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Navigating Digital Transformation in Talent Acquisition: Impact of AI Screening Tools on Engineering Freshers' Entry into Industry 5.0 Workplaces A Case Study of Nagpur, India

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ABSTRACT

This research paper probes the ambiguous effects of AI-based recruitment to Industry 5.0, a new industrial paradigm, where on the one hand algorithmic screening designed for efficiency is the norm, while on the other hand there is a strong demand for human qualities such as creativity, adaptability, and ethical reasoning. The authors have employed a sequential mixed-methods approach to their study combining survey data of 250 engineering fresh graduates with in-depth interviews with 15 HR professionals and a document analysis of job descriptions for an emerging market in a metropolitan area.

The quantitative data depict anxieties, feelings of obscurity, and the notion of being out of alignment with the required skills among freshers entering AI-driven recruitment mechanisms. On the other hand, qualitative data reveal emotional, psychological, and infrastructural hurdles in recruitment by algorithms.

The research paper views the digital skills gap in a new way, essentially it is more of a challenge of figuring out how to handle AI-driven evaluative systems rather than a lack of technical skills. Theoretically, the study results show that Industry 5.0 and human capital theories could be extended by revealing the contradictions between the rationalities of automation and the human-centric workforce development. In practice, the paper offers a Human-in-the-Loop recruitment model as a way to harmonize AI-enabled talent acquisition's efficiency, fairness, and ethical accountability.

Keywords: AI in Recruitment, Talent Acquisition, Industry 5.0, Emerging Markets, HumanCentric HR, Engineering Education, Digital Transformation, Sustainable Workforce

INTRODUCTION

The worldwide shift from Industry 4.0, which is mainly about automation and data exchange, to Industry 5.0, that stresses human-machine collaboration and sustainability, is a change of the entire way of thinking with significant effects on workforce development (Breque et al., 2021). In order to keep up with such a progression, a new generation of engineers is required to be not only skillful in tech but also to have the human-centric qualities like creative thinking, emotional intelligence, and complex adaptive problem solving. At the same time, the discipline of Human Resource Management is also experiencing a revolution of its own through digital transformation, where AI-powered tools are becoming leading actors in first stages of talent acquisition. The two fateful changes at the same time create the scenario of catching up with both massive opportunities and formidable challenges at the same time in India - a typical emerging market with a yearly inflow of more than 1.5 million engineering graduates to the job market (AICTE, 2023).

Nagpur, a technology and industrial hub of the future located in the heart of India, appears to be a perfect microcosm for an in-depth investigation of this phenomenon. Known as the "Orange City" and counted among India's smart cities, Nagpur is home to numerous engineering colleges, IT parks, and manufacturing units gearing up for advanced Industry 4.0 and 5.0 practices (Nagpur Industrial Development Plan, 2022). Fresh engineering graduates from this region looking for jobs frequently come across AI-driven screening tools that are the primary means of selection. Such tools include Applicant Tracking Systems (ATS), chatbot screeners, gamified assessments, and video interview analyzers. The latter allow the automation of what was previously a timeconsuming and expensive part of HR functions. While such tools offer to bring objectivity, efficiency, and broadening of the employer's reach, at the same time, the effect on candidate experience, fairness, and identifying skills for the future are barely recognizable yet.

The present study is a significant contribution to existing literature as it highlights an important issue overlooked by previous research. There is a considerable amount of research on AI application in recruitment (Tambe et al., 2019) and on competencies necessary for Industry 5.0 (Nahavandi, 2019), however, very few papers have discussed the convergence of these two themes from the perspective of entry-level candidates in emerging markets. Engineering freshers are the most affected group as they have to go through a digital hiring process which may be more focused on algorithmic compatibility than human potential. Thus, a paradox is created where the very instruments conceived to detect talents might, in an indirect manner, eliminate those candidates who are the most suitable for collaborative and innovative environments of Industry 5.0.

The first of the three main goals delineated in this paper is to assess the changes in the candidate experience and the perception of barriers due to the use of AI screening tools with a particular focus on engineering freshers. The second is to evaluate the extent to which the skills prioritized by AI systems correspond to the competencies of a human-centric nature required in the workplaces of Industry 5.0. The third one is to suggest ways the HR department may use AI tools in their recruitment process that will be not only time-saving and fair but also enable the creation of sustainable future workforces. By using Nagpur as a research site, the findings of this work are relevant for other emerging market scenarios as well.

To date, most of the work in assessing AI-enabled recruitment has focused on the gains in efficiency and scalability, with little attention to its correspondence with the human-centric aims of Industry 5.0, especially from the point of view of entry-level job seekers. Engineering freshmen are a strategically key but also vulnerable group whose Employment is at the mercy of inscrutable algorithmic systems more and more. This research homing in on this segment of the community therefore, contributes to addressing a major missing part of the conversation at the crossroads of digital transformation, human capital development, and ethical AI governance in emerging-market contexts.

