Joshi, 2025).

However, despite all those benefits, one shouldn't see AI recruitment tools as an alternative to human recruiters. Modern academic studies emphasize that the most effective and efficient way is a hybrid human-AI recruitment process where intelligent tools complement human skills and responsibilities, and recruiters continue doing ethical judgment, cultural evaluation, building relationships and making final hiring decisions (Hunkenschroer & Luetge, 2022; Maake et al., 2026).

2. Literature Review

AI has changed talent management in terms of having intelligent recruitment processes, talent analytics, decision support systems, and strategic workforce planning for industry 4.0. Despite the positive effect of AI in automating the recruitment process, assessing candidates, and hiring process, questions regarding algorithmic bias, transparency, fairness, privacy, and explainability persist. The following review focuses on research papers published from 2022 to 2026. It identifies the major themes of research, methods, findings, and research gaps.

According to Hunkenschroer & Luetge (2022), there was an ethical assessment of the application of AI in the recruitment and selection of staff. The authors touched upon such aspects of using algorithms as bias, discrimination, transparency, accountability, and fairness in hiring decisions. As stated by the authors, organizations must have ethical guidelines for the application of AI in recruiting people responsibly and keeping humans in the decision-making process.

Another study on the topic conducted by Qin et al. (2023) focused on the comprehensive review of AI technologies for talent analytics. The researchers separated AI tools into five categories including machine learning, deep learning, natural language processing, predictive analytics, and recommendation systems. Qin et al. (2023) found out that AI greatly improves the processes of workforce analytics, prediction of employee performance, and recruitment.

Moreover, Albassam (2023) reviewed intelligent recruiting through analytical approach and concluded that intelligent recruiting systems can considerably save time, improve candidate matching, and increase organizational effectiveness. At the same time, Albassam (2023) discovered certain problems of data privacy, algorithmic bias, and organizational preparedness for the usage of AI technology.

Jatobá et al. (2023) conducted a systematic literature review regarding the role of intelligent human resources in the adoption of AI technology. The researchers found out that successful implementation of AI technologies depends not only on the technical aspect but also on organizational culture, employee skills, commitment of leaders, and strategic change in HR management.

Kaushal et al. (2023) used systematic literature review and bibliometric analysis techniques for identification of emerging research trends in the field of artificial intelligence and human resource management. According to the findings of the authors, there has been an exponential increase in the studies on AI-enabled HR activities like recruiting, talent analytics, engagement of employees, and workforce planning. The authors have provided some future research directions in terms of ethical use of AI as well as cooperation between humans and AI.

Ekuma (2024) conducted a systematic review of the application of artificial intelligence and automation in human resource development. The review indicated that use of AI contributes to the improvement of learning process of employees, recruitment effectiveness, performance management, and productivity of organizations. Nevertheless, successful integration is possible only through reskilling of employees.

Ali and Kallach (2024) performed scoping review and focused on the analysis of functions performed with the help of artificial intelligence in recruiting. According to the findings, resume screening, candidate ranking, interview scheduling, chatbot conversations, predictive hiring analytics, and assessment became the most popular AI applications in recruitment.

In their systematic literature review on the application of AI in improving the HR effectiveness in the era of Industry 4.0, Kurniawan et al. (2024) found that AI helps in strategic work-force planning, intelligent decision making, employee efficiency, and digital transformation of organizations. In addition, the research highlighted the growing need for AI skills in HR professionals.

Using systematic literature review, Tusquellas et al. (2024) investigated the role of artificial intelligence in professional development and talent management. The findings of their study indicate that artificial intelligence enables continuous learning, individual career development, competency mapping, succession planning, and intelligent workforce development in order to boost the organizational competitiveness.

In a bibliometric analysis of artificial intelligence in talent acquisition, Gupta et al. (2025) discovered a fast-growing number of publications on topics of AI recruitment, predictive analytics, machine learning, and intelligent HR systems. They pointed out the generative AI, explainable AI, and autonomous recruitment technology as new research frontiers.

Gadesha and Joshi (2025) examined the effects of using AI in recruitment in Industry 4.0 organizations using empirical data from Indian companies. It was found that AI implementation led to increased efficiency, quality, and effectiveness of the recruitment process. However, the problems related to trust, acceptance, and compliance remained relevant.

Swain and Malik (2025) conducted a systematic review on the use of AI in the recruiting process. They found that AI significantly increases the efficiency of resume sorting, interviews scheduling, candidates' interactions, and analysis of recruiting process while decreasing its cost and time consumption. Ethical principles of the recruiting process were also discussed by the authors.

Benabou and Touhami (2025) made a PRISMA systematic literature review on artificial intelligence in human resources management. Increasing research interest towards explainability, algorithmic fairness, organizational trust, and AI governance was pointed out. Authors emphasized that ethical aspects should become integral parts of AI HR systems.

Mazlougui et al. (2025) analyzed technology-supported recruitment and talent management within the meta-driven organizational context. The review by Mazlougui et al. (2025) showed that AI technologies are transforming organizational culture through intelligent talent acquisition, digital collaboration, virtual recruitment, and decision-making. However, organizational transformation requires significant efforts and investments in technological resources and human capital.

Panda et al. (2025) applied systematic literature review and bibliometric analysis to analyze artificial intelligence in agile human resources. The research by Panda et al. (2025) revealed that AI technologies improve the agility of organizations due to faster decision-making, intelligent workforce planning, adaptive performance management, and strategic talent management. In addition, the research revealed future trends related to predictive HR analytics and autonomous decision support systems.

Mountassir and Benyassine (2026) conducted a critical analysis of legitimization-validation paradox connected with AI-based talent acquisition. The analysis revealed the contradiction between technological legitimization and recruitment fairness.

