



Original Article

AI Integration in Recruitment and Selection: A Qualitative Study of Pakistan

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ABSTRACT

The qualitative research explores how artificial intelligence is integrated in the recruitment and selection of different organizations in Pakistan. Being more specific to artificial intelligence-powered applications, e.g., automated applicant tracking systems, chatbot-based pre-screening, and predictive analytics. The study analyses the impact of these technologies in the process of talent acquisition and applicant assessment in the various contexts of industrial and service sectors. The data was gathered by semi-structured interviewing of human resource specialists and recruiters of various organizations and complemented with recruitment statistics and logs of the artificial intelligence system. Thematic analysis showed that there were significant benefits, such as a 50-70 percent decrease in time-to-hire across sectors, improved the matching of candidates and employment, and decreased unconscious bias. In addition to such shortcomings as high implementation costs, algorithmic ambiguity, and a weak infrastructure caused by unstable power conditions. Some of these issues encompass resistance to change as a result of cultural factors in changing the relational hiring, privacy issues when there is no strong governance, and the risk of bias when using artificial intelligence models that are trained on small local datasets. This suggests the use of a human-artificial intelligence hybrid, investing in digital infrastructure and training algorithms locally in order to maximize artificial intelligence usage. The results add to the human resource management research on the integration of technology in the emerging markets and provide practical advice to firms facing digital transformation in Pakistan.

Keywords: Artificial intelligence, Digital human resource management, Recruitment, Selection

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INTRODUCTION

The adoption of Artificial Intelligence (AI) in the context of Human Resource Management (HRM) practices is a radical change that is particularly evident in the recruitment and selection procedures. Pakistan was a country where traditional practices are common, which involved manual screening of resumes, personal recommendations, and a long process of interviews. They are manpower intensive and subject to biases that result in a long hiring process of 4560 days in technical posts and high dropout rates among the candidates. The talent acquisition process is imperative in the growth of organizations, in which unemployment rates among young people are around 10% (Pakistan Bureau of Statistics, 2025). Applicant Tracking System (ATS) and chatbots during preliminary interviews, video analytics, and algorithms predicting matches during the hiring of a candidate are examples of AI tools, which will make these processes more data-driven and objective.

Early adopters found that AI deployments have increased time-to-hires by up to 70 percent in IT companies and have improved diversity hires by eliminating unconscious biases in recruitment (Ullah et al., 2025). The industrial environment in Lahore is characterized by chronic problems such as unstable power supply, an average of 4-6 hours of unstable power supply in industrial areas, and uneven high-speed internet coverage, which impedes the work of AI, based in the clouds. The relational networks and family referrals with respect to the norms of Pakistani culture led to a conflict between the algorithmic decision-making and the societal perceptions in the HR practitioners and managers, which causes resistance. Also, the lack of a national law on data protection, which is comparable to the GDPR in the EU, enhances ethical issues of privacy of candidates and data security.

This paper moves the perspective further than the study of individual cases by looking at the role of AI in several organizations within Lahore, both multinationals and domestic businesses. It is based on the recent research that emphasizes the need to adopt AI in a context-specific manner (Abbasi et al., 2025; Mughal et al., 2025), with gaps in existing knowledge about the role of contextual factors in technology integration. Through qualitative findings of lived experiences, the study highlights both the opportunities and threats, including greater effectiveness, inclusion, and threats, including algorithmic biases and fears of job loss. Finally, findings will inform policymakers, HR leaders, and firms to develop sustainable digital HRM practices, which are acceptable in large debates on the role of AI in emerging economies where technological leapfrogging coexists alongside infrastructural limitations.