This document is organized in the following manner: Section 2 goes through the pertinent literature concerning the digital transformation of HR, the use of AI in talent acquisition, the competencies related to Industry 5.0, and the emerging market contexts. Section 3 elaborates on the mixed-methods research design. Section 4 shows the results from both candidates and employers' perspectives. Section 5 is devoted to discussing the theoretical and practical implications, and Section 6 wraps up with the limitations and suggestions for further research.

LITERATURE REVIEW

The Digital Transformation of Talent Acquisition

Talent acquisition has changed significantly be fore it was mostly done manually through relationships, the process has currently been data-driven and technology-mediated. The digital transformation in HR, which was double accelerated by the COVID19 pandemic, has resulted in the adoption of cloudbasedplatforms, data analytics, and AIpowered tools at a glance (Marler & Boudreau, 2017). This change is very significant in emerging markets, where organizations are looking for scalable solutions to handle a large number of applicants. According to the Deloitte survey (2022), 73% of Indian companies have already implemented AI in HR or are running pilot projects, where talent acquisition is the most common application.

The main reasons for using AI to drive recruitment include: (1) time saving through the automation of the performance of repetitive tasks, (2) better candidate sourcing through data mining, (3) increased fairness due to the use of standardized assessments, and (4) the use of predictive analytics for more successful hiring (ChamorroPremuzic et al., 2020). Nevertheless, the change has completely redesigned the candidate experience, thus the concept of the black box of digital hiring has been widely adopted, referring to the fact that in the early stages of the process, where critical decisions are made, candidates confront algorithms instead of humans (Bogen & Rieke, 2018).

AI Screening Tools: Taxonomy and Critical Perspectives

AI screening tools encompass a range of technologies with varying levels of sophistication:

Table 1: Taxonomy of AI Screening Tools in Talent Acquisition

Tool Type	Function	Common Technologies	Stage of Recruitment
Resume Parsers	Extract and rank information from resumes/cvs	NLP, Keyword Matching	Initial Screening
Chatbot Screeners	Conduct preliminary interviews via text/voice	Conversational AI, Sentiment Analysis	Pre-screening
Gamified Assessments	Evaluate cognitive abilities and personality	Game Analytics, Behavioral Metrics	Assessment
Video Interview Analyzers	Analyze facial expressions, speech patterns	Computer Vision, Affective Computing	Interview
Predictive Analytics	Forecast candidate success and retention	Machine Learning, Statistical Modeling	Decision Support

Researcher notice that these tools give benefits. People who study the tools point out big concerns. Algorithmic bias stays a problem because AI systems that learn from data can keep the same unfairness (Raghavan et al. 2020). The dehumanization of hiring processes can hurt candidate experience. Can hurt employer branding (Acikgoz et al. 2020). Also the focus, on keyword optimization and standard answers can give an edge to candidates who know how to game the system. The focus can hurt candidates who have potential (Newman et al., 2020).

Industry 5.0 and the Future Workforce Paradigm

Industry 5.0 marks a major shift from Industry 4.0 based on the incorporation of three values that include humancentricity, sustainability, and resilience (Breque et al., 2021). Industry 4.0's aim is entirely dependent on automation, whereas Industry 5.0's vision is the development of a complementary ecosystem that utilizes human strengths together with the strengths of machines. Such a paradigm shift calls for a shift in the skills of the workforce.

The European Commission's Industry 5.0 framework has identified numerous essential humancentric skills, which include (1) problem-solving in a collaborative humanmachine system, (2) creativity and innovation, (3) emotional intelligence, (4) adaptability, and (5) sustainability mindset (European Commission, 2021). This means that engineers are no longer supposed to be competent solely in a technical skill but are now required to possess what Xu et al. (2021) refer to as "T-shaped" skills, which entail deep disciplinary knowledge alongside interdisciplinary skills.

The Emerging Market Context: India and Engineering Education

India is a very unique environment to examine the relationship between AI-powered hiring and Industry 5.0 readiness. The country has over 3500 engineering colleges which produce nearly 1.5 million graduates annually, thus the supply of fresh talent at the entry-level is massive. The problem, however, is employability as only 46.8% of engineering graduates are found employable, according to the National Employability Report. Changing geography of opportunity: Although Bangalore and Hyderabad continue to be the top metro

technology hiring centers, secondary cities like Nagpur are becoming more prominent due to their advantages of lower operating costs, better infrastructure, and government initiatives such as the Smart Cities Mission, as per the statement. While this certainly causes a decentralization that opens up opportunities, it simultaneously escalates the difficulties that fresher may face as they possibly lack the networks or resources that are available in bigger metros.

Research

on emerging markets only, uncovers further points to consider: (1) digital divide issues that may hamper the fair access of AI mediated hiring processes, (2) linguistic and cultural biases, in AI tools, which are mainly designed for Western contexts, (3) the different levels of institutional readiness for Industry 5.0 changes, and (4) the conflict between global competency frameworks and local educational systems (Madanaguli et al., 2022).