Maake et al. (2026) analyzed the barriers and risks related to implementation of AI in global talent management. It is found that technological complexities, privacy, ethical uncertainties, organization resistance, regulatory disparities, and lack of competencies in AI use are the main barriers that hinder effective application of AI in international organizations.

Kurchellapati and Challapalli (2026) analyzed the role of agentic AI in talent analytics. The study proved that the introduction of autonomous AI agents increases talent discovery, selection process, workforce analysis, and recruitment planning. Agentic AI was recognized as one of the upcoming innovations in intelligent HRM systems.

Sarmiento Orna et al. (2026) studied the introduction of AI and data analytics in human talent management. They focused on the importance of predictive analytics, intelligent workforce planning, and performance prediction in evidence-based decision making of strategic HRM.

Yuksel et al. (2026) studied the use of large language models in candidate assessment. The research showed that LLM-based recruitment platforms facilitate context-based candidate assessment, conversation-based interviewing, competencies evaluation, and customized recruitment assistance. Yuksel et al. (2026) concluded that the employment of generative AI would dramatically transform the future recruitment process.

Monson et al. (2026) performed bibliometric analysis combined with systematic literature review of AI application in the process of recruitment in the field of information systems. The results showed the growth of the body of

knowledge in the field of AI-based recruitment, and identified intelligent decision support, talent analytics, and candidate evaluation as dominant research themes.

Jamal et al. (2026) provided a review of talent management in the digital era, emphasizing the need for the integration of AI technologies with organizational culture, leadership skills, employees' development, and workforce planning. The authors stressed the importance of HR strategy complementing technology in achieving organizational success.

According to Hossain and Rafat (2026), AI talent management in higher education involves ethics, strategy, and socio-technical aspects. The findings by the researchers indicated that artificial intelligence improves hiring processes, faculty appointments, competency assessment, and work-force planning within an institution, but it requires good governance practices.

Table 2.1. Summary of Literature Review

S. No.	Author(s)	Year	Title	Methodology	Key Findings	Research Gap
1	Hunkenschroer & Luetge	2022	Ethics of AI-enabled Recruiting and Selection	Literature Review	Highlighted ethics, fairness, transparency and AI governance	Limited empirical validation across industries
2	Qin et al.	2023	AI Techniques for Talent Analytics	Survey Paper	Comprehensive taxonomy of AI techniques for HR analytics	Limited discussion on organizational implementation
3	Albassam	2023	AI in Recruitment	Analytical Review	AI improves hiring speed and candidate matching	Ethical implications require deeper investigation
4	Jatobá et al.	2023	Intelligent HR for AI Adoption	Systematic Literature Review	HR capability is essential for successful AI adoption	Limited evidence from developing economies
5	Kaushal et al.	2023	AI and HRM	SLR + Bibliometric Analysis	Identified future research trends in AI-enabled HRM	Need empirical validation of proposed frameworks
6	Ekuma	2024	AI and HR Development	Systematic Review	AI supports recruitment, learning and workforce development	Organizational readiness remains underexplored
7	Ali & Kallach	2024	AI Recruitment Functionalities	Scoping Review	Resume screening, chatbots and analytics	Limited focus on ethical governance

					dominate recruitment	
8	Kurniawan et al.	2024	AI in HR Behavior	Systematic Literature Review	AI enhances HR effectiveness in Industry 4.0	Lack of quantitative performance evaluation
9	Tusquellas et al.	2024	AI for Talent Management	Systematic Literature Review	AI improves professional development and talent management	Long-term organizational impacts remain unclear
10	Gupta et al.	2025	Future of AI in Talent Acquisition	Bibliometric Analysis	Identified emerging AI recruitment trends	Requires empirical investigation of future technologies
11	Gadesha & Joshi	2025	AI Recruitment Systems	Empirical Study	AI improves recruitment efficiency in Indian organizations	Limited international comparison
12	Swain & Malik	2025	AI in Recruitment	Systematic Literature Review	Automation improves recruitment performance	Human-AI collaboration requires further study
13	Benabou & Touhami	2025	AI in HRM	PRISMA-Based SLR	Emphasized explainable and responsible AI	Lack of practical implementation frameworks
14	Mazlougui et al.	2025	Technology-Enhanced Recruitment	Systematic Review	AI transforms organizational culture and recruitment	Meta-driven HR ecosystems need further investigation
15	Panda et al.	2025	AI in Agile HR	SLR + Bibliometric Analysis	AI supports agile HR practices	Limited industry-specific evidence
16	Mountassir & Benyassine	2026	AI-driven Talent Acquisition	Critical Systematic Review	Examined legitimacy, fairness and explainability	Empirical validation required
17	Maake et al.	2026	AI Integration Barriers	Systematic Review	Identified organizational and ethical barriers	Cross-cultural comparison needed

18	Kurchellapati & Challapalli	2026	Agentic AI Talent Analytics	Systematic Literature Review	Agentic AI enhances talent discovery	Technology remains in early adoption stage
19	Sarmiento Orna et al.	2026	AI and Talent Management	Review Study	Data analytics strengthens strategic HRM	More industrial case studies required
20	Yuksel et al.	2026	LLM-driven Candidate Assessment	Conference Paper	LLMs improve intelligent candidate evaluation	Long-term reliability requires assessment
21	Monson et al.	2026	AI in HR Recruitment	Bibliometric + SLR	Rapid growth of AI recruitment research	Industry-specific validation required
22	Jamal et al.	2026	Digital Talent Management	Systematic Review	AI supports digital workforce transformation	More organizational implementation studies needed
23	Hossain & Rafat	2026	AI-driven Talent Management	Review Study	AI improves strategic talent management with ethical governance	Limited higher education evidence