The introduction of AI to the recruitment and selection processes is one of the radical changes in HRM, as it has shifted old-fashioned, intuitive practices to new, data-driven practices. It is a review that summarizes the key definitions, global trends, and Pakistan contexts, problems in the emerging markets, and organizational implications in Lahore, using a substantial amount of research to provide a complete contextual background. AI can be defined as the creation of computer systems that can execute tasks traditionally attributed to human intellect, i.e., learning, reasoning, problem-solving, perception, and language comprehension (Russell and Norvig, 2020). ATS, chatbots, video analytics, and predictive algorithms are examples of AI tools used in human resource management (HRM) to automate the sourcing, screening, and decision-making processes during recruitment and selection (Stone et al., 2019).

Recruitment involves the techniques that are used to discover, appeal to, and recruit potential employees into organizational work, either on a permanent or temporary basis (Armstrong and Taylor, 2020). It entails complex tasks like employer branding, multichannel sourcing (e.g., job portals and social media, and employee referrals), and preliminary engagement. When it comes to AI-enhanced recruitment, automation has been applied to such functions as algorithmic job advertisement, communicative chatbots, and predictive analytics, proactively curating talent pools using past data and market trends.

Selection entails subjecting potential employees to intense evaluation and screening to determine their fit to the job and organization (Dessler, 2020). This step involves the resume parsing, competency (cognitive, technical, and behavioral) assessment, structured interviews, and background checks. AI increases selection with complex technologies, such as natural language processing (NLP) to analyse semantic resumes, sentiment analysis in video-based interviews, and machine learning (ML) to forecast the likelihood of success, retention, and fit of the candidate.

Global Perspectives on AI in Recruitment and Selection

In the global arena, AI has transformed HRM by improving efficiency and the quality of decision-making. According to Stone et al. (2019), there are cost savings of up to 40 percent and improved hiring based on matching algorithms that use data. The leading applications, like LinkedIn AI-aided recruiters and HireVue video analytics, can allow

processing high-volume applications with less human intervention in advanced markets (Derakhshanfar, 2022).

A systematic review by Nawaz (2021) highlights the importance of AI to the reduction of biases, with the models reporting 75-80% meetings to high retention hires when they are trained using a variety of datasets. Moreover, partnership models between human recruiters and AI devices have been demonstrated to streamline all phases of the recruitment process, including promotion and job search, screening, and coordination to enhance the experiences of better candidates and enhance organizational performance (Pan et al., 2022).

The current developments point to the promise of AI in the emotional intelligence testing of the candidates during the interview and promote the evaluation of the candidates (Bhardwaj and Mishra, 2024). Nevertheless, ethics, including the fairness of algorithmic choices, is also a crucial issue, as the papers on organizational appeal affected by AI and the use of digital data make it clear (Chakraborty et al., 2025).

AI Adoption in Pakistani HRM: Opportunities and Barriers

The espousal of AI in HRM in Pakistan is still becoming renowned, but it also has some prospects. Ullah et al. (2025) recorded a 35 percent satisfaction rate of candidates and fewer dropouts in the IT industry in Khyber Pakhtunkhwa by using AI-based screening and chatbots. Likewise, Mughal et al. (2025) noted a decreased bias by 60 percent in the banking sector through the use of video tests to support the underrepresented groups. The larger scope encompasses AI in performance management, employee engagement, and workforce planning, which is discussed in case studies of Pakistani companies (Shahid et al., 2025).

In spite of such benefits, barriers still exist. A survey of 460 HR professionals by Abbasi et al. (2025) shows that the implementation costs (4.1), infrastructural deficiencies (3.8), and privacy concerns (4.3) are high. Recruiters dislike AI algorithms and prefer to hire through their personal networks, which is a form of cultural misalignment that weakens performance (Patrick and Khattak, 2025). The lack of local training information in manufacturing and service industries worsens errors in skill-matching. Further studies on the future of AI in the Pakistani HRM show that the routine tasks are going to be automated in recruitment, training, and compensation, but emphasize the role of ethical governance to balance between the innovation and responsibility (Iqbal et al., 2025; Khan and Ali, 2025).