Synthesis and Research Gap

The literature indicates three different but overlapping discussions: the technological transformation of HR with AI, the changing competency requirements of Industry 5.0, and the specific challenges of workforce development in emerging markets. However, there is hardly any research on how AI-mediated hiring processes in emerging markets influence the identification and selection of candidates with Industry 5.0 competencies. This issue is especially important for engineering freshers as they are the next generation of the workforce in advanced industrial ecosystems.

The research questions that this study aims to answer through the investigation are as follows:

1. In what ways do AI screening tools change the candidate experience and the engineering freshers' perception of barriers during the hiring process in Nagpur?

2. How do people perceive the connection between the skills prioritized by AI screening and the human-centric competencies required by Industry 5.0 workplaces?

3. What measures can HR professionals take to use AI tools in talent acquisition to maintain a balance between efficiency and fair identification of Industry 5.0 competencies?

Overall, the evidence from the literature uncovers a divergence between the use of AI in recruitment and the competency frameworks promoted in the context of Industry 5.0. On the one hand, algorithmic recruitment tools mainly focus on easily measurable, quantifiable aspects like the occurrence of certain words, the reputation of the applicant's university, and the possession of technical qualifications. On the other hand, Industry 5.0 highlights the importance of relational, flexible, and ethically sound human abilities. Most of the previous research has been devoted to these two aspects separately rather than seeing them as conflicting issues. Consequently, there is very little empirical knowledge of how the candidates feel about this gap in reality. The current research assumes a more comprehensive perspective by combining these separate data strands and exploring how AI-based recruitment influences the perception of employability, fairness, and the value of human qualities among engineering freshers.

METHODOLOGY

Research Design

The current research makes use of a sequential mixed-methods design (Creswell & Plano Clark, 2017) in order to demonstrate both breadth and depth of comprehension. The study is based on a QUAN → QUAL hierarchy, meaning that statistical data from candidate surveys help to clarify and direct the qualitative data gathering from HR professionals. By using this method, broad trends from the viewpoint of candidates can be deepened with the subtle understanding of the organizational decision-makers.

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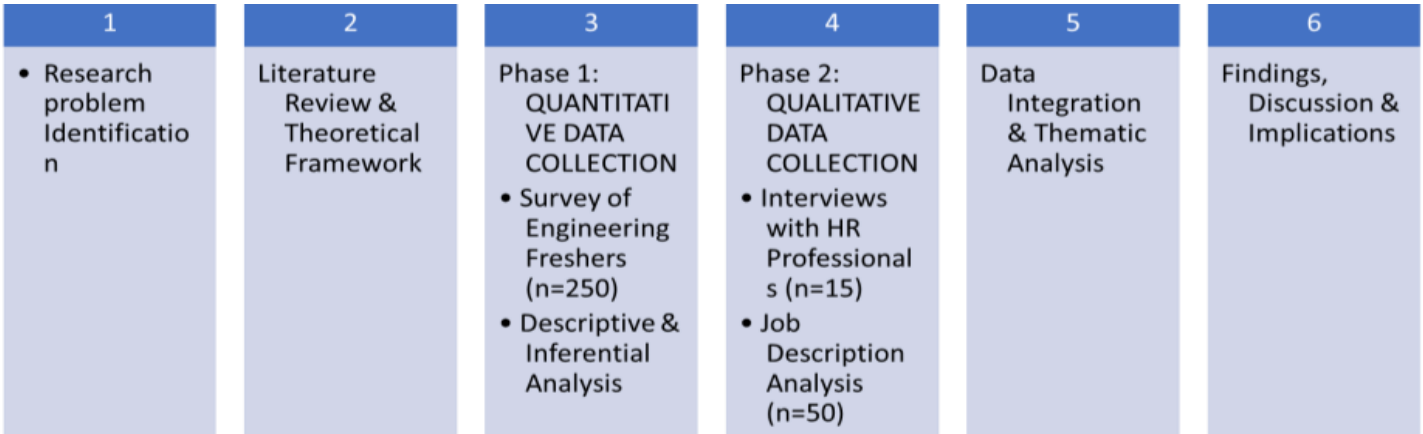
Figure 1: Research Design Flowchart



Population and Sampling

This research study revolves around a primary population of two groups in Nagpur, Maharashtra:

1. Engineering Freshers: These are graduates with 2 years of experience who are looking for entry-level positions. The sampling frame was made up of graduates from six engineering colleges in Nagpur, and members of local professional networks. To ensure representation across disciplines (Computer Science, Mechanical, Electrical, Civil) and academic performance tiers, a stratified random sampling approach was been used.
2. HR Professionals and Recruiters: The individuals who are responsible for the acquisition of talent in the organizations which are hiring engineering freshers. Purposive sampling has been employed to select the participants from the different sectors comprising IT services (5), manufacturing (4), startups (3), and consulting (3).

