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Role of artificial intelligence in employee recruitment: systematic review and future research directions

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Abstract
Artificial intelligence (AI) is increasingly used in recruitment processes to enhance efficiency and improve hiring decisions. This systematic literature review examines the opportunities and challenges of AI in employee recruitment across various organizational settings. Analyzing 49 peer-reviewed articles sourced from the Web of Science database published between 2018 and 2025, this review summarizes the current knowledge of AI's impact, highlighting its potential to increase productivity (e.g., through automated resume parsing and chatbot-led initial screening), improve candidate quality (e.g., via predictive analytics for job-fit and AI-assisted video interview analysis), and potentially reduce human bias by standardizing initial evaluations, though it also addresses critical ethical considerations such as the risk of algorithmic bias stemming from training data. However, it also addresses ethical considerations, including algorithmic bias and the need for transparency. The review concludes with recommendations for future research focused on legal frameworks, industry-specific applications, and mitigating the risks associated with AI in recruitment.

Keywords Artificial intelligence (AI), Recruitment, Hiring, PRISMA, Systematic literature review

1 Introduction

Artificial intelligence (AI) is rapidly changing the landscape of human resource management (HRM), particularly in hiring processes. By automating tasks such as candidate sourcing, interview scheduling, and performance assessment, AI technologies offer the potential to enhance the effectiveness and productivity of recruitment, for instance, by automating time-consuming tasks like candidate sourcing, initial resume parsing, and interview scheduling [37]. The drive to overcome common challenges like human bias in manual screening, inefficiencies, and the high costs of traditional recruiting methods is fueling AI adoption [39]. As businesses strive to maintain a competitive edge in a rapidly

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evolving job market, the promise of AI to accelerate hiring and improve decision-making has become increasingly appealing.

Yet, alongside these advantages, significant ethical, legal, and practical considerations arise. AI systems must ensure fairness and transparency to prevent bias [33]. A crucial concern is the potential for algorithmic bias, where AI systems unintentionally perpetuate pre-existing biases found within historical data [8]. The accuracy and transparency of algorithmic decisions are also questioned, leading some HR professionals to hesitate in adopting AI technologies [34]. These concerns highlight the necessity of robust ethical regulations and legal frameworks to govern the use of AI in hiring.

This systematic literature review aims to synthesize the current knowledge regarding AI's application in recruitment, emphasizing its benefits, limitations, and opportunities. To provide insights for future research, the review identifies key trends and gaps in the existing literature through an in-depth analysis of the field. This review reveals several potential benefits of AI in recruitment, including increased productivity (e.g., by streamlining workflows through automated screening), enhanced intellectual capital (e.g., through data-driven identification of top talent using predictive analytics), and potentially reduced human bias in initial stages [44]. AI technologies can automate complex tasks, freeing HR managers to focus on more strategic initiatives. Furthermore, AI can leverage data-driven insights to identify and attract top talent, thereby improving intellectual capital [39]. The ability of AI to mitigate bias in hiring can also foster a more inclusive and diverse workforce [50].

However, the review also underscores several drawbacks associated with AI in recruitment. Ensuring fairness and transparency in AI systems requires careful development and implementation, raising significant ethical considerations [33]. Algorithmic bias remains a major concern, as AI systems may inadvertently replicate existing biases present in historical data [8]. Moreover, concerns regarding the accuracy and transparency of algorithmic decisions may hinder the widespread adoption of AI technologies by HR professionals [34].

While AI in recruitment is a burgeoning field, existing reviews may not fully capture the most recent advancements and ethical discussions, or provide a comprehensive synthesis of future research priorities. This systematic review aims to address this gap by providing a comprehensive overview of the current state of the literature, identifying key research gaps, and outlining promising directions for future investigation.

2 Methodology

To synthesize the diverse findings from existing research on the application of artificial intelligence in hiring, this review paper employed a qualitative research design, specifically, a systematic literature review. This methodological approach was strategically chosen to identify broad trends, assess the multifaceted impacts, and understand the challenges and constraints associated with incorporating AI into modern recruiting processes.

2.1 Search strategy

To identify relevant research articles, we utilized the Web of Science database, as this platform encompasses extensive data from various fields of scholarly works, including but not limited to management, psychology, and computer science. The following search

query was used: TS = ("Artificial Intelligence" OR "Machine Learning" OR "Deep Learning") AND TS = (" Recruitment" OR "Hiring"). The goal of the search string was to collect all studies that explored the effects of AI on recruiting within the organizational setting. One possible drawback of this strategy might be that it only relies on the Web of Science database, which may have excluded numerous pertinent studies in other databases.