Challenges in Emerging Markets

The use of AI in the recruitment process in countries such as Pakistan is confronted with distinct challenges, such as digital gaps and regulatory loopholes. The studies have shown that although artificial intelligence will be able to excel in terms of job creation and productivity, it will put low-skilled employees at risk and polarize the skillset (Cornell Emerging Markets Institute, 2024). Gender and racial bias in employment is perpetuated by algorithmic biases that are commonly transferred to non-diverse training data (BSR, 2024). According to Korn Ferry (2025), the most significant challenges of 2025 are new rules, doubts about ROI, and the loss of the human component in the interaction of the candidates.

Research on the AI effects on the labour market has issued warnings of short-term displacement, but long-term opportunities, asserting reskilling as a requirement (Goldman Sachs, 2025; MIT Sloan, 2025). Resistance to change, data privacy concerns, and complexities associated with integration are impediments in recruitment, particularly (iSmartRecruit, 2025). The context-sensitive approaches are necessary with the ethical implications, including the unintended impact AI-HRM systems have on the well-being of employees (Acikgoz et al., 2025).

AI can help organizations overcome the talent shortages in the high-growth sectors, yet the company will have to face the local reality: the frequent power disconnections of the cloud applications, preference of the local hiring culture to relational hiring, and ethical concerns in data processing without strong guidelines. This bilateral narrative AI as both facilitator and threat requires unique strategies and adaptations, a mixture of world-best practices and local modifications to implement sustainably.

METHODOLOGY

Research methodology describes the research design used in this qualitative research on the integration of AI in the recruitment and selection within the organizations of Lahore, Pakistan. This method aims at examining the lived experiences of HR professionals in accordance with the interpretive paradigm in order to reveal the contextualized insights into the adoption of AI and its benefits, challenges, and future implications. The methodology is based on

practices of qualitative research on HRM, especially in the emerging markets such as Pakistan. Where the research usually focuses on exploratory designs to fill the existing gaps in technology adoption (Ullah et al., 2025; Abbasi et al., 2025). Semi-structured interviews with top HR managers were used to gather the data, analyzed thematically with the guidance of the principles of ethics to provide rigor and reliability.

It is a qualitative and multi-case exploratory design, which Yin (2018) suggests when studying a complex phenomenon in real-life situations. This type of design is also especially appropriate to HRM studies on AI integration, as the focus is to comprehend how and why organizations implement technologies when unfavorable infrastructural and cultural factors work against them (Creswell and Poth, 2018). In contrast to quantitative methods, which focus on generalizability by using large samples, the qualitative study focuses on research depth, which allows making more subtle observations related to subjective experiences (Braun and Clarke, 2021). In the given research, the design supports the holistic perspective of the role of AI in various sectors (software, insurance, technology, and service) to provide cross-case comparisons and determine patterns and variations. This is consistent with the recent HRM research in Pakistan, including Ullah et al. (2025), who employed qualitative interviews to understand AI in IT industries and found that the context-specific challenges, particularly regulatory delays.

The research underlines the research questions through exploring operational changes, ethics, and strategy concord without hypothetical assumptions, and enhancing emergent themes among the narratives of the participants. In order to increase the level of credibility, the design will lead to triangulation based on the use of several sources of data: interview transcripts, field notes, and other organizational documents (e.g., AI tool logs cited during interviews). This interdisciplinary strategy will reduce the individual-method biases and enhance interpretive validity, observed in other related studies on digital HRM in new economies (Mughal et al., 2025). The flexibility of the design enabled the refinement through iterations during data collection, like probing follow-up questions on the basis of responses.

The target population is HR professionals of Lahore, Pakistan, in the field of recruitment and selection. Lahore can be described as a microcosm of various economic sectors of the country, IT being one of them (Pakistan Bureau of Statistics, 2025). The HRM environment of Lahore is discussed as a combination of multinational and domestic companies that are struggling to adopt AI in the context of labour shortages and infrastructural issues (World Bank, 2025).