Data Collection Instruments and Procedures

Phase 1: Quantitative Survey (February March 2025)

A structured online questionnaire was administered to 250 engineering freshmen. The instrument included:

Demographic section (age, gender, discipline, academic performance) 5 point Likert scale items measuring perceptions of AI screening tools (reliability $\alpha = 0.87$) Multiple choice questions on job search experiences and outcomes Open ended questions about challenges and suggestions

Phase 2: Qualitative Interviews (April 2025)

Fifteen semi-structured interviews (45-60 minutes each) were held with HR professionals. The discussion covered:

The use of AI screening tools in the company and the implementation process Effects on recruitment outcomes and candidate experience Beliefs about the efficiency of the tool in assessing Industry 5.0 competencies Difficulties and future plans Document Analysis:

Fifty recent job descriptions for entry-level engineering positions in Nagpur-based companies have been studied through content analysis to uncover the competency requirements both explicitly and implicitly stated.

Data Analysis

SPSS Version 28 was used for the analysis of quantitative data. Descriptive statistics were used to summarize the characteristics of the sample and the distributions of the responses. Inferential statistics included t-tests and ANOVA to look at differences between groups, and correlation analysis to identify relationships between variables.

Qualitative data were converted to text and analyzed through thematic analysis, which involved six phases according to Braun and Clarke (2006). Coding was done for the content of the interview transcripts and comments in the open-ended portion of the survey with the help of NVivo software. Two coders worked on 20% of the transcripts, and they got a $\kappa = 0.82$ for agreement between them.

Ethical Considerations

The study received ethical approval from the Institutional Review Board. All participants provided informed consent with clear explanation of research purposes, data usage, and confidentiality protections. Survey responses were anonymized, and interview participants are identified by pseudonyms in reporting. Data were stored securely with access restricted to the research team.

FINDINGS

Demographic Profile of Respondents

Table 2: Demographic Characteristics of Engineering Fresher Respondents (n=250)

Characteristic	Category	Percentage	Frequency
Gender	Male	68%	170
	Female	30%	75
	Prefer not to say	2%	5
Engineering Discipline	Computer Science/IT	42%	105
	Mechanical	24%	60
	Electronics & Communication	18%	45
	Civil	12%	30
	Other	4%	10
Academic Performance (CGPA)	8.0 and above	28%	70
	7.0-7.9	45%	112
	6.0-6.9	22%	55
	Below 6.0	5%	13
Job Search Status	Employed	32%	80
	Received offer, not joined	15%	38
	Actively searching	42%	105
	Not actively searching	11%	27

Table 3: Profile of HR Professional Interviewees (n=15)

Sector	Position	Experience	Organization Size
IT Services (5)	Talent Acquisition Lead (3)	8-15 years	Large (1000+ employees)
	HR Manager (2)	5-12 years	Large
Manufacturing (4)	Recruitment Head (2)	10-20 years	Medium-Large
	HR Business Partner (2)	6-14 years	Medium
Startups (3)	Founder/HR Head (2)	4-8 years	Small (<50 employees)
	Talent Specialist (1)	3-6 years	Small
Consulting (3)	Senior Recruiter (2)	7-11 years	Medium
	HR Director (1)	15+ years	Medium

Theme 1: The Fresher Experience with the "Digital Gatekeeper"

Survey results showed that 87% of engineering freshers had experienced AI screening tools as part of their job search, AI resume screening being the most common method (92%), followed by online assessments (76%), and chatbot interviews (41%). Their interaction with the technology was described in terms of the perception of its key patterns:

Perception of Invisibility and Uncertainty: More than two-thirds of the respondents (68%) were of the opinion that "I don't understand how AI tools evaluate my application", and they expressed that view most vehemently. Much of the anxiety was caused by the fact that the AI remained hidden, with 72% reporting that they were stressed, especially by the "not knowing what the algorithm is looking for" factor. One of the computer science graduates reflected on this feeling in the following way "It is as if you were yelling but the void didn't respond. Even if you optimize your resume with keywords, you are not sure if that is what they want. There is no feedback, only silence or automated rejection."

Strategy, Adaptation and "Gambling with the System": As a matter of fact, 64% of freshers responded that they were actively changing their application methods so as to conform with presumed algorithmic constraints. Their explanations for the most frequently modified parts of their applications were: use of resume keywords (58%), use of online optimisation for ATS (47%), practice for gamified assessments through mock-platforms (39%) and research for "ideal" responses to chatbot interview (32%). There were instances of the same adaptations that conflicted with the respondents' sincerity as in the case of a mechanical engineering graduate's statement: "I am aware that I should be myself but when I see my friends getting interviews by correctly using all the right keywords, I get the feeling that I have to do the same even if it doesn't show my real side of strength."

Emotional Impact: Quantitative data gave out the signal of significant emotional effects. The Job Search Stress Scale (adapted from Vinokur & Caplan, 1987) was used to measure the stress levels of the respondents, who indicated that their stress levels were between moderate and high ($M=3.8$, $SD=0.9$ on a 5-point scale). Among the stressors were: impersonal automated rejections (81%), lack of human interaction (77%), and the feeling of being reduced to data points (69%). Women, as a group, were the most stressed - female respondents indicated statistically significantly higher stress levels ($t=2.87$, $p<.01$), especially when it comes to video interview analysers.