3. Problem Statement

The development of Artificial Intelligence (AI) technology has made it possible to use recruitment tools that can automate the screening of applicants' CVs, match applicants, conduct talent analytics, develop recruitment bots, and make hiring decisions based on collected data. Taking into account Industry 4.0 context, AI-powered talent acquisition has become a helpful solution for increasing recruitment effectiveness, saving costs, and finding high-quality applicants. Nevertheless, despite its numerous advantages, AI application raises a number of problems associated with algorithmic bias, transparency, explainability, privacy, liability, and justice in employment decisions (Hunkenschroer & Luetge, 2022; Benabou & Touhami, 2025). The latest developments in generative AI, Large Language Models (LLMs), agentic AI, and predictive analytics have increased the capabilities of AI-driven recruitment from the level of automation to assessment and workforce planning. Nevertheless, organizations face some difficulties in implementing new tools due to their technical maturity, employees' distrust, and compliance with the new AI ethics rules (Maake et al., 2026; Yuksel et al., 2026). Despite the existing research dedicated to various issues, including ethical AI, talent analytics, recruitment automation, and HR digitalization, there is a lack of integration among findings, which indicates the need for a comprehensive systematic literature review of the problem.

4. Proposed Work

In this research, a Systematic Literature Review (SLR) methodology will be used to thoroughly investigate the transition of talent acquisition processes by Artificial Intelligence during the time of Industry 4.0. Contrary to traditional narrative reviews, a systematic literature review uses a structured, replicable process for identification, selection, evaluation, and synthesis of pertinent academic research articles. The objective of the review is to

develop an evidence-based understanding of the issues associated with novel AI technologies, recruiting applications, organizational advantages, ethical aspects, implementation challenges, and future research avenues.

The research framework comprises five consecutive steps: literature identification, study screening, eligibility assessment, qualitative synthesis, and thematic analysis.

4.1 Research Methodology

The literature review is conducted using the framework of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Only peer-reviewed journal articles, conference papers, review papers, and scholarly literature published from 2022 to 2026 were used in this review.

Table 4.1: Literature Search Strategy for the Systematic Literature Review

Component	Details
Academic Databases	Scopus, Web of Science, IEEE Xplore, SpringerLink, ScienceDirect, Emerald Insight, Taylor & Francis, Google Scholar
Primary Search Keywords	Artificial Intelligence, Talent Acquisition, Recruitment, Human Resource Management, Industry 4.0, Talent Analytics, Machine Learning, Generative AI, Large Language Models, Agentic AI, AI Recruitment
Search Strategy	Keywords were searched individually and in various combinations to maximize the retrieval of relevant studies.
Boolean Operators	AND, OR
Purpose of Boolean Operators	To improve search accuracy, broaden or refine search results, and maximize the identification of relevant literature.
Objective	To identify comprehensive, high-quality, and relevant studies on AI-driven talent acquisition in the context of Industry 4.0.

4.2 PRISMA-Based Review Process

The process of systematic review is guided by four key phases as suggested by PRISMA:

Identification: Relevant studies were identified with pre-specified search strings from various scholarly databases.

Screening: The duplicates were removed, and the titles and abstracts of these records were screened.

Eligibility: The full texts of articles were assessed based on pre-specified inclusion and exclusion criteria.

Inclusion: Only those studies that focused on the use of Artificial Intelligence in talent acquisition, recruitment, talent management, HR analytics, and Industry 4.0 human resource practices were considered for qualitative synthesis.

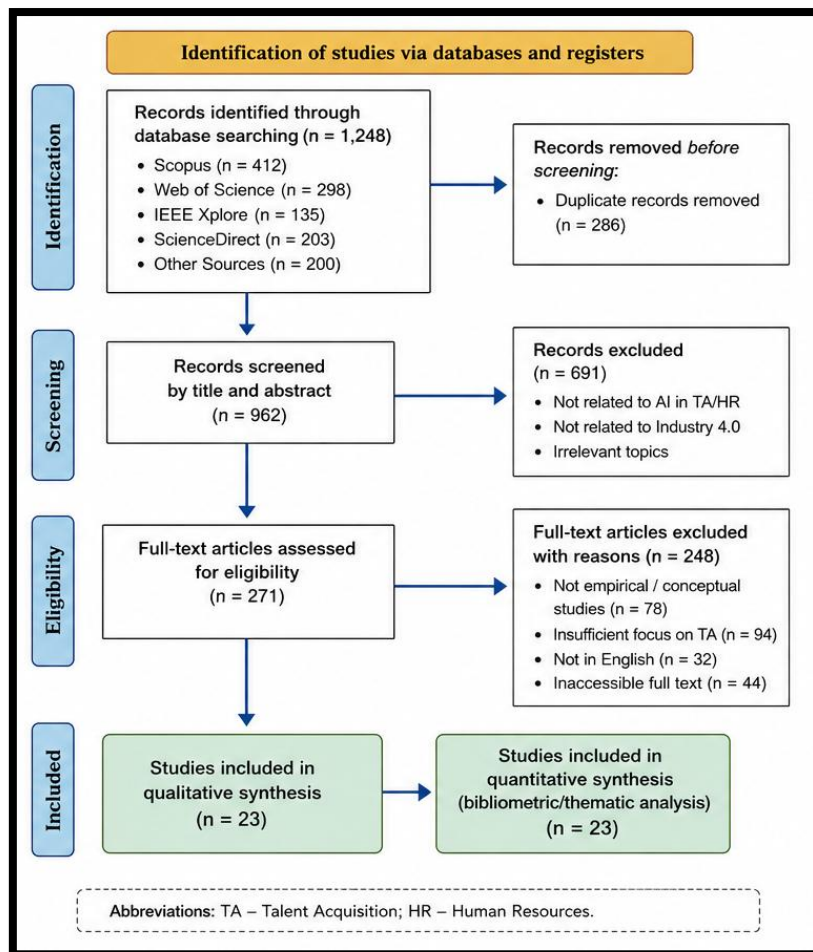


Figure 1. PRISMA Flow Diagram

4.3 Inclusion and Exclusion Criteria

To maintain consistency and research quality, explicit eligibility criteria were established.