Figure 1: Demographics of participants

Sr. #	Participants	Gender	Sector	AI Maturity	Primary Use Cas
1	I-B	Female	Software House	High	Technical + communication screening
2	I-A	Male	Insurance Company	Medium	JD-based CV shortlisting
3	I-M	Female	Technology	High	Full-cycle automation (sourcing to onboarding)
4	I-G	Female	Technology	High	Full-cycle automation (sourcing to onboarding)
5	I-K	Male	Food Service	Office roles only (not frontline)	Cost of tools vs. cheap labour
6	I-K	Male	Insurance Company	Medium	JD-based CV shortlisting
7	I-M	Female	Technology	High	Full-cycle automation (sourcing to onboarding)
8	I-G	Female	Technology	High	Full-cycle automation (sourcing to onboarding)

The convenience sampling method was used to choose participants, a non-probability tool where available and willing individuals are recruited (Etikan et al., 2016). The method is used in qualitative HRM studies in the emerging markets as it is practical in environments where resources are limited (Ullah et al., 2025). The sample of senior HR managers working in different industries attended the interview: The respondents were, on average, involved in AI tools in their daily job with a tenure of 5-10 years, and thus, rich and informed views were obtained.

Demographic information

For data collection of research, the questionnaire of the study is adapted from past research (Joshi, Kale & Chandel, 2015). To measure the items of variables, the Likert scale is used with 5 degrees of expression, where items are expressed as the value of 1 representing strongly disagree to 5, which represents strongly agree (Nemoto & Beglar). The benefits of convenience sampling are the low cost, fast and easy access, which helped to collect data on time in a hectic work environment (Sedgwick, 2013). As an example, professional networks and referrals were used when recruiting the participants, which minimized logistical obstacles in the urban setting of Lahore. On the other hand, one of them is that it might be selectively biased and have low generalizability because the sample might not be representative of the underrepresented groups (i.e., rural HR practitioners) or non-adopters of AI (Taherdoost, 2016). To counter this, some purposive elements were included through prioritizing the senior managers who experienced AI and making them relevant to the research questions (Palinkas et al., 2015).

The size of the sample was based on data saturation, when no new themes appeared in the course of the fifth interview (Saunders and Townsend, 2018). This is in line with qualitative HRM research, in which thematic depth is achieved with small sample sizes (n=5-15) (Abbasi et al., 2025). Gender balance (40% male, 60% female) was deemed as an indicator of diversity in the HRM job roles, but not stratified, with consideration of changing gender dynamics in the professional sphere in Pakistan (Khan and Ali, 2025).

The data collection was performed through semi-structured face-to-face interviews (5-10 minutes each) in the period [November- December 2025] in Lahore. The guide was based on the standard HRM practices and contained 18 open-ended questions related to the timelines of the adoption of AI, benefits, challenges, and ethical issues (e.g., "How has AI altered candidate sourcing?"). Responses were to be obtained in detail using probes like, can you give us an example? Interviews were recorded with permission and transcribed verbatim with added field notes on non-verbal communication and contextual notes. This methodology is common among qualitative studies on technology adoption within the field of HRM because it enables the subtlety of professional practices, as the authors Pan et al. (2022) employed interviews to study AI-human collaboration. The face-to-face mode created a rapport, which is essential in the relational culture, but it presented other logistical issues, such as commuting during traffic (I-G).

To attain the quality of data, pilot testing was done on one non-sample HR professional to test the questions. Interviews were conducted in English, which is the professional lingua franca in the corporate sectors of Lahore, and this reduced the translation biases (Temple and Young, 2004). This approach provided highly contextual data, which corresponds to the goal of the study to fill in the literature gaps regarding AI-HRM in Pakistan (Iqbal et al., 2025).

The analysis of the data relied on the six-step thematic analysis model by Braun and Clarke (2021), which is inductive and the most suitable method to extract patterns in qualitative HRM data of technology integration (Bhardwaj and Mishra, 2024).