2.2 Inclusion and exclusion criteria

To ensure the relevance and focus of this review, we developed and applied predetermined inclusion and exclusion criteria. Only studies that explicitly addressed the use of AI *within* the context of hiring were selected for inclusion. Conversely, studies examining AI applications in unrelated fields, such as healthcare, education, or those that did not explicitly address AI's role in hiring, were excluded from the review.

2.3 Data extraction and synthesis

The PRISMA model was used to rigorously document the systematic search and selection procedure, providing a transparent account of each step from the initial search to the final selection of studies [30]. The PRISMA instructions assessed the available articles for eligibility, considering their titles and abstracts. Potentially eligible articles' full texts have been gathered and reviewed according to precise inclusion and exclusion criteria. Data was collected using a prescribed form for research, which matched. The following content was taken out: details about the study (a) author, year of publication, journal title, (b) characteristics of AI usage (technology type and purpose); (c) study technique (e.g., experiment, case study); (d) essential conclusions about how AI affects recruitment; and (e) study limitations. The extracted data were then synthesized to identify common themes, trends, and contradictions in the literature. A narrative synthesis approach was used to summarize the findings, providing a comprehensive overview of the current state of knowledge. Figure 1 presents the PRISMA flow diagram, illustrating the systematic process of study identification, screening, eligibility assessment, and inclusion. Figure 2 depicts the temporal distribution of the included studies, highlighting the growing research interest in this area. Figure 3 illustrates the geographical distribution of the included studies, providing insights into the global research landscape on AI in recruitment. Finally, Table 1 provides a comprehensive summary of the included studies, detailing their author/years, samples, contexts, research designs, and key findings.

3 Results: key themes in AI-driven recruitment

Existing research on the use of AI in recruitment processes has been conducted in various contexts and across various industry sectors. For example, a study investigating the application of AI in talent acquisition within Greek luxury hotels revealed significant increases in efficiency [26]. Generative AI has also been proven to enhance gender diversity in recruitment processes in the hospitality industry, a finding highlighted by Thakur et al. [45]. Humanized AI technologies, such as virtual AI job interviews, have positively impacted applicants' reactions and experiences, making the recruitment process more interactive and less intimidating [10]. Case studies, such as the one conducted at POSCO in South Korea, underscore the potential benefits of collaborative intelligence driven by AI-enabled recruitment, leading to improved hiring processes and more effective talent acquisition strategies [23].

