Original Article

Algorithmic Hiring in Pakistan's Software Industry: Efficiency, Fairness, and Evolving Role of Human Resource

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ABSTRACT

This study examines the adoption of algorithmic hiring within Pakistan's software industry, focusing on its implications for efficiency, fairness, and the evolving role of human resource professionals. Drawing on qualitative evidence from HR practitioners and supported by a review of contemporary literature, the article explores how artificial intelligence tools are being used to automate recruitment tasks such as job description writing, résumé screening, candidate ranking, and initial assessments, significantly reducing time and administrative burden. The findings indicate that while AI enhances standardization, speed, and data-driven decision-making, it also introduces critical challenges related to algorithmic bias, transparency, ethical accountability, data privacy, and organizational readiness. Rather than replacing human judgment, artificial intelligence is predominantly applied within a hybrid model where human resource professionals retain oversight in contextual evaluation, ethical control, and final hiring decisions. The study highlights that in Pakistan's developing-country context, structural constraints, skill gaps, and cultural resistance further shape artificial intelligence outcomes. Overall, the research concludes that algorithmic hiring is transforming human resources from an administrative function into a more strategic, analytical role, contingent on effective governance, capacity building, and sustained human oversight.

Keywords: Algorithmic hiring, Artificial intelligence, Efficiency, Fairness, Software industry, Human resource management

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INTRODUCTION

Artificial Intelligence (AI) has drastically transformed Human Resource Management (HRM), altered the traditional practices, and provided quicker, data-driven methods of managing the workforce. AI has enhanced the efficiency and productivity of the recruitment process by automating mundane tasks, including candidate sourcing, preliminary screening of resumes, scheduling of interviews, etc. It helps to mitigate most of the prevalent issues, such as human bias in manual screening, inefficiencies, and the high cost of traditional recruiting processes, through the use of AI. For businesses seeking to maintain a competitive edge in a highly competitive job market, the prospect of AI to expedite the hiring process and enhance decision-making has become increasingly attractive (Dadaboyev et al., 2025).

The initial applications of AI to HRM marked a significant paradigm shift in HR, as they offered new solutions to longstanding issues (Jiaxing Du, 2024). The AI boom appeared to be all about automating the tasks of resume screening, candidate matching, automated document reading, and question-answer generation, on the basis of keyword-matching systems (Alkashami et al., 2025). In the infancy stage of AI in HRM, a significant implementation of AI includes assessing employee performance, tracking of the key performance indicators (KPIs), and creation of reports that managers could use to appraise personnel based on performance data (Tambe et al., 2019). Subsequently, interactive software, such as chatbots and video interview software (e.g., HireVue and Pymetrics), was introduced, which changed the perspective of traditional hiring completely. Nowadays, software evaluates candidate response, behavior, and problem-solving strategies (Fabris, Lee, and Johansson, 2025). This development has reshaped HRM to an algorithmic role without losing human touch to maintain fairness and contextual discretion.

Conceptual Foundations of AI in HRM

Traditionally, HRM is an abstract concept that refers to the process of managing the workforce to achieve organisational goals, improve employee performance, and foster talent development. According to Armstrong (2006), HRM is defined as the strategic approach towards effective management of people in an organisation. According to Dessler (2019), HRM is defined as the process of acquiring, training, appraising, and compensating employees. Mathis and Jackson (2011) further introduce that HRM is also about keeping relationships that aid in the effectiveness of the organisation.

The initial idea of Artificial Intelligence (AI) was written by McCarthy (1956), who explained it as the science and engineering of intelligent machines. The initial theorists of AI, like Nilsson (1998) and Russell and Norvig (2010), described AI as systems that can learn, reason, solve problems, and make decisions. With time, AI has grown to encompass machine learning, predictive analytics, natural language processing (NLP), robotics, and algorithmic decision-making. Dadaboyev (2025) views AI in HRM as the software replicating the decision-making and automating the operations, whereas Tambe, Cappelli, and Yakubovich (2019) regard its significance in terms of analyzing employee data, identifying skill gaps, and developing a workforce strategy. Collectively, these definitions reveal that AI is not merely a tool, but an aid that assists organisations to manage their people more strategically.