Figure 2: Fresher Perceptions of AI Screening Tools (n=250)

Perception Dimension	Strongly Disagree (1)	2	3	4	Strongly Agree (5)
Improves efficiency					12%
Reduces human bias					8%
Is transparent					4%
Assesses my true potential					6%
Is stressful					82%
Feels impersonal					78%
Provides helpful feedback					3%

Theme 2: The Skill Assessment Disconnect

Analysis revealed a significant gap between competencies prioritised by AI screening tools and those required for Industry 5.0 workplaces:

AI Prioritized Skills: Content analysis of job descriptions and interview data identified that current AI systems primarily screen for: technical keywords (95% of job descriptions), academic performance (87%), certification counts (64%), and specific tool proficiency (58%). From the HR perspective, these parameters were valued for

their measurability and scalability. As an IT recruitment head explained, "When we get 2000 applications for 20 positions, we need filters. The ATS helps us narrow down based on must-have technical skills. It's about efficiency at scale."

Industry 5.0 Competency Gap: When asked to rate the importance of various competencies for future success, HR professionals identified collaboration (94%), adaptability (91%), creative problem-solving (89%), and learning agility (86%) as critical. However, 73% acknowledged that their current AI screening tools were "not effective" or "only somewhat effective" at assessing these attributes. This disconnect was quantified through a competency alignment matrix developed from the data: Table 4: Competency Assessment Alignment Matrix

Competency	**Importance for Industry 5.0 (HR Rating)**	**Effectiveness of AI Assessment (HR Rating)**	**Alignment Gap**
Technical Proficiency	4.2/5.0	4.5/5.0	0.3
Problem-Solving	4.7/5.0	3.1/5.0	-1.6
Collaboration	4.8/5.0	2.4/5.0	-2.4
Adaptability	4.6/5.0	2.1/5.0	-2.5
Creativity	4.3/5.0	1.8/5.0	-2.5
Ethical Reasoning	4.1/5.0	1.5/5.0	-2.6

Emerging "Digital Skills Gap": The study identified what participants termed a "digital skills gap"—not in technical abilities, but in navigating AI-mediated hiring systems. Successful candidates reported investing substantial time in learning to "speak the algorithm's language," sometimes at the expense of developing deeper competencies. A startup founder observed: "We're selecting for people who are good at taking tests and optimising resumes, not necessarily those who will excel in collaborative, ambiguous problem-solving environments."

Theme 3: The HR Perspective: Efficiency vs. Effectiveness

HR professionals reported significant operational benefits from AI screening tools. Quantitative estimates from interview data indicated:

40% average reduction in initial screening time

35% decrease in cost per hire for volume roles

Ability to process 35 times more applications with existing staff However, these efficiency gains came with concerns about effectiveness:

Quality of Hire Concerns: 67% of HR professionals expressed moderate to great concern about missing potentially excellent candidates due to algorithmic filtering. A manufacturing HR head shared: "We rejected a candidate because his resume didn't have the specific CAD software we mentioned. He reached out directly, and it turned out he had equivalent experience with a different tool and amazing problem-solving skills. The algorithm would have cost us that talent."

Bias and Fairness Considerations: While 82% of HR professionals believed AI tools could reduce subjective human bias, 64% acknowledged concerns about algorithmic bias. Specific issues raised included: disadvantage to candidates from less prestigious institutions (mentioned by 58%), linguistic bias against nonnative English speakers (47%), and potential gender bias in video analysis tools (52%). Most organisations (73%) reported having no formal process for auditing their AI tools for bias.

Integration Challenges: The data revealed varying levels of AI integration maturity:

Basic Level (40%): Using a standalone ATS with keyword filtering

Intermediate (35%): Implementing chatbot screeners and basic assessments

Advanced (25%): Deploying integrated platforms with predictive analytics

Smaller organisations and startups faced particular challenges with cost (87% mentioned as a barrier) and lack of technical expertise (72%).

Theme 4: Emerging Market Nuances

The Nagpur context revealed several location-specific factors influencing the AI hiring landscape:

Digital Divide Impacts: While 94% of freshers reported smartphone access, only 68% had reliable high-speed internet at home, and 42% reported technical difficulties during video-based assessments. This created what one civil engineering graduate called a "two-tier job search": "My friend with a fibre connection at home could do flawless video interviews. I had to go to a cyber cafe and hope the connection held. It didn't feel like a level playing field."

Linguistic and Cultural Considerations: 56% of freshers reported discomfort with English-only AI interfaces, particularly chatbot interviews that didn't account for Indian English variations or multilingual competencies. HR professionals noted challenges with tools calibrated for Western communication styles and cultural references.