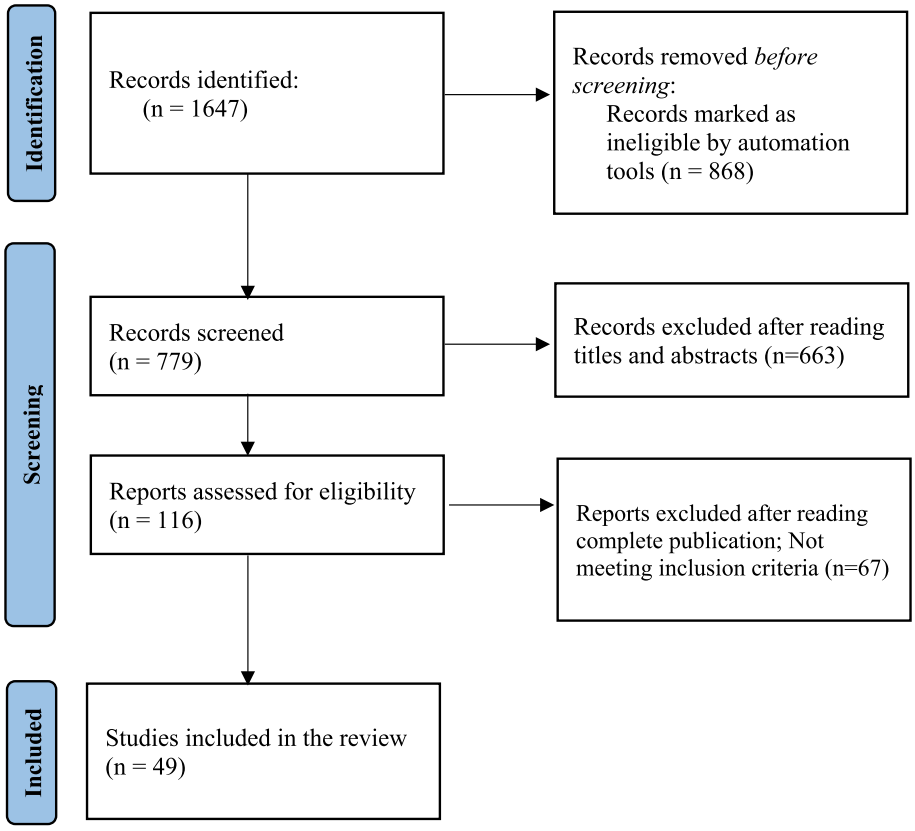


Fig. 1 Article search and selection process

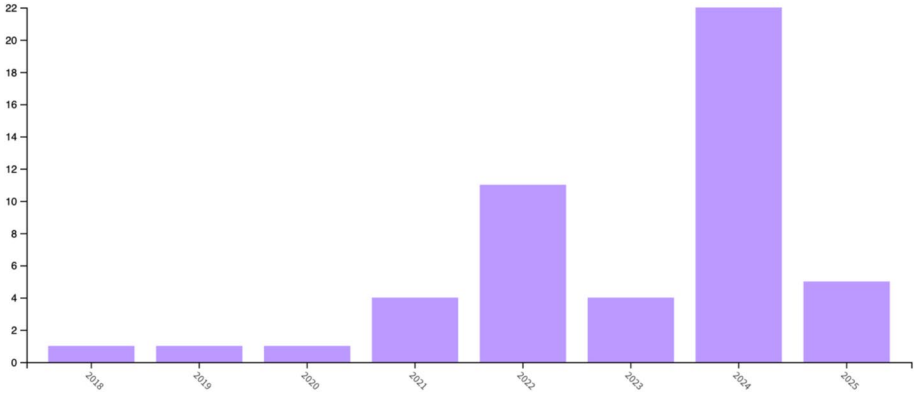


Fig. 2 Number of publications in years

3.1 AI-powered candidate sourcing and screening

This theme, AI-Powered Candidate Sourcing and Screening, encompasses the application of artificial intelligence technologies to automate and enhance the initial stages of the recruitment pipeline, from identifying potential candidates across various platforms to filtering applications based on predefined criteria.

A primary driver for adopting AI in sourcing and screening is the significant enhancement in operational efficiency and speed [26, 44]. Multiple studies highlight AI's capacity to process vast volumes of applications far quicker than manual methods, thereby reducing time-to-hire [44]. In today's rapidly evolving and highly competitive job market, the

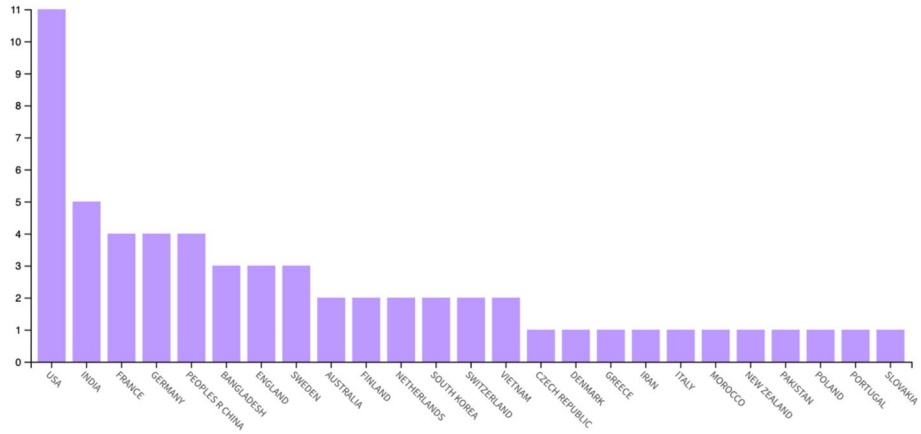


Fig. 3 Number of publications based on countries

ability of AI to automate and enhance decision-making in the hiring process presents an attractive prospect for organizations seeking to gain a competitive edge.

Beyond speed, AI tools are reported to improve the quality of candidate pools by leveraging data-driven insights to identify top talent [39]. This involves matching skills more accurately and reaching passive candidates. This ability to identify and attract high-caliber individuals contributes directly to an organization's intellectual capital [39]

A frequently cited benefit is AI's potential to minimize human bias in initial screening stages [45, 50]. AI plays a crucial role in minimizing bias in recruitment decisions, a critical consideration given the potential for unconscious bias to influence human judgment [45]. AI systems can potentially evaluate candidates based on objective criteria, limiting the impact of unconscious biases that may otherwise sway human decisions [50]. By focusing on objective qualifications and performance indicators, AI can help create a more diverse and inclusive workforce, identifying qualified candidates who might have been overlooked using traditional methods [38]. Moreover, AI offers the potential for consistent and objective evaluations, ensuring that every candidate is judged fairly and impartially [44].

However, it's crucial to note that this potential is contingent on the design and data used to train these AI systems, as biases can also be embedded algorithmically, a concern explored further in the following sections.

3.2 AI in interviewing and assessment

This section explores the evolving role of AI in the interviewing and assessment phases of recruitment, moving beyond simple automation to include sophisticated tools for evaluating candidate suitability and enhancing the applicant experience.