Benefits of AI in HRM

AI has turned out to be a game-changer in HRM, and recent studies can hint at its potential to streamline routine operations and promote evidence-based decision-making in the entire employee lifecycle (Dadaboyev et al., 2025). Researchers continually state that AI solutions not only enhance efficiency but also increase precision and impartiality in major HR operations. The evidence of this is seen worldwide as AI helping to make more informed decisions by analysing vast amounts of data to determine patterns that inform recruitment and selection, workforce strategy, and performance management (Tambe, Cappelli, and Yakubovich, 2019; Dadaboyev et al., 2025).

With the adoption of AI tools, HR professionals can devote more time to strategic responsibilities, such as talent development and organisational planning, while routine administrative tasks are handled algorithmically. The fairness of AI-powered systems is improved through the standardisation of assessment criteria and the elimination of unconscious bias, and they also take much less time to screen and shortlist candidates (Patrick and Khattak, 2025). Pakistan is no exception, as organisations that deploy AI enjoy the

same benefits. IT and telecommunications giants are already using AI to perform first-round resume screening, candidate matches, and chatbots to accelerate the recruiting process and reduce human effort (Patrick and Khattak, 2025; Mughal et al., 2025).

Challenges and Barriers of AI in HRM

Although AI has the potential to revolutionise HRM, it is subject to several challenges that can erode its effectiveness in practice. The major concern is the risk of algorithmic bias. When the AI learns based on biased or incomplete data, it may reproduce such biases and even enhance the current unfairness in its judgments, promotions, and employee ratings (Dailey, 2024; Fabris et al., 2025). According to Fabris et al. (2025), transparency is one of the primary issues because the intricate work of AI is not always clear to HR personnel, suggesting the notion of trust and responsibility.

Privacy and security of data are also major issues in the world. Given that sensitive employee information is collected, processed, and stored digitally, businesses need to protect personal and performance information and comply with the evolving legal standards (Arshad, 2025; Dailey, 2024). There are also ethical issues that create further complications. Fabris et al. (2025) consider that the autonomy, privacy, and equity of AI can be conflicting with the ethical principles of humanity by virtue of its ability to monitor employee behaviour, analyse mood, or predict performance. The cultural resistance is another significant barrier; workers and management may fear the loss of their jobs, or have little trust in algorithmic decisions, or are just reluctant to change the old ways of practicing HR (Ullah et al., 2025). Altogether, these concerns highlight the fact that AI implementation in HRM is not an issue of technological enhancement. Infrastructure, skills advancement, cultural tolerance, ethical governance, and human oversight should be taken into serious consideration to achieve successful integration.

One of the first and most noticeable HR functions that has embraced AI is recruitment and selection. According to Dadaboyev (2025) and Fabris et al. (2025), organisations across the world use diverse tools, such as Applicant Tracking Systems (ATS), NLP-based resume parsing, predictive analytics platforms, chatbots, and video assessment tools like HireVue or Pymetrics. These systems facilitate the screening of the candidates, enhance the job-candidate fit, and minimise the use of manual and subjective assessments. Patrick and Khattak (2025) note that HireVue and similar tools save an average of 90 per cent on the time spent during the hiring process, assisting in mass hiring with equal appraisal criteria. Predictive analytics also provides a greater accuracy of candidate-job matching, reducing human bias (Fraij and Laszlo, 2024; Dadaboyev, 2025).

Evolution and Historical Foundations of AI in HRM

The development of AI in the sphere of HRM has become a transformational era, redefining the traditional patterns of work and providing new opportunities in the field of strategic human resources management (Basnet, 2024). The historical development of AI in HRM presents a path of primitive automation to advanced systems, which preconditions the discussion of the modern meaning of AI. Artificial Intelligence (AI) dates back to the mid-20th century when achievements such as the Turing Test (1950) and Dartmouth Conference (1956) were made (Fenwick, 2024). The first HR automation came in the 1960s-1970s, when mainframe computers introduced computerised payroll processing and primitive ATS (HRCI, 2025).