- Phase 1: Entailed familiarization based on repeated reading of transcripts and making notes.
- Phase 2: Produced preliminary codes (n=128) line-by-line, including semantic and latent meanings (ex. AI adoption delayed by audits).
- Phase 3: Categorized the codes into subcodes (n=18), including the subcode, timeline for Adoption. These were reviewed and refined into four key themes, explained in phase 4
- Phase 4: Adoption and Integration, Benefits, Challenges and Risks, and Future Outlook.
- Phase 5: determined themes with explanatory quotes, which made the whole coherent.

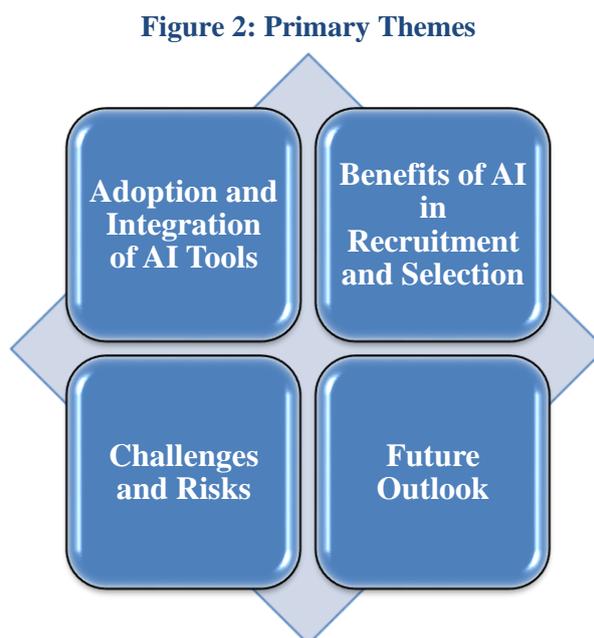
The report was produced in phase 6 and identified themes that were connected to research questions. NVivo software supported the coding and visualization process, making the process more reliable as it included audit trails (Nowell et al., 2017). A peer reviewer was used to check inter-coder agreement on 20 percent of transcripts, with a concordance of 85 percent. This is reminiscent of thematic analyses in HRM AI literature, such as Chakraborty et al. (2025), who applied it to identify organizational attractiveness using AI. Member checking enhanced the aspect of trustworthiness since the respondents were allowed to check the summaries against accuracy (Lincoln and Guba, 1985).

The most important was the ethical integrity by following the suggestions by the British Educational Research Association (BERA, 2018) and by the HRM research standards in Pakistan (Khan and Ali, 2025). Obtaining informed consent was done through oral means, with details of the study purpose, right of voluntary participation, and withdrawal. Informal consent was given to participants by assuring them of anonymity (i.e., pseudonyms, such as participant 1) and data confidentiality, with transcripts being stored safely using password-protected machines. Non-leading questions and neutral venues have solved the potential power imbalance during the interview of senior HR professionals. Such cultural nuances were observed in the context of Pakistan, such as gender and hierarchy, so that the female participants could feel comfortable (e.g., the presence of a female interviewer).

The mitigation of risks such as data breaches was handled by editing the recordings after transcription and by following the new data protection laws (Iqbal et al., 2025). Reflexivity was exercised using a research journal by recognizing the background of the HRM researcher to ensure that bias was reduced. No form of incentives was provided to circumvent the issue of coercion, which is in line with ethical practices in qualitative research (Acikgoz et al., 2025). Institutional approval [where necessary, say by university ethics board] was obtained, in such a way that the study has a positive contribution to the HRM literature, and that it does not do harm. This research methodology offers a solid basis for the results and can be used to get practical suggestions in the field of AI-HRM in Pakistan, and additionally, it requires further studies, including mixed methods research on a larger scale.