A significant development is the emergence of 'humanized AI' technologies, such as socially intelligent virtual AI job interviewers [10, 23]. Research suggests that humanized AI technologies, such as socially intelligent virtual AI job interviewers, have also shown promising results in enhancing applicant responses and overall experiences [10]. These innovative tools can mimic human interactions, combining the best aspects of both human and artificial intelligence to create a recruitment process that is engaging and less intimidating for applicants. These virtual interviewers can conduct initial screenings of candidates, asking standardized questions and assessing their communication skills, personality traits, and overall suitability for the role. AI algorithms can analyze

Table 1 Comprehensive summary of the included studies

№	Author &year	Sample	Context	Research design	Key findings
1	[37]	Not explicitly stated	Impact of AI technologies on personnel selection	Modified thematical approach with broader topics followed by detailed coding focusing on beliefs and emotions	AI technologies have a big impact on hiring decisions, which causes meta-algorithmic judgements to rise exponentially
2	[39]	Not specified	Leveraging AI in recruitment to enhance intellectual capital	Resource-based view and dynamic capability framework	AI can enhance intellectual capital in recruitment processes through strategic resource management and dynamic capabilities
3	Rao et al., [33]	Not specifies	Ethical AI in HR, focusing on tech hiring	Case study	To maintain fairness and transparency in AI-driven HR procedures, especially in tech hiring, ethical considerations are essential
4	[8]	Not applicable	Ethical safeguards in algorithmic HR management, focusing on the right to work in the age of AI, the right to privacy, and the right to equality	Conceptual analysis	Protecting employees' rights in AI-driven HR management requires ethical measures
5	[3]	100 recruiters from Portugal who regularly use AI tools in their professional activities; 355 recruiters from Portugal	Recruiters' acceptance of AI	Quantitative, structural equation modeling (SEM)	Recruiters' acceptance of AI is influenced by perceived usefulness and ease of use
6	[26]	Greek luxury hotels	Use and effectiveness of AI in HRM and talent acquisition in luxury hotels	Quantitative, structural equation modeling (SEM) Use and effectiveness of AI in HRM and talent acquisition in luxury hotelsQualitative, inductive thematic analysis of semi-structured interviews	Explored managers' perspectives on the application of AI-enabled technology in talent acquisition within the luxury hotel industry. AI improves efficiency in talent acquisition processes in Greek luxury hotels
7	[45]	Hospitality industry	Generative AI shaping gender diverse recruitment	Empirical study	Generative AI can improve gender diversity in hiring practices in the hotel sector
8	[10]	Not specified	Humanized AI in hiring	Empirical study	Candidates' responses and experiences are positively impacted by socially skilled virtual AI job interviewers

Table 1 (continued)

№	Author &year	Sample	Context	Research design	Key findings
9	[44]	Candidates: 21 DevOps job candidates (seniority: 3–11 years) Reviewers: 3 experienced DevOps specialists (5, 7, and 8 years of experience)	Comparing AI (ChatGPT, Mistral, Google Gemini) with human expertise for candidate assessment in DevOps recruitment	Mixed-method (Qualitative & Quantitative)	Due to inconsistencies and the inability to evaluate interpersonal abilities, AI tools cannot completely replace human judgement in technical recruitment, even though they exceeded humans in speed by a large margin
10	Cao, [7]	Vietnam's medium-sized firms	n = 297: Hiring managers (13.4%), HR directors (51.5%), Top executives (35.1%). Primarily from commerce and service sector (70.4%)	AI adoption in talent acquisition	The study demonstrates the constructs' discriminant validity. It also highlighted the importance of data privacy and anonymity as ethical considerations
11	[34]	Swiss HR departments	Aversion to algorithms used in HR, specifically staff engagement processes	Quantitative, hypothetico-deductive approach using PLS-SEM on three models (complete, private, public sectors)	Due to concerns regarding transparency and fairness, Swiss HR departments are opposed to algorithmic hiring
12	Benhmama et al., [4]	Companies located in the Casablanca-Settat region of Morocco	Adoption of artificial intelligence recruitment	Quantitative, univariate and multivariate analysis	Technology readiness and perceived benefits are two factors propelling AI usage in hiring
13	[28]	15 experts from Iranian companies	Challenges of e-recruitment (ER)	Qualitative, thematic data analysis	Adopting online recruitment tools presents concerns for employers, including user acceptance and technical problems
14	[24]	128 AI-powered recruitment software and systems analyzed	The application of AI in e-recruitment and its status as a crucial ICT in management-focused academic research	VOSviewer-based bibliometric analysis, scientific mapping, and software and system comparison	AI plays a crucial role in contemporary hiring procedures by increasing accuracy and efficiency
15	[32]	HR and recruitment professionals from companies in Stockholm and Uppsala, Sweden	AI in talent acquisition	Qualitative, grounded theory approach with open and axial coding of semi-structured interviews	AI has an impact on talent acquisition's operational and organisational aspects. Investigated the trade-off between relational engagement and transactional efficiency while using AI in hiring
16	Sadeghi et al., [38]	K-12 education	AI in recruitment and retention of teachers of color	Empirical study	AI assists in recruiting and retaining teachers of color, enhancing diversity and inclusivity