In the 1990s, organisations started to automate major administrative processes, which included payroll, benefits, administration, employee record-keeping, and decision-support systems due to globalisation and technological advancement. The introduction of rule-based ATS assisted in scanning candidate resumes on the basis of keyword parameters, and the application of HR Information Systems (HRIS) was used to handle employee data. The initial wave of machine learning came in the early 2000s, specifically in the human resources field, with the emergence of social media and increasingly sophisticated applicant tracking systems that could be filtered by keyword and skillset to make a recommendation. Issues of ethics and bias also started to emerge, especially in the hiring process, where machines were likely to take the previous trend and predict accordingly. These initial developments formed the foundation of further implementation of AI in recruitment, talent management, and HR analytics.

As determined above, AI has significantly increased the efficiency and speed of service delivery in the recruitment process. However, this rapid analytics-based procedure raises several important concerns about ethics and fairness. The subjective judgment incorporated in the AI about the preferable characteristics of the

candidates can be subject to manipulation in the selection process. One example is the case where AI, based on the historical pattern of the company to recruit more male employees in technical positions, still prefers male candidates. Dailey (2025), Fabris et al. (2025), and Zuiderwijk et al. (2021) assert that these factors, combined with the absence of transparency in decisions, present ethical challenges that jeopardise equity and trust in the hiring procedure.

Zuiderwijk et al. (2021) stress the importance of the quality and clarity of training data because AI results strongly depend on data management and accountability; without clear standards, the hiring decision will be unjust, and the applicants will lose confidence in the selection process and the organisation itself. Although AI has the potential to increase efficiency, it cannot completely substitute managerial judgment; HRs will continue to play a significant role in ethical, fair, and trustworthy recruitment because it will maintain the confidence of candidates and organisational reputation.

Both Fabris et al. (2025) and Dailey (2025) contend that AI is helpful in initial recruiting functions like resume screening and shortlisting; there is no need to eliminate human judgment in final hiring, accountability, and alignment to organisational values. This gives the justification for hybrid recruiting, where AI-driven efficiency is used alongside human discretion in the selection process. Organisations enhance the validity of decisions, equity, and applicant confidence by combining algorithmic screening and managerial assessment.

The use of AI in recruitment and HR is becoming an increasingly popular trend among organisations around the world, as it enhances efficiency, speed, and standardisation, but it is also associated with the emergence of algorithmic bias, ethical risk, privacy concerns, and inequality. In Pakistan, the positive aspects of AI are further complicated by structural limitations (poor quality of data and technological inefficiency) and cultural elements (lack of trust in technologies, top-to-bottom decision-making, and informal human resource management), which restrict the value of operations and equity of HR practices. Even though there is increasing global interest, the literature remains sparse in providing empirical evidence in Pakistan, or more generally within the developing-country framework, about how the HR managers themselves experience this transition; how they view the role of AI and its importance, where they are (or are not) relating to AI utilisation, and what tangible actions they are taking to balance automation.

Figure 1: Frequency Distribution of Major Themes Based on MAXQDA Code Relation Browser Analysis