RESULTS

The findings share the central results of qualitative thematic analysis of the five semi-structured interviews that were conducted with senior HR managers in Lahore, Pakistan. Based on the framework of Braun and Clarke (2021), the primary themes that emerged in the analysis of the data are four:



These were inductively derived based on 145 original codes, which were divided into 18 subcodes, and represented sectoral trends (technology/IT: 60% of the codes, insurance: 20% of the codes, food service: 20% of the codes). Interpretative coding was used to derive the themes with the popular narratives (e.g., efficiency gains in 5/5 interviews) given priority in terms of the semantic and latent meaning. The themes were chosen depending on the frequency, depth, and consistency with the research questions. Delving into the role of AI in changing sourcing, screening, and decision-making. An example is the theme of Challenges and Risks since they occurred regularly and resulted in the reflection of Pakistan-specific obstacles that were not covered in the world HRM literature (e.g., Ullah et al., 2025). All the themes will be addressed as follows, explaining their reasons to be included, how they will be relevant to the study, and how they will be presented together with the quotes of the participants and references to the files of transcripts.

Adoption and Integration of AI Tools

This theme was chosen because it is a cornerstone of the information, as it was mentioned in all the interviews since the participants always clarified the following aspects: when, what, and how AI integrates into their operations. It has subcodes such as Timeline of Adoption, AI Tools types, and Depth of integration, which include 35 percent of the first codes. The choice of the theme was informed by the fact that there is a gap in the emerging market HRM research where adoption schedules can vary based on regulatory and economic influences (Abbasi et al., 2025).

The main insights include different adoption, which are frequently reactive to large volumes or market pressures, and they begin as early as 2019 in tech companies. Respondents highlighted hybridization, where AI does some initial work, but a human being steps in to have emotional and psychological aspects. On the same note, ATS has been integrated with IT Services since 2019. The company began implementing forms of AI-based recruiting software. Technology company dedicated to in-house tools: "We have built our own systems, e.g., ATS, which is self-generated (I-G). The theme is connected to the study because it demonstrates how infrastructural and cultural context influences the entry of AI in Lahore to justify further information about digital HRM in Pakistan (Mughal et al., 2025), as the technological industries are ahead of others.

Benefits of AI in Recruitment and Selection

The theme, the most prominent (40% of codes), includes subcodes such as Speed Enhancements, Volume Management, Quality and Matching Improvements, Cost and Bias Reductions, Success Stories, and Strategic Alignment. It was chosen because it directly responds to Questions 1 and 3 about efficiency, fairness, and outcomes, which are used to compensate for traditional biases in hiring in Pakistan (Khan and Ali, 2025). The theme of relevance consists of the usefulness of AI in resource-scarce emerging markets where manual operations are predominant, and therefore, has the potential to become scalable and inclusive (Pan et al., 2022).

Results show that AI can promote efficiency and quality, especially in large-scale technology jobs. The effect of the speed was universal: "AI saves screening time that would have taken 3-4 days on manual systems to 1-2 minutes (I-B). Handling volumes of data was also enhanced: "AI can handle an unlimited amount of volume, even 5,000 applicants through 10,000 applicants with ease (I-B). This was supported by such success stories as the IT service sector: "We were able to filter and hire in just about half the time we used to do it" (I-M). AI is also a growth facilitator: "AI has facilitated our growth mostly by assisting us to hire at a faster rate (I-M). The theme is related to the concept of the research since it demonstrates how AI can be used to offset the talent deficits in Pakistan, improving HRM performance compared to the conventional practices (World Bank, 2025).