Table 1 (continued)

№	Author &year	Sample	Context	Research design	Key findings
17	[48]	Not explicitly stated, focused on the role of AI-enabled talent management platforms in HEIs	Adoption of AI in talent management in Higher Education Institutions (HEIs)	Quantitative, structural equation modeling	The biggest influence on AI adoption is perceived ease of use, which is followed by perceived utility
18	[36]	Multi-national corporations	AI in talent acquisition	Multiple case study	Contextual considerations determine how AI is adopted in talent acquisition by multinational organisations
19	Rigotti et al., [35]	Not specified	Use of AI focusing on dimensions of fairness, bias, discrimination	Conceptual analysis	Although AI-driven hiring is more efficient and less biassed, it still has many drawbacks, including privacy invasions, potential discrimination, and differing stakeholder perceptions of justice
20	[23]	POSCO in South Korea	Collaborative intelligence in AI-enabled recruitment	Case study	AI-enabled hiring improves recruitment outcomes by fostering collaborative intelligence
21	Seppala et al., [41]	Not specified	AI and discriminative decisions in recruitment	Conceptual analysis	AI may result in discriminatory hiring practices, upending long-held beliefs
22	Campion et al., [6]	Not specified	Machine learning's effects on hiring decisions	Emperical study	Processes for choosing employees are greatly impacted by machine learning
23	[40]	Indian IT organizations	AI in talent acquisition	Empirical study	The degree of acceptance of AI in talent acquisition varies among HR experts in Indian IT companies
24	[19]	Not specified	AI for hiring talents	Quantitative	AI improves hiring procedures by providing impartial and effective assessments
25	[11]	Not explicitly stated, but involved interview transcripts totaling 435 pages	Recruiters' interactions with AI technologies at work	Qualitative data analysis approach	Process specialists are essential to maintaining equity in AI-driven hiring
26	[25]	Not specified	Discrimination risks in AI hiring	Conceptual analysis	AI and automated hiring decisions carry the possibility of prejudice
27	[50]	Manufacturing sector in China	AI impact on recruitment biases	Quantitative, regression analysis	AI technologies can greatly lessen biases in hiring
28	[42]	Not specified	Legal issues in hiring AI	Conceptual analysis	For AI-driven hiring procedures to be fair and compliant, legal issues are critical
29	[16, 17]	552 job applicants from 12 nationalities	Candidates perception about AI in hiring	Quantitative study using an online survey	Transparency and fairness have an impact on applicants' opinions of AI in hiring
30	[16, 17]	283 recruiters and HR professionals from 15 countries	Recruiters' perception of AI-based tools	Empirical study	Recruiters' perception on AI-based technologies differ depending on how beneficial and simple they seem to be
31	[21]	Not applicable	Algorithmic inclusion in hiring	Conceptual analysis	AI recruiting predictive algorithms have the power to influence diversity and inclusivity

Table 1 (continued)