Inclusion Criteria

- Peer-reviewed journal articles and conference papers.
- Publications between 2022 and 2026.
- English-language publications.
- Studies focusing on AI in recruitment, talent acquisition, HR analytics, or Industry 4.0.
- Systematic reviews, bibliometric analyses, empirical studies, and conceptual research.

Exclusion Criteria

- Publications before 2022.
- Non-English studies.
- Editorials, opinion papers, dissertations, and magazine articles.
- Studies unrelated to human resource management or recruitment.
- Duplicate publications and incomplete manuscripts.

4.4 Data Extraction Strategy

A standardized data extraction format was developed to ensure consistency during the entire review process. In this connection, for each selected article, appropriate information including the author(s), year of publication, geographical location/region, objective of the study, method adopted, nature of AI technology employed, function of the recruitment tool, findings, limitations, and future research direction was gathered. Taking into consideration the literature reviewed, this research intends to develop a general AI Talent Acquisition Framework for companies belonging to the Industry 4.0 era. The framework outlines how intelligent tools are aiding the recruitment process in each of its stages.

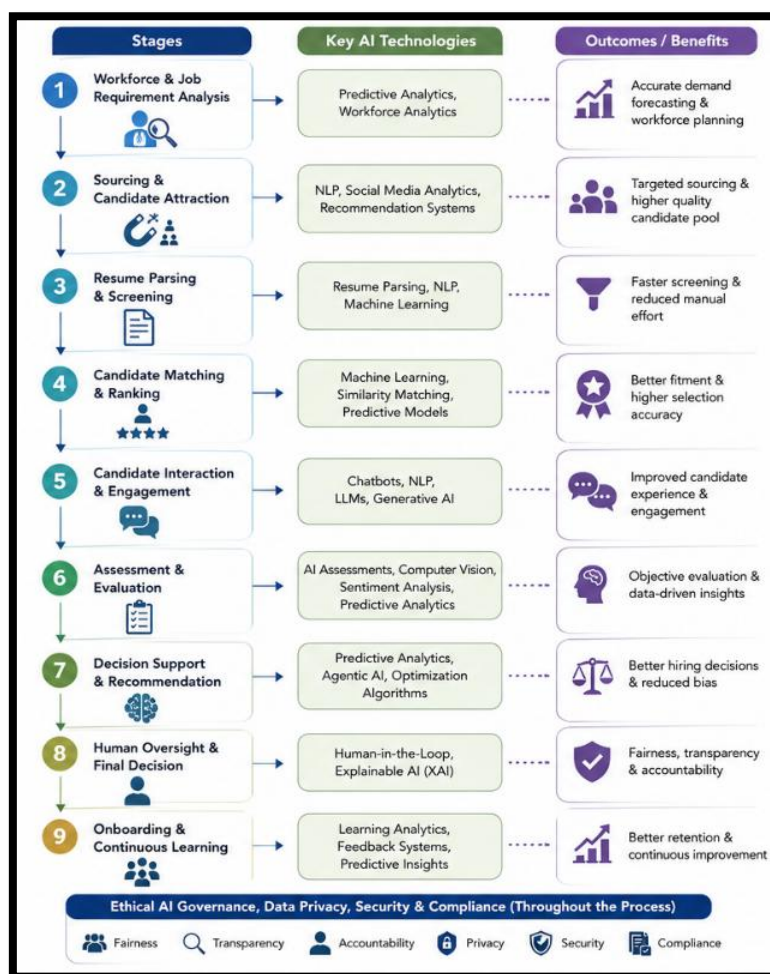


Figure 2. Proposed AI-Driven Talent Acquisition Framework

The suggested framework proves that artificial intelligence solutions complement but do not replace human recruiters. Machine learning, NLP, generative AI, large language models, predictive analytics, and agentic AI altogether make the recruitment process more efficient, provide better candidate experience, foster evidence-based decision-making, and enable strategic workforce planning. The involvement of humans is crucial in order to guarantee the ethical governance of the recruitment process.

5. Results and Discussion

The literature review entailed the synthesis of 23 peer-reviewed scholarly works which were conducted between 2022 and 2026 to examine the utilization of Artificial Intelligence (AI) in talent acquisition in Industry 4.0. These works are systematic literature review papers, bibliometric analysis papers, empirical papers, conceptual papers, and scoping reviews. In general, these papers reveal that AI has developed from merely an enabling technology

for recruitment into a strategic tool that can revolutionize the whole talent acquisition process. This section will entail the findings of the synthesis based on thematic analysis.

5.1 Publication Trend Analysis

From the review of the literature which has been selected, there is a rise in the number of studies on the utilization of talent acquisition with the help of artificial intelligence in the last five years. In the year 2022, there is only one publication on AI recruitment ethics. But, during the years 2023 and 2024, numerous studies were conducted on the topic. Most of these studies were conducted during 2025 and 2026.