Frequency Distribution of Major Themes Based on MAXQDA Code Relation Browser Analysis
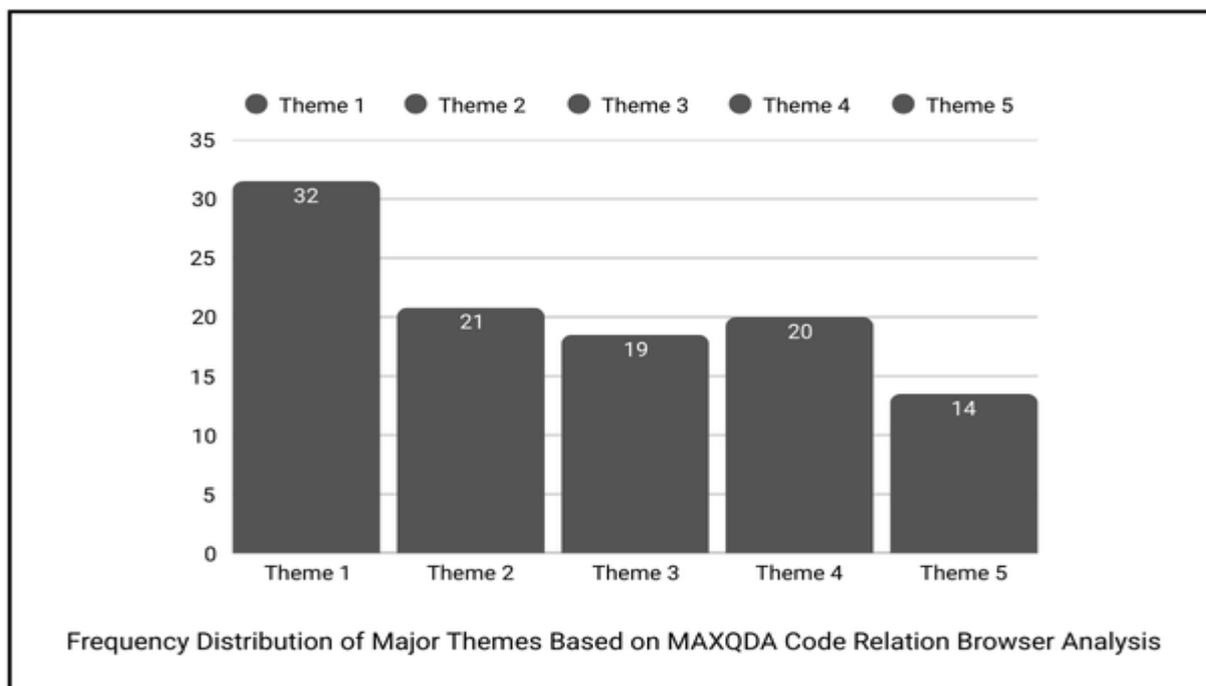
Theme 1: AI Adoption in HRM

The organisations use AI as an assistant to reduce workloads in the recruitment and HR field, automating front-end procedures without losing the human touch as the final decision-maker. It simplifies tasks that once required weeks or months into standardised and accelerated workflows so that HR departments can serve more candidates and projects with less manual effort and time.

> *"After approval, when resumes start coming in, we also get those resumes ranked through AI against our JD. As soon as the interview ends, the system will generate the result within three minutes."*
> (Organisation 1, Interview, 18 November 2025)

> *"AI reduced our competency framework timeline from 12–16 months to just 3 months for a workforce of 1,200 employees."*
> (Organisation 2, Interview, 18 November 2025)

The contribution of AI to HR activities and recruitment is the capacity to perform structured, repetitive tasks in a fast and consistent manner. The most frequently used AI applications in organisations are JD writing, candidate sourcing, resumé parsing, preliminary ranking, and, in more progressive cases, competency frameworks and training resources. As these activities have been replaced by AI, tasks previously taking a lot of time and coordination among HR have been reduced to much quicker and more standardised workflows, which means that AI is not just an addition but a gateway to increased efficiency.

Theme 2: Automation with Human Oversight

AI's integration in the recruitment and HR poses some questions concerning the balance between automation and human judgment. AI is presented as a useful tool that filters and prioritises candidates, identifies strengths and weaknesses, and gives match scores in relation to the job requirements. However, the suitability, performance potential, communication abilities, and ethical issues remain within the realm of the HR professionals, which makes the process remain within a hybrid human-AI model.

> *"AI partially helps by showing strengths, weaknesses, skill matching level, and percentage of match (e.g., 67% match). However, due to limited data, AI is not 100% reliable. We still manually verify important decisions."*
> (Organisation 1, Interview, 18 November 2025)

The application of AI in recruitment and human resource decision-making lies in its ability to filter information instead of replacing human judgment. Throughout the interviews, AI is described as a check of JD-fit, a surfacing of strengths and weaknesses, and a percentage match, but always as something that is partial and not 100% reliable. It filters pools of candidates, but the process of understanding this result, determining performance potential, and making decisions on who to hire or promote is still in the hands of human actors.

Theme 3: Shared Bias and Ethical Control

The integration of AI in recruitment and human resources creates issues of ethics, bias, and responsibility. Respondents report risks associated with misaligned data and using AI to make decisions that extend beyond standard cases and need more precise contextual decisions. They also acknowledge that managers carry their prejudices with them, and thus, fairness requires continued human scrutiny, process monitoring, and more explicit ethical standards in Pakistan.