Educational System Alignment: Both freshers and HR professionals identified gaps between engineering education and Industry 5.0 competency development. While technical training was generally rated as adequate (3.8/5.0), development of collaborative, creative, and adaptive skills was rated lower (2.9/5.0). This mismatch placed additional pressure on hiring processes to identify potential rather than proven capability.

DISCUSSION

The purpose of this research was to investigate if the increasing use of AI-based recruitment is in line with the human-centered concept of Industry 5.0. The results clearly show a paradox: on the one hand, AI systems facilitate the performance and growth of companies, on the other hand, they exclude skills that are at the core of human-centric workforce development. The paper, through merging quantitative trends with qualitative accounts, shows how AI-driven recruitment changes the experience of candidates, creating both institutional and emotional obstacles which, according to the authors, are hardly addressed in current models mainly focused on efficiency.

Theoretical Implications

This research is a valuable addition to three theoretical debates: digital transformation in HR, future of work studies, and emerging market dynamics. Initially, it extends the Technology Acceptance Model (Davis, 1989) in the HR context by providing evidence that resistance of candidates to AI tools is not due to perceived usefulness or ease of use, but rather due to opacity and perceived unfairness. Consequently, it points to the theoretical need of having broader frameworks that recognize transparency and justice issues when dealing with algorithms.

Furthermore, the article enriches human capital theory by presenting the idea that AI-driven recruitment can lead to the creation of new "signalling" (Spence, 1973) mechanisms where candidates focus on gaining algorithmic recognition rather than on real skill development. This, in turn, affects the ways human capital is developed, signalled, and gets its value in digital labor markets.

Finally, the study deepens institutional theory by explaining how worldwide HR technology trends are transformed in the contexts of emerging markets. The results indicate a "glocalisation" process where global AI

tools are used, but locally specific issues such as digital infrastructure, linguistic diversity, and educational alignment arise because of the implementation.

Practical Implications for Stakeholders

HR professionals, the discoveries imply that if a company's hiring decision completely depends on resumes filtered through AI, then human talents who possess high adaptability and creativity might be neglected. Hence, schools have to equip students with not only the technical skills but also the capabilities to handle AI-driven assessments. On the other hand, regulators have to cater to the set of rules that ensure the tech utilization in hiring is transparent, accountable, and by the guidance of human judgment especially in the labor markets of developing countries.

For HR Professionals and Organizations:

1. Utilize "HumanintheLoop" AI Concept: Instead of fully automating their processes, companies should use hybrid models in which AI performs the initial screening of the volume of cases, but humans check the borderline cases and exceptions. In this way, the efficiency is combined with the ability of the human to make a judgment.

2. Create AI Auditing Procedures: Bias audits should be performed regularly to evaluate the fairness of the algorithms with respect to gender, institutional prestige, linguistic background, and other dimensions of diversity. Transparency reports could be a way to increase the trust of candidates.

3. Redefine Success Metrics: The first thing to do is to go beyond efficiency metrics (time to hire, cost per hire) and include quality metrics (retention rates, performance scores, promotion velocity) as well as diversity outcomes.

4. Improve Candidate Experience: Explain more clearly the use of AI tools, give the candidates the opportunity to practice, and make sure that there is a real human interaction at the most important moments of the decision.

For Educational Institutions:

1. Integrate Digital Hiring Literacy: The curriculum should have modules that teach the students how to use an AI-mediated hiring process, how to present themselves ethically in digital environments, and how to understand algorithmic recruitment.

2. Develop Industry 5.0 Competencies: The focus should be beyond the technical skills to include project-based learning, interdisciplinary collaboration, use of the creative problem-solving process, and the learner's adaptability through the experiential pedagogies.

3. Foster Industry-Academia Partnerships: Work with employers to understand the changes in competency requirements and get educational institutions aligned with the future needs of the workplace.

For Policymakers in Emerging Markets:

1. Develop Ethical AI Guidelines for Employment: Build systems managing the use of AI for hiring in a way that is ethical and responsible. Such systems should include aspects of transparency, accountability, and reduction of bias, being also adapted to the local realities.

2. Invest in Digital Infrastructure: Make sure that all, including the residents of smaller cities and students in schools, have fair access to a fast internet connection and modern digital devices.

3. Support Upskilling Initiatives: Provide money for programs that connect with the needs of people looking for a job and those working in the field of human resources so as both groups may gain the necessary digital skills in the changing hiring environment.