№	Author &year	Sample	Context	Research design	Key findings
32	[15]	194 participants	Mitigating bias in AI candidate management	Empirical study	Hiring bias and discrimination can be lessened by integrating XAI (Explainable Artificial Intelligence) into AI-based systems
33	[18]	Not explicitly stated	Elements impacting the behavioral intention of HR professionals in Bangladesh to use AI in hiring	Quantitative study	The use of AI in Bangladeshi hiring procedures increases productivity and equity
34	Duong et al., [12]	Student job-seekers	Factors influencing job application intention	Quantitative study	Self-efficacy moderates the impact of AI recruitment on student job applicants' satisfaction
35	[9]	Not applicable	Discrimination and ethics in hiring procedures using artificial intelligence	literature review and conceptual discussion	AI and recruiters working together can lessen human bias in the workplace
36	[13]	Not specified	AI's ethical concerns in recruitment	Empirical study	Performance expectations and organizational trust are impacted by ethical views of AI in hiring
37	[46]	Not applicable	Disability and fairness in AI recruitment	Conceptual analysis	There are issues with justice and disability in AI hiring
38	[5]	11 experts (one professor, two researchers, and the author) participated in a two-round Delphi study	Key factors HR professionals consider when choosing to use AI in hiring	Delphi study with two online rounds	Several factors affect how much AI is used in hiring procedures
39	[14]	174 participants	Examining how selection judgements made using human, AI/ML, and augmented (human + AI/ML) methods affect applicants' responses (perceived fairness, perceived control, and satisfaction of competence demands)	Two experimental studies	Compared to a purely AI/ML-based strategy, an augmented approach resulted in a stronger felt level of influence, particularly during the final selection stage. Greater satisfaction of competence needs was linked to familiarity with the selecting process
40	[2]	243 responses from AI users in manufacturing firms	Factors predicting the intention to use (IU) and actual use (AU) of AI for talent recruitment, moderated by age	Quantitative study using PLS-SEM	Performance expectancy, effort expectancy, social influence, and facilitating conditions strongly predict AI adoption (IU). Intention to use fully mediated the effect of facilitating conditions on actual use. Age moderated the influence of intention to use on actual use
41	[20]	Not applicable	Legal and ethical risks associated with AI in employment decisions	Legal analysis and commentary	Explored the need for legal and moral considerations when utilising AI for hiring, as well as possible biases in the technology and a lack of transparency

Table 1 (continued)

№	Author &year	Sample	Context	Research design	Key findings
42	[43]	Ten HR managers participated in the first round, followed by AI developers and HR managers with conceptual and technical expertise in AI	Common biases in recruitment and selection and HR managers' views on using AI to mitigate these biases	Qualitative study using grounded theory methodology with open, axial, and selective coding	Investigatin of how AI developers and HR experts view the application of AI in hiring and selection, with an emphasis on bias reduction
43	[49]	Job applicants interacting with AI-enabled e-recruitment services	Investigates how AI tools affect hiring, submission of applications, and job hunting	Qualitative approach	AI tools' interactive nature encourages higher-quality applications AI adjusts the application procedure according on each applicant's requirements and expectations Applications are more likely when AI is viewed favourably, which expands the pool of candidates and improves their calibre
44	[29]	Not explicitly stated	The application of AI in e-recruitment: themes, possible advantages, and disadvantages	Thematic analysis of interview transcripts	Themes including data analytics, employer branding, candidate experience, automation, accuracy, efficiency, fear, mistrust, loss of human touch, and AI limits were identified
45	[22]	Statements made by participants regarding their experiences	The practical application of AI in hiring from the viewpoint of human resources professionals	Phenomenological research with four steps of data analysis	Five broad themes that describe the mental structure of the AI recruitment experience were found
46	[31]	297 Chinese companies, surveyed through HR managers and senior managers	Examines the elements that affect the adoption of AI in hiring by applying the Transaction Cost Theory and the Technology-Organization-Environment (TOE) model	Quantitative study using a structured survey. Data analyzed via hierarchical multiple regression to examine AI adoption determinants	While technological proficiency and regulatory assistance promote AI adoption, perceived complexity hinders it. AI adoption is not much impacted by industry or company size. The effect of technological skill and complexity on the adoption of AI is mitigated by transaction costs
47	[1]	Study 1: 298 MTurk workers Study 2: 225 college seniors from a Southeastern university	Investigates applicants' perceptions of AI in recruitment and selection processes	Two experiments with vignettes describing human vs. AI decision-makers and outcome favorability	Two-way communication and the opportunity to perform were important mediators of applicant reactions, including organisational attraction, job pursuit intentions, and litigation intentions, which were impacted by AI-based interviews that were thought to be less procedurally and interactionally just than traditional human-based interviews

Table 1 (continued)

№	Author &year	Sample	Context	Research design	Key findings
48	[47]	Not explicitly stated	Factors influencing job applicants' likelihood of applying when encountering AI in the application process	Quantitative study using established scales and statistical analysis	Investigated how anxiety, novelty of activity, attitude towards the company, and incentive for using technology affect the likelihood of applying for a job
49	[27]	Not applicable	The role of trust in automation reliance	Conceptual discussion	Emphasized the value of trust when depending on automated technologies

candidates' responses, facial expressions, and tone of voice to provide objective assessments of their qualifications and potential [10]. Beyond virtual interviewers, AI is also being used to develop more sophisticated assessment tools that can evaluate candidates' technical skills, problem-solving abilities, and cognitive capabilities [10]. These assessments can provide valuable insights into a candidate's potential for success in a particular role, helping organizations to make more informed hiring decisions. By providing personalized feedback and guidance throughout the process, tailored Humanized AI can significantly improve candidates' overall experience and satisfaction [23].