Table 5.1. Year-wise Distribution of Selected Studies

Year	Number of Publications	Percentage (%)
2022	1	4.35
2023	5	21.74
2024	4	17.39
2025	7	30.43
2026	6	26.09
Total	23	100

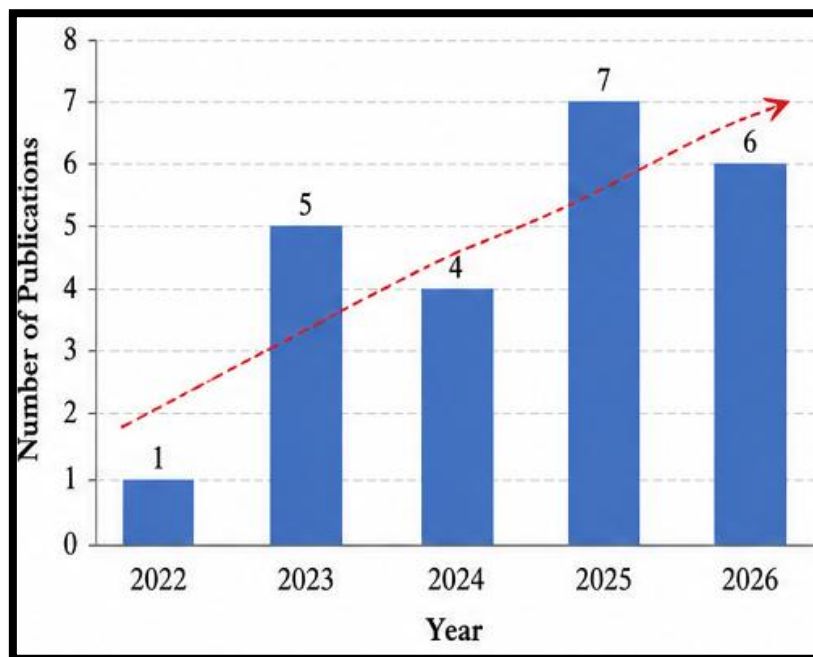


Figure 3. Publication Trend (2022–2026)

Interpretation

- Research on AI-driven talent acquisition has grown consistently over the review period.
- Nearly **57%** of all selected publications were published during **2025–2026**, indicating rapid advancement in AI-enabled HR research.
- The emergence of Generative AI and Large Language Models has significantly accelerated scholarly interest in intelligent recruitment.

- The increasing number of systematic reviews demonstrates the maturity of AI research within Human Resource Management.

5.2 AI Technologies Applied in Talent Acquisition

As can be seen from the analyzed research, there is more than one type of artificial intelligence that is used in modern recruiting processes. The most popular technology is machine learning; other widely spread technologies include natural language processing and predictive analytics. Recently, there have been a lot of publications on generative AI, large language models, and agentic AI.

Table 5.2. AI Technologies Identified in the Reviewed Studies

AI Technology	Frequency	Percentage (%)
Machine Learning	18	78.26
Natural Language Processing	16	69.57
Predictive Analytics	15	65.22
Resume Parsing	14	60.87
Chatbots	13	56.52
Generative AI	9	39.13
Large Language Models (LLMs)	8	34.78
Agentic AI	5	21.74

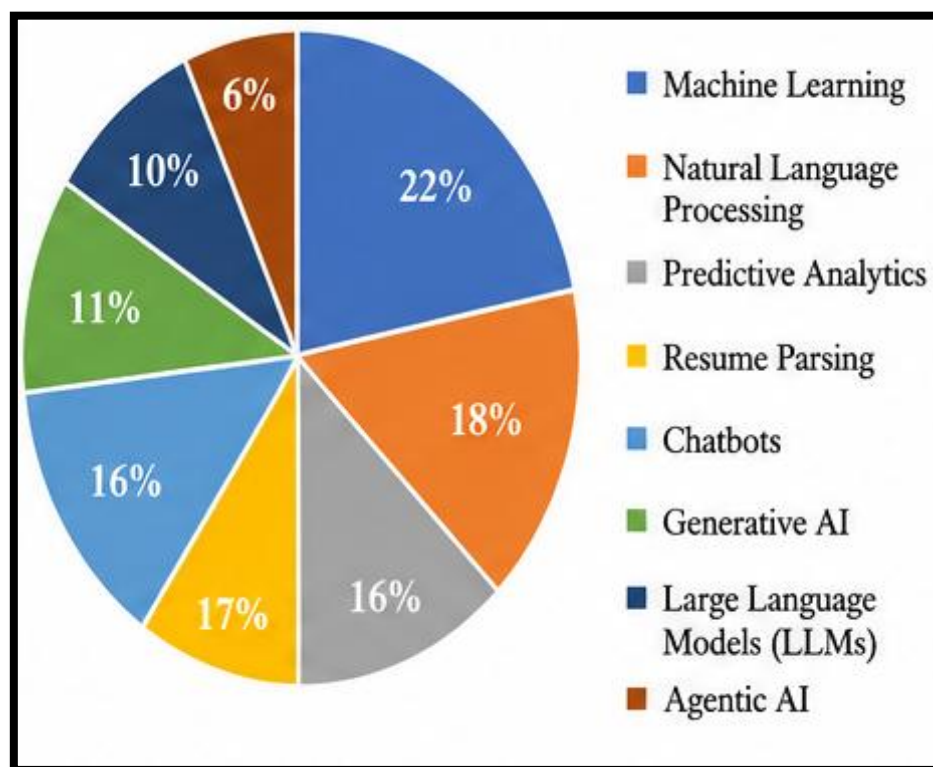


Figure 4. Distribution of AI Technologies

Interpretation

- Machine Learning is the dominant technology supporting intelligent recruitment.
- Natural Language Processing is widely used for semantic resume analysis and candidate communication.
- Predictive analytics enables evidence-based workforce planning and employee performance forecasting.
- Generative AI and LLMs have emerged as recent innovations, significantly improving conversational recruitment and automated candidate evaluation.
- Agentic AI remains an emerging research area with promising applications in autonomous recruitment systems.

5.3 AI Applications Across Recruitment Functions

According to the literature, AI tools are embedded at all stages of the recruitment process rather than being confined to the initial resume-screening stage. Smart recruitment systems enable candidate identification, competency evaluation, interview scheduling, predictive hiring, workforce planning, and onboarding.