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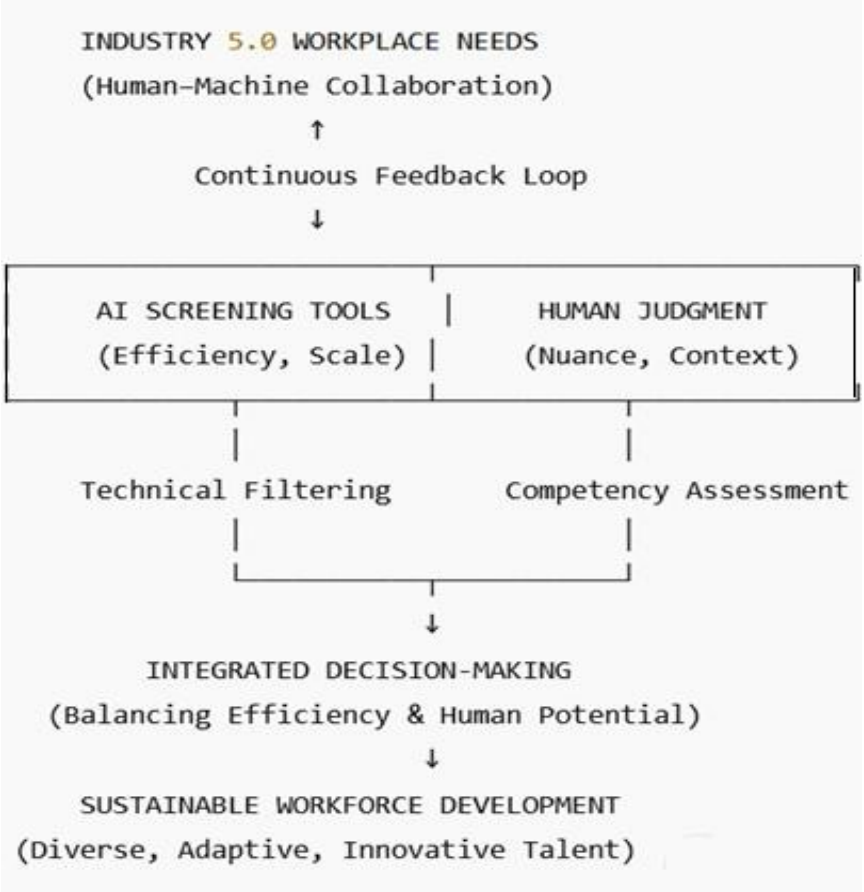
The HumanCentric AI Framework for Talent Acquisition

Based on the findings, this study proposes a framework for integrating humancentric values into AIdriven talent acquisition:

Figure 3: HumanCentric AI Framework for Talent Acquisition



This framework emphasizes continuous feedback between AI systems and human decisionmakers, with the shared goal of identifying candidates who can thrive in Industry 5.0 environments. It positions AI not as a replacement for human judgment, but as a collaborative tool that amplifies human capabilities when designed and implemented with humancentric values.

Limitations and Future Research Directions

Several limitations apply to this research. One of them is that due to the rapid progress of AI technologies for recruitment, the particular tools studied might become outdated; nevertheless, the conceptual challenges regarding the balancing of efficiency, fairness, and human-centered competencies revealed in the study are expected to endure. Another limitation is that the research concentrates mainly on urban engineering graduates, so the findings might not be applicable to other fields or rural settings. Incoming studies may consider using longitudinal studies, comparing different sectors, and employing experimental methods to examine the impact of continuously changing AI tools on recruitment results over time.

CONCLUSION

This study offers a deep understanding of how digital transformation in talent acquisition intersects with the transition to Industry 5.0 workplaces in an emerging market context. The discoveries portray a contradictory world where AI screening tools can provide exceptionally efficient solutions, yet at the same time, they have the potential to create new obstacles and make it difficult to challenge that bias because these tools are even more biased than before. For engineering freshers in Nagpur, the digital hiring maze becomes a challenge as well as an opportunity, thus they have to acquire new forms of digital literacy and strategic self presentation.

The research finds that the present AI implementations in talent acquisition mainly aim at achieving the efficiency goals of Industry 4.0, rather than aligning with the humancentric values of Industry 5.0. This lack of harmony between the two has far-reaching effects on workforce sustainability since organizations may end up selecting employees who are algorithmically compatible, thus losing the collaborative, adaptive, and creative skills that are necessary for future innovations, without even realizing it.

Nevertheless, the research is equipped with the study of possible opportunities for the future as well. The organizations can avail themselves of the merits of AI while lessening its dangers by using the design principles grounded in human values, carrying out strong bias audits, and establishing a hybrid human-AI decision system. Schools should not only be responsible for technical preparation, but also for turning students into digital hiring ecosystem professionals. Governments have to make sure that the shift towards a digital era in the field of employment will not be at the cost of further inequality, but will promote fair play and access to everyone.

To put it simply, the question of AI impacting talent acquisition is no longer relevant as the change is already happening. The main question is the direction of this change: will it bring more efficiency with less regard for human potential, or will it result in a more balanced fusion of technology with human-centric values? For a new market like India, which is just about to experience a big industrial growth, it is very important not only from an operational point of view to get this right, but also from a strategic point of view that will allow the country to develop in an inclusive and sustainable way in the era of Industry 5.0.

The data from Nagpur reflect a smaller scale scenario of the issues and chances that regions with similar characteristics are facing globally. By understanding this environment and applying the human-centric model put forward, the three sectors of society—companies, educational institutions, and government—can collaborate to make sure that the digital change in talent acquisition is a step towards Industry 5.0, not a stumbling block.