Rather than entirely replacing human recruiters, AI is increasingly viewed as a tool for "collaborative intelligence" [23]. In this model, AI systems augment human decision-making by providing data-driven insights and objective assessments, while human recruiters contribute contextual understanding and strategic judgment [23]. This synergy can lead to more informed hiring decisions and identify the most suitable candidates more effectively [10, 23].

3.3 Ethical considerations and challenges

A fundamental ethical concern is the risk of algorithmic bias, where AI systems unintentionally maintain or even intensify current societal and historical biases present in their training data [8, 33, 41]. Because these systems learn from past hiring decisions, they may penalize candidates from underrepresented groups, leading to unfair treatment and undermining organizational efforts to create diverse and inclusive workforces [25]. This potential for AI to become a tool for preserving inequality, rather than mitigating it, represents the most significant ethical barrier to its adoption.

The 'black box' nature of some AI algorithms raises concerns about transparency and explainability in decision-making [33]. This lack of clarity can lead to resistance from HR professionals who question the reliability and opacity of algorithmic judgments [34]. Building trust in AI systems requires robust ethical safeguards and mechanisms to ensure that AI-generated HR management is fair and transparent [8]. If AI systems are designed and monitored improperly, they may inadvertently lead to discrimination in hiring, perpetuating existing inequalities, and undermining efforts to create a more diverse and inclusive workforce.

Another major drawback of AI in recruitment is the potential for algorithmic bias to arise when AI systems unintentionally reinforce biases that already exist within historical data [41]. This can lead to unfair treatment of candidates and ultimately undermine the credibility and legitimacy of AI-driven recruitment processes [25].

Although AI is intended to ensure fairness, it can inadvertently become a tool for perpetuating existing inequalities if not carefully designed and implemented [41].

The successful integration of AI also hinges on user acceptance from both HR professionals and candidates [28]. Some HR professionals express reluctance, fearing AI may not fully capture essential behavioral and organizational contexts [28, 34]. Furthermore, practical challenges such as system errors, data security concerns, and compatibility with existing HR systems can hinder effective AI adoption [41].

Despite the risks, the literature also suggests that AI, when thoughtfully implemented, can offer new possibilities for promoting diversity and inclusion. For example, AI can assist in identifying qualified candidates from disadvantaged groups who might be overlooked by traditional methods, ensuring fairer consideration [38]. This potential for AI to foster a more inclusive workforce is a significant area of ongoing exploration [45].

While the fundamental principles of AI remain consistent across industries, its specific applications and requirements often vary significantly depending on the unique characteristics of each sector. For instance, research has demonstrated the positive role of AI in increasing the efficiency of talent acquisition processes within Greek luxury hotels [26], as well as enhancing gender diversity in recruitment processes within the broader hospitality industry [45]. A deeper understanding of these industry-specific applications of AI in recruitment can equip organizations with valuable knowledge on how to tailor AI solutions to meet their unique needs and challenges [26]. Moving forward, the issuance of sound legal and regulatory guidelines for the utilization of AI in the recruitment process will be essential to promote fairness, transparency, and accountability [42]. These legal considerations, like AI-driven recruitment processes, must be implemented according to existing laws and regulations [20].

4 Discussion and conclusion

This systematic review has illuminated several key themes regarding the role of AI in employee recruitment, notably efficiency gains, AI interviewing, and ethical concerns about bias, each presenting a complex interplay of opportunities and challenges. AI offers the promise of improved operational efficiency, reduced biases in decision-making, and enhanced precision in identifying top talent. The automation of routine tasks through AI empowers HR professionals to focus on more strategic initiatives, fostering collaboration between AI systems and human expertise to create more effective and optimized hiring methods [37, 39, 44]. Furthermore, humanized AI innovations, such as virtual AI interviewers, can positively influence candidates' experience, making the hiring process more engaging, personalized, and less daunting [10, 23].

However, despite these promising advancements, this review has also highlighted several ethical, technical, and practical challenges that must be addressed to ensure the successful and responsible implementation of AI in recruitment. A critical finding of this review is that evidence regarding AI's ability to reduce bias is decidedly mixed. While AI holds the potential to standardize processes and reduce certain human biases, the pervasive risk of algorithmic bias, as discussed earlier, is a significant counter-narrative found throughout the literature [8, 33]. The potential for AI to reinforce historical biases through algorithmic decision-making necessitates vigilant monitoring and the implementation of proactive transparency measures [25, 41]. Moreover, resistance from some HR professionals to fully embrace AI adoption stems from concerns about its clarity,

understandability, and reliability. Addressing these technical challenges, including data security, system integration difficulties, and ensuring user acceptance, is crucial to facilitate wider adoption and maximize the benefits of AI implementation [28, 34].