> *"We must control these things so that we don't make it a part of any unethical activity, and we don't make it do anything wrong."*
> (Organisation 1, Interview, 18 November 2025)

The theme is rooted in the fact that participants realise that both AI systems and humans may be biased and unfair. They also emphasise that AI works under predetermined parameters and is unable to cope with something that is not structured. It fails to capture emotions, non-standard or complex cases, and the resulting

outputs may be biased when the input data is incomplete, wrong, or out of context with the local workforce environment. This renders algorithmic decisions unreliable and ethically weak, particularly when the information behind them is not relevant to the context of application.

Theme 4: Managerial and Organizational Role

The adoption of AI in the organisations under investigation is presented not as a technical change but as a challenge to organisational and managerial readiness, which is manifested in the supportive organisational culture. The use of AI is a strategic resource in organizations with strong capacity; it is underutilized in organizations with weak capacity despite the presence of systems.

> *"We have pro versions of Perplexity as well. But even then, the challenge is that we are not able to utilise it fully. The biggest reason is prompt designing and engineering — in our region, we are not very strong compared to others… When I joined, the first training I conducted was on prompt engineering — how to design a proper prompt."*
> (Organisation 2, Interview, 18 November 2025)

Managerial and organisational dimensions of AI implementation are interrelated and extremely influential. On the one hand, the existence of more sophisticated AI tools is not a novelty, as participants emphasized the use of high-quality AI systems and other HR applications, but on the other hand, the inability to utilize them to their fullest extent continues to present a significant challenge to numerous organisations. Managers acknowledge that they cannot make the most use out of it, due to a lack of prompt engineering and user capability. This disparity between the existence and effective use of AI suggests that AI potential is not reliant on the tools, but on whether the organisations have invested in the capabilities, organisations, and attitudes to render them useful.

Theme 5: Future of HR
Artificial intelligence is not a fad, but it is a trend that is going to permanently change HR work. Organisations believe that routine HR functions will have high risks of redundancy, and that more data-intensive and technologically enhanced roles will be demanded, as well as more strategic ones. The future is being urgently framed: companies that fail to acquire these new digital and prompting skills are not considered to be viable in the changing job market.

> *"Emotionally, the takeaway is: learn AI as soon as possible… AI is not optional."*
> (Organisation 3, Interview, 20 November 2025)

CONCLUSION

The future of AI in HR is projected as being threatening and transformative. On the one hand, the risk is quite high: one manager foresees that in five years, 60-70% of HR jobs could be eliminated in case professionals do not learn to use AI, and another manager speaks about the future labour market, such as survival. AI is not seen as a fad but as a structural transformation that will radically transform what is considered employable HR work.

Meanwhile, interviews indicate that not all people and organisations will have to face redundancy, but it will depend on the ability to adapt. The survival tactics are evident: learn AI as fast as possible, acquire timely engineering skills, and enhance one's abilities in such a way that AI will be an extension of his/her work rather than a substitute. The people who learn to utilise AI will be able to outperform their non-users, meaning that HR professionals will distinguish themselves through their ability to use AI optimally, as opposed to not using it.

This prospective discussion also suggests a qualitative change in the character of HR functions. With AI performing more mundane functions, such as screening and document writing, the future of HR is envisioned as more analytical, interpretive, and strategic, with professionals relying on AI outputs, reading complex patterns in data, and navigating teams through the change. The recurring motto that AI is not an option and that technology will proceed regardless creates the impression of inevitability: not choosing AI is presented less as an idealist position and more as a choice to be less efficient in a competitive world.

Overall, the interviews present a scenario where AI will become the new normal of HR practice and reorganise the profession based on new skills and expectations. This theme shows a more complicated picture of the classic roles, rather than a pure replacement story. AI creates an extra strain on the classic roles, but it can also offer the possibility to those who are willing to reskill and reposition themselves as AI-enabled HR professionals.

DECLARATIONS

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AUTHORS' CONTRIBUTIONS

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JK: Acquisition and analysis of data, drafting of the manuscript, and critical intellectual input.
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The author had read and approved the final manuscript.

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