Table 5.3. Major Recruitment Functions Supported by AI

Recruitment Function	Frequency
Resume Screening	20
Candidate Matching	19
Talent Analytics	18
Candidate Ranking	17
Interview Scheduling	16
Skill Assessment	15
Workforce Planning	13
Predictive Hiring	12
Employee Onboarding	9

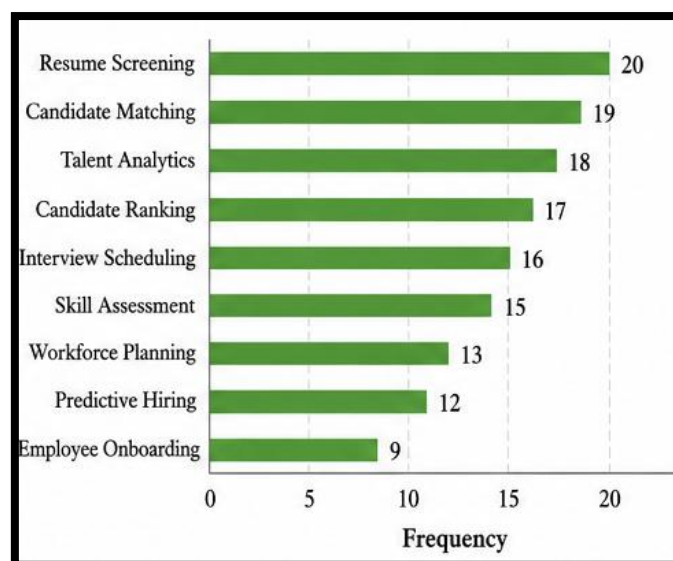


Figure 5. AI Applications Across Recruitment Functions

Interpretation

- Resume screening is the most extensively automated recruitment activity.
- AI-powered candidate matching improves recruitment accuracy by comparing applicant competencies with organizational requirements.
- Talent analytics has become a strategic HR capability supporting long-term workforce planning.
- Intelligent interview scheduling and chatbot communication substantially improve recruiter productivity and candidate experience.
- Predictive hiring enables organizations to estimate future employee performance before final recruitment decisions.

5.4 Benefits of AI-Driven Talent Acquisition

In the reviewed literature, it has been found that AI helps in improving the effectiveness of the recruiting process, lessening the administrative workload, increasing the quality of hiring, and facilitating effective strategic workforce planning.

Table 5.4. Major Benefits Reported in the Literature

Benefit	Frequency
Faster Recruitment Process	21
Improved Candidate Matching	20
Reduced Recruitment Cost	18
Enhanced Recruiter Productivity	18
Better Decision-Making	17
Improved Candidate Experience	16
Workforce Analytics	15
Increased Organizational Efficiency	14

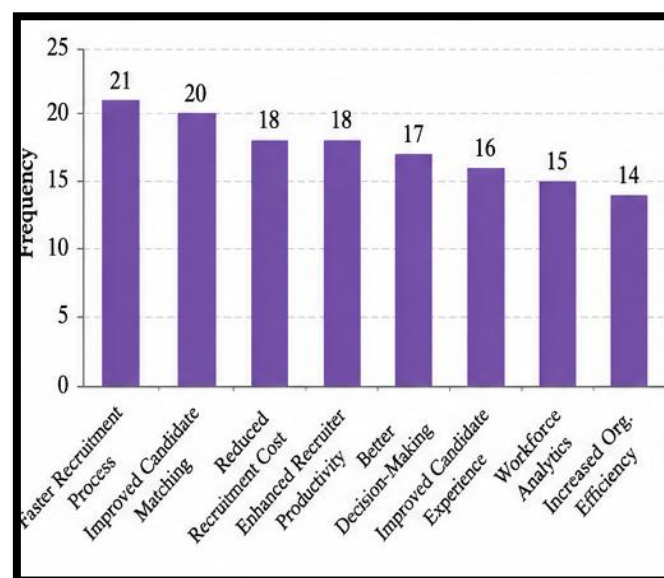


Figure 6. Benefits of AI in Talent Acquisition

Interpretation

- Faster recruitment is the most consistently reported organizational benefit.
- AI substantially reduces manual administrative work performed by HR professionals.
- Intelligent candidate matching improves recruitment quality while reducing employee turnover.
- Data-driven hiring decisions strengthen organizational competitiveness and workforce planning.
- AI enables HR professionals to focus on strategic talent management rather than repetitive administrative activities.

5.5 Challenges and Ethical Concerns

However, despite the clear advantages for organizations, there are a number of serious barriers identified from the literature that hinder the implementation of AI in recruiting processes. Ethical governance, algorithmic fairness, transparency, explainability, privacy, and organizational trust are still prevailing research issues.

Table 5.5. Challenges Associated with AI-Driven Recruitment

Challenge	Frequency
Algorithmic Bias	19
Ethical Concerns	18
Data Privacy	17
Lack of Transparency	16
Explainability	15
Regulatory Compliance	14
Employee Trust	13
Organizational Readiness	12