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Appendices

Appendix A: Survey Instrument

Section 1: Demographic and Academic Information

Please select the most appropriate option for each question or provide a short answer where indicated.

Item	Question	Response Type
D1	**Age (in years):**	[Open Field]
D2	**Gender:**	◯ Male ◯ Female ◯ Non-binary ◯ Prefer not to say ◯ Other: _____
D3	**Primary Engineering Discipline:**	◯ Computer Science/IT ◯ Mechanical ◯ Civil ◯ Electrical/Electronics ◯ Other: _____
D4	**College/University Affiliation (Anonymized):**	[Open Field]
D5	**Current/Final Cumulative Grade Point Average (CGPA) or Percentage:**	◯ Below 6.0 ◯ 6.0 - 7.0 ◯ 7.1 - 8.0 ◯ 8.1 - 9.0 ◯ Above 9.0
D6	**Year of Expected Graduation:**	◯ 2026 ◯ 2025 ◯ 2024 ◯ Other: _____

Section 2: Job Search Activity and Status

Please select the option that best describes your current situation.

Item	Question	Response Type
J1	**Current Employment/Career Status:**	◯ Received and accepted a full-time offer (Pre-joining) ◯ Employed full-time ◯ Actively searching for entry-level positions ◯ Not actively searching at this time ◯ Pursuing Higher Education ◯ Other: _____
J2	**Approximate number of entry-level job applications submitted in the past 6 months:**	◯ 0-5 ◯ 6-15 ◯ 16-30 ◯ 31-50 ◯ More than 50
J3	**Approximate number of formal interviews (excluding initial screening) attended in the past 6 months:**	◯ 0 ◯ 1-3 ◯ 4-6 ◯ 7-10 ◯ More than 10

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Section 3: Exposure and Perception of AI Screening Tools (Key Constructs)

Scale: Please indicate the extent to which you agree or disagree with the following statements regarding your job search experience.

1 - Strongly Disagree (SD)	2 - Disagree (D)	3 - Neutral (N)	4 - Agree (A)	5 - Strongly Agree (SA)

A. Exposure to AI and Perceived Efficiency

Item	Statement	SD	D	N	A	SA
E1	I have encountered automated or AI-powered tools (e.g., resume screeners, chatbot/video interview assessment) during my job search.	○	○	○	○	○
E2	The use of AI tools makes the initial screening phase of the hiring process significantly faster.	○	○	○	○	○
E3	AI-mediated hiring reduces the overall time-to-hire compared to traditional methods.	○	○	○	○	○

B. Perceptions of Algorithmic Fairness and Transparency (H1 Focus)

Item	Statement	SD	D	N	A	SA
F1	The use of AI tools ensures an objective and fair evaluation of all candidates.	○	○	○	○	○
F2	I have a clear understanding of the specific criteria or keywords the AI tools used to evaluate my application.	○	○	○	○	○
F3	The decision made by an AI tool feels less biased than a decision made solely by a human recruiter.	○	○	○	○	○
F4	I believe AI tools may screen out qualified candidates due to algorithmic error or bias.	○	○	○	○	○

C. Candidate Experience and Industry 5.0 Readiness (H3 Focus)

Item	Statement	SD	D	N	A	SA
R1	The use of AI tools makes the application process feel impersonal and stressful.	○	○	○	○	○
R2	I feel more motivated to develop the *human-centric* skills (e.g., creativity, ethics) required for Industry 5.0 after encountering AI screening.	○	○	○	○	○
R3	The feedback (or lack thereof) received from AI screening tools is useful for improving my future applications.	○	○	○	○	○
R4	I believe AI screening tools primarily focus on technical keywords rather than assessing complex behavioral/soft skills.	○	○	○	○	○

Section 4: Qualitative Insights on AI-Mediated Hiring

Please provide brief, honest responses to the following open-ended questions. Your identity will remain confidential.

Item	Question
Q1	From your experience, what has been the **single biggest challenge or barrier** you have faced when interacting with AI screening tools in the job application process? [Text Box for Response]
Q2	Based on your goals and the demands of Industry 5.0, what **two key suggestions** would you offer to companies for improving the fairness and transparency of their AI-mediated hiring processes? [Text Box for Response]

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Appendix B: Interview Protocol for HR Professionals

INTRODUCTION & CONSENT

Explanation of research purpose and confidentiality Obtaining informed consent Demographic and organizational information collection

Interview Questions

1. Can you describe your organization's current use of AI tools in talent acquisition?
2. What benefits have you observed from implementing these tools?
3. What challenges or concerns have emerged?
4. How do you assess whether AI tools are identifying the right candidates?
5. How do you ensure fairness and reduce bias in AI screening?
6. How do candidates typically respond to AImediated hiring processes?
7. What competencies are most important for engineering freshers in your organization's future?
8. How well do current AI tools assess these competencies?
9. What improvements would you like to see in AI hiring technology?
10. What advice would you give other organizations implementing AI in talent acquisition?