This review has also underscored the importance of considering industry-specific nuances when adopting AI-based recruitment solutions. Different industries face unique challenges and opportunities, and AI technologies must be tailored to meet their specific requirements. For example, the hospitality industry has successfully leveraged AI to improve hiring efficiency and optimize gender diversity, highlighting the need for adaptable AI solutions that can be customized to address specific industry needs [26, 45]. These findings emphasize the need for organizations to personalize their AI solutions to align with their unique field-related demands and maximize their return on investment.

Furthermore, this review has identified the critical need to establish a strong legal and administrative framework to effectively regulate AI applications in recruitment. Clear and well-defined rules will empower organizations to manage ethical risks proactively, ensuring transparency in decision-making and actively mitigating algorithmic discrimination to foster trust among users and stakeholders [20, 42]. Legal clarity will also enable recruiters and organizational leaders to confidently and ethically adopt AI technologies while minimizing fears and resistance associated with AI management uncertainties.

4.1 Implications

For practitioners, this review highlights the need for careful due diligence when selecting AI recruitment tools, emphasizing systems that offer transparency and allow for bias audits. For policymakers, the findings underscore the urgency of developing clear legal and ethical guidelines to govern AI use in hiring, ensuring fairness and protecting applicant rights [20, 42].

Theoretically, our findings suggest that existing models of technology acceptance may need to be augmented to incorporate the unique ethical and trust dimensions associated with AI in high-stakes decision-making processes like recruitment.

4.2 Identified limitations and future research directions

M Our systematic review of the literature reveals several critical gaps. To address these, we propose a research agenda focused on key areas such as *ethical governance and legal frameworks*, *technological transparency and efficacy*, *the human-AI interface*, and *industry-specific contexts*. Table 2 provides the idetified gaps, future research questions, and brief elaborations.

4.3 Concluding remarks

This systematic review synthesizes two sides of AI in recruitment: a promising technology for efficiency and fairness, yet with significant challenges. While AI offers the potential to lessen certain human biases, this outcome is not guaranteed and is often neutralized by the unescapable risk of algorithmic bias. Future progress centers on focused efforts in key areas, like establishing robust ethical and legal governance, demanding greater technological transparency, understanding the long-term human-AI interaction, and developing industry-specific solutions. The successful and ethical adoption of AI in recruitment requires a collaborative approach, integrating technological capabilities with human judgment and robust regulatory frameworks.

Table 2 Idetified gaps, future research questions, and brief elaborations

Identified gap	Future research question	Brief elaboration
Gap 1 The literature highlights the need for legal oversight [20, 42] but lacks consensus on what these frameworks should contain	How can standardized, auditable frameworks for AI in recruitment be developed to ensure fairness and legal compliance across different jurisdictions?	Research should focus on developing and testing practical bias audit methodologies, establishing standards for transparency, and creating governance models that can be adapted globally
Gap 2 Concerns about the 'black box' nature of AI are prevalent [33], but there is little comparative research on the practical impact of Explainable AI (XAI) or the differences between proprietary vendor tools and in-house solutions	What is the comparative effectiveness and ethical implication of proprietary AI recruitment tools versus custom-built or open-source solutions, particularly concerning transparency and bias mitigation?	Studies could compare candidate outcomes, recruiter trust, and bias levels between different types of AI systems. This directly addresses the need for organizations to make informed procurement decisions.[a]
Gap 3 While studies examine initial reactions [10], the longitudinal effects of AI on the recruiter's role and the broader candidate experience remain underexplored	What are the long-term consequences of AI-driven recruitment on the evolution of the HR profession, overall candidate experience, and employee engagement?	Longitudinal studies are needed to track changes in recruiter skill sets, time allocation, and career paths. Research should also investigate how prolonged interaction with AI affects candidate perceptions and organizational branding
Gap 4 Findings are often presented generally or from one sector (e.g., hospitality—[26]), yet recruitment needs vary significantly	How do the challenges and benefits of AI in recruitment differ across high-stakes industries like *healthcare, finance, and engineering*, and what tailored solutions are required?	Future work should conduct comparative case studies across sectors to identify domain-specific challenges (e.g., credential verification in healthcare, assessing creativity in marketing) and develop tailored AI applications

[a]We thank one of the reviewers for suggesting this point

Declaration of generative AI and AI-assisted technologies in the writing process
During the preparation of this work, the author(s) used Gemini 2.0 Flash to improve the manuscript's readability and language and have some suggestions on the structure of the paper. After using this tool/service, the author(s) reviewed and edited the content as needed and took (s) full responsibility for the content of the published article.

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J.A., N.A., A.S., and K.M. wrote the draft of main manuscript text and S.M.U.D. supervised the team, edited, prepared the final manuscript. All authors reviewed the manuscript.

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