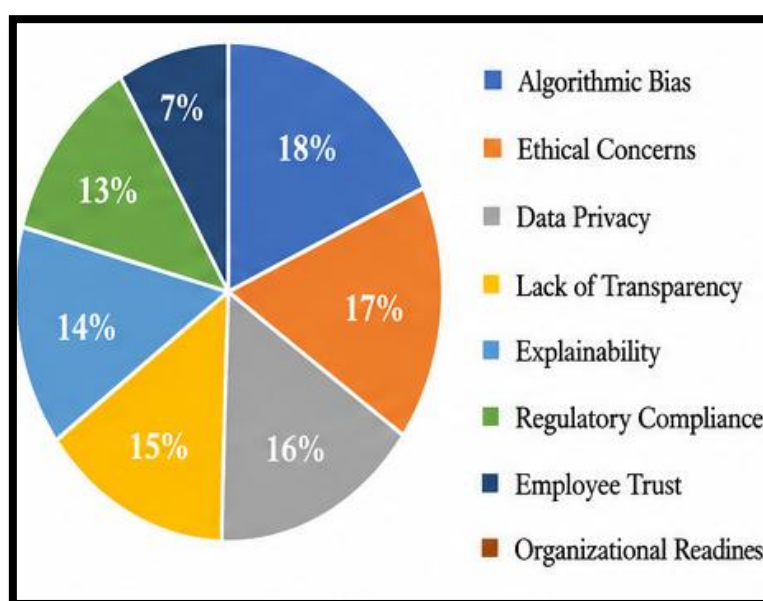


Figure 7. Ethical and Organizational Challenges

Interpretation

- Algorithmic bias remains the most frequently discussed concern within AI-enabled recruitment.
- Ethical governance is increasingly recognized as essential for responsible AI implementation.
- Organizations must ensure compliance with evolving AI regulations and data protection legislation.
- Explainable AI models are required to improve recruiter confidence and candidate trust.
- Organizational readiness, employee skills, and change management significantly influence successful AI adoption.

5.6 Emerging Research Themes

The thematic synthesis identified six major research themes across the selected publications.

Table 5.6. Emerging Research Themes

Theme	Representative Studies
Ethical AI and Fair Recruitment	Hunkenschroer & Luetge (2022); Benabou & Touhami (2025); Maake et al. (2026)
AI-Powered Talent Analytics	Qin et al. (2023); Kurchellapati & Challapalli (2026); Sarmiento Orna et al. (2026)
Intelligent Recruitment Automation	Albassam (2023); Ali & Kallach (2024); Swain & Malik (2025)
Industry 4.0 HR Transformation	Jatobá et al. (2023); Kurniawan et al. (2024); Jamal et al. (2026)
Generative AI and LLMs	Gupta et al. (2025); Yuksel et al. (2026)
Agentic AI and Autonomous Recruitment	Mountassir & Benyassine (2026); Kurchellapati & Challapalli (2026)

Interpretation

Based on the findings of the thematic analysis, one can conclude that the development of AI-based technologies has been evolving from automatic recruitment to intelligent workforce management. According to the current research trends, there is a growing tendency towards responsible AI governance, explainability, autonomous recruitment bots, generative AI, and human-machine interaction. The further development of the AI-based recruitment systems will include the elements of predictive analytics and conversational intelligence.

5.7 Discussion

The results of this systematic literature review prove that the application of Artificial Intelligence in talent acquisition in Industry 4.0 goes far beyond the automation of repetitive tasks such as resume screening and interview scheduling but includes the intelligent evaluation of candidates, predictive workforce analysis, competence mapping, personalization of engagement and support in decision making. Machine Learning, Natural Language Processing, and Predictive Analytics are still the most popular technologies at the moment, and Generative AI, Large Language Models, and Agentic AI will be the next generation technologies in terms of intelligent recruitment solutions owing to their reasoning and contextual understanding. In addition, ethical

problems associated with algorithmic bias, transparency, explainability, privacy and compliance still exist, which underlines the need for using AI in decision making and not in decision support.

6. Conclusion

Artificial Intelligence (AI) is another disruptive technology that is revolutionizing the field of talent acquisition. The following systematic literature review provides an analysis of research papers on how AI is impacting recruitment in the Industry 4.0 environment. In total, 23 peer-reviewed scientific articles that have been published between 2022 and 2026 were analyzed for the purposes of the current study to show how the use of AI has transformed recruitment practices into intelligent talent acquisition using Machine Learning, Natural Language Processing (NLP), Predictive Analytics, Generative AI, Large Language Models (LLMs), Agentic AI, resume parsing, and chatbots. The application of these technologies in recruitment processes leads to greater recruitment efficiency, faster hiring, improved candidate-job matching, and automation of routine tasks.

However, even with all these advantages, the review indicates the existence of some problems with regards to algorithmic bias, transparency, explainability, privacy, fairness, and regulatory compliance. It is important to note that all these findings show the importance of having responsible AI governance and human oversight in recruitment practices. All these findings point towards the fact that AI should be used in addition to human recruiters and not replace them while making hiring decisions. It is also evident from the review that the academia has taken keen interest in researching on AI-based recruiting, especially during 2025–2026, due to rapid developments in Generative AI, LLMs, and Agentic AI.

7. Future Scope

Further research can be focused on the development of intelligent, open, and human-centric AI-based recruiting technologies, which would satisfy increasingly complex demands of organizations. Among the directions that need to be explored are the application of Agentic AI for autonomous recruiting activities; the use of Generative AI and LLMs for context-aware interviewing and personal engagement of candidates; and Explainable Artificial Intelligence (XAI). Moreover, further research may focus on such directions as fairness-aware AI; strategies to mitigate potential bias; privacy-preserving approaches; and ethical guidelines for AI governance. The research might include analysis of the application of AI in different countries, industries, and organizational settings. Finally, the adoption of AI into Industry 5.0 concepts (human-centricity, sustainability, resilience, and collaborative intelligence) would open additional opportunities to develop even more inclusive recruiting tools. Additionally, longitudinal research is needed to estimate the long-term influence of the hiring process with AI support on the retention rates, performance, and diversity of employees. The cooperation of HRM researchers, experts in AI, data science, organizational psychology, information systems, and business ethics would be very helpful in this respect.