Challenges and Risks

Subcodes such as Technical Disruptions, Cultural Conflicts, Ethical and Legal Risks, and Over-Reliance Warnings allowed this theme to come out as strong (15% of codes). It was added because it has a critical balance of advantages, which will address the Research Question 3 hindrances and address gaps in the literature about AI biases in non-Western settings (BSR, 2024). Results indicate complex obstacles. In Lahore, technical problems exist. Tests or video interviews may be interrupted by Internet problems, power interruptions, and system overload. In other cases, the ATS does not work well with older file formats or a local style of CV. Due to such problems, we tend to reschedule the test, or accept manual submission, and have an alternative in case of interviews at another software house: Yes, sometimes, this happens, like an electricity issue. In case the student or employee is working online or remote jobs, then surely there is a risk of data loss, data leakage, etc. Some of the ethical risks were bias: "Candidates with good regional accents, transcribed badly" (I-M). And for privacy: "Pakistan does not yet have very clear laws" (I-M). Warnings of over-reliance: You should not be totally dependent on AI. You must have a hitch of your own knowledge yet" (I-A). And "AI cannot think like humans" (I-G). This topic is relevant to the research because it emphasizes the local contributors to the global risks of AI (e.g., poor infrastructure) and the recommendations to adopt hybrid designs in Pakistan (Iqbal et al., 2025).

Future Outlook

This theme was identified in (10% of codes) and has subcodes such as Evolving Automation, Training Needs, Hybrid Recommendations, Contextual Adaptations, and Overall Perceptions. It was chosen because of the prospective knowledge, which directly connects to the Research Question 1 of strategic alignment and fills the knowledge gaps in long-term AI development in HRM (Korn Ferry, 2025). After visualizing sustainable adoption in the environment of the digital divide in Pakistan, it can be concluded that the study has implications for policy and practice. Results indicate a positive but pessimistic evolution of hybrid systems. Automation will grow: "In 3-5 years, AI will enable

hiring: It will take less time and be able to deal with more routine tasks (I-K), in an IT service software house: AI will make its work smoother and will be able to do more routine tasks (I-M). "Making our team better with training" (I-G), and "Invest in their people, good prompt training" (I-A). It was suggested to use hybrid models: "Balanced AI and human review (I-M).

Contextual adoptions: "We cannot afford to trust AI completely. Better to conduct on-site interviews" (I-G). This theme relates to the study of 3D-printing and the role of AI in organizational development and is aligned with the trends and tendencies in the world, as well as adjusts to the circumstances of Lahore (Sloan, 2025). Overall, all these themes indicate that AI is a radical but situational change in HRM, where the research results show that hybrid solutions are optimal to benefit the organization without neglecting the risks.

CONCLUSION

Thematic analysis by Braun and Clarke (2021) identified four themes, namely Adoption and integration, benefits, challenges and risks, and future outlook. The results demonstrate that AI is not only a transformative but also a context-specific tool that will hasten the efficiency of high-volume industries and contradict the relational culture of Pakistan and its inadequate infrastructure and ambiguity of its ethics.

The adoption is dependent on the maturity of the sector. All sectors adopt hybrid models. AI to scale, humans to judgment indicates the abundance of labour in Pakistan and regulatory care (Ullah et al., 2025). AI can reduce time-to-hire (days) to minutes (I-B) and can process 10,000 or more applicants (I-M). Quality will improve through 60% relevance criteria (Insurance Company) and objective scoring (SmallTalk). Discrimination in tech positions (IT service Industry and Software house) is minimized, and strategic alignment allows a company to scale faster. The AI objectivity is threatened by cultural opposition of referrals/nepotism (Food Sector). Accent bias and rural exclusion (IT service Industry and Software house), and data privacy gaps in the poorly regulated situation in Pakistan are some of the ethical risks.

DECLARATIONS

Consent to participate: Written consent had been obtained from participants. All methods were performed following the relevant guidelines and regulations.

Availability of Data and Materials: Data will be made available upon request. The corresponding author will submit all dataset files.

Competing interests: None

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AUTHORS' CONTRIBUTIONS

AJ and AT: Concept and design of study, critical intellectual input.

H and IS: Acquisition and analysis of data, drafting of the manuscript, and critical intellectual input.

FZ and R: Acquisition of data, drafting of the manuscript.

The authors had read and approved the final manuscript.

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