References:

- [1] Hunkenschroer, A. L., & Luetge, C. (2022). Ethics of AI-enabled recruiting and selection: A review and research agenda. *Journal of Business Ethics*, 178, 977–1007. <https://doi.org/10.1007/s10551-022-05049-6>
- [2] Qin, C., Zhang, L., Cheng, Y., Zha, R., Shen, D., Zhang, Q., ... & Xiong, H. (2023). *A comprehensive survey of artificial intelligence techniques for talent analytics*. *arXiv*. <https://arxiv.org/abs/2307.03195>
- [3] Albassam, W. A. (2023). The power of artificial intelligence in recruitment: An analytical review of current AI-based recruitment strategies. *International Journal of Professional Business Review*, 8(6), e02089. <https://doi.org/10.26668/businessreview/2023.v8i6.2089>
- [4] Jatobá, M. N., Ferreira, J. J., Fernandes, P. O., & Teixeira, J. P. (2023). Intelligent human resources for the adoption of artificial intelligence: A systematic literature review. *Journal of Organizational Change Management*, 36(7), 1099–1124.

- [5] Kaushal, N., Kaurav, R. P. S., Sivathanu, B., & Kaushik, N. (2023). Artificial intelligence and HRM: Identifying future research agenda using systematic literature review and bibliometric analysis. *Management Review Quarterly*, 73(2), 455–493.
- [6] Ekuma, K. (2024). Artificial intelligence and automation in human resource development: A systematic review. *Human Resource Development Review*, 23(2), 199–229.
- [7] Ali, O., & Kallach, L. (2024). Artificial intelligence enabled human resources recruitment functionalities: A scoping review. *Procedia Computer Science*, 232, 3268–3277. <https://doi.org/10.1016/j.procs.2024.02.142>
- [8] Kurniawan, A., Khuzaini, K., & Shaddiq, S. (2024). Application of artificial intelligence in increasing the effectiveness of HR behavior in the era of Industry 4.0: Systematic literature review method. *Proceedings of the Islamic University of Kalimantan*.
- [9] Tusquellas, N., Palau, R., & Santiago, R. (2024). Analysis of the potential of artificial intelligence for professional development and talent management: A systematic literature review. *International Journal of Information Management Data Insights*, 4(2), 100288.
- [10] Gupta, S., Kumar, R., & Sharma, P. (2025). Unveiling the future of artificial intelligence in talent acquisition: A bibliometric analysis of emerging trends and future directions. *Sustainable Futures*, 10, 101410. <https://doi.org/10.1016/j.sfr.2025.101410>
- [11] Gadesha, V., & Joshi, K. D. (2025). AI-based recruitment systems for Industry 4.0 organizations: Evidence from Indian enterprises. *Vision: The Journal of Business Perspective*. Advance online publication. <https://doi.org/10.1177/02560909251379212>
- [12] Swain, P., & Malik, A. (2025). The role of AI in recruitment: A systematic literature review. *GRS Journal of Multidisciplinary Research and Studies*, 2(6), 21–30. <https://doi.org/10.5281/zenodo.15572327>
- [13] Benabou, A., & Touhami, F. (2025). Artificial intelligence in human resource management: A PRISMA-based systematic review. *Acta Informatica Pragensia*.
- [14] Mazlougui, A., Alami, F. Z., & Sehmani, A. (2025). Technology-enhanced recruitment and talent management: A systematic review of transforming organizational culture in the meta-driven era. In *Transforming Organizational Culture Through Meta-Driven Human Resources* (pp. 279–322).
- [15] Panda, G., Aggarwal, S., Kaswan, M. S., & Dhillon, K. (2025). Artificial intelligence in agile human resource practices: Systematic literature review and bibliometric analysis. *International Journal of Lean Six Sigma*, 16(4), 918–945.
- [16] Mountassir, H., & Benyassine, H. (2026). The legitimization-validation paradox in AI-driven talent acquisition: A critical systematic review. *International Journal of Accounting, Finance, Auditing, Management and Economics*, 6(7).
- [17] Maake, G., Bezuidenhout, A., Schultz, C. M., & Smit, P. K. (2026). Explore barriers and risks that hinder AI integration into global talent management: A systematic review. *F1000Research*, 15, 791. <https://doi.org/10.12688/f1000research.179429.1>
- [18] Kurchellapati, V. R., & Challapalli, D. P. (2026). Agentic AI powered talent analytics enabling talent discovery: A systematic literature review. *International Journal of Advances in Signal and Image Sciences*, 273–289. <https://doi.org/10.29284/ijasis.12.1s.2026.273-289>
- [19] Sarmiento Orna, D. A., Apolo-Silva, M. F., Solís-Naranjo, A. P., Borja-Salinas, E. I., Espinoza-Solis, E. J., & Peralta-Gamboa, D. A. (2026). Artificial intelligence and data analytics in human talent management. *Frontiers in Artificial Intelligence*, 9, 1793296. <https://doi.org/10.3389/frai.2026.1793296>

- [20] Yuksel, K. A., Anees, A. B., Elneima, A. H., Hewavitharana, S., Al-Badrashiny, M., & Sawaf, H. (2026). Agentic AI for human resources: LLM-driven candidate assessment. In *Proceedings of the Conference of the European Chapter of the Association for Computational Linguistics*.
- [21] Monson, F. K. S., Mani, E. K. F., & Samai, M. N. (2026). The use of artificial intelligence in human resource management recruitment: A bibliometric analysis and systematic literature review of information systems industry. *International Journal of Science and Management Studies*, 9(2), 216–245. <https://doi.org/10.51386/25815946/ijsms-v9i2p125>
- [22] Jamal, M. T. B., Hamid, A. H. B. A., & Mansor, A. N. (2026). Navigating talent management in the digital age: A systematic review. *Veredas do Direito*, 23(6), e235377.
- [23] Hossain, M. Z., & Rafat, S. O. G. (2026). Artificial intelligence-driven talent management in higher education: Ethical, strategic, and socio-technical perspectives. *Journal of Artificial Intelligence and Technological Development*, 2(2), 33–45.