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COMPARATIVE ANALYSIS OF AI - DRIVEN RECRUITMENT SYSTEMS VS. TRADITIONAL RECRUITMENT METHODS IN MITIGATING HIRING BIAS AND PROMOTING WORKPLACE DIVERSITY

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Abstract

Aim The purpose of this comparison study was to evaluate how AI-driven recruitment tools and conventional hiring procedures affect fostering workplace diversity and minimizing bias. A mixed-methods strategy was used to collect the data. **MATERIAL AND METHOD** which included semi-structured interviews with hiring managers and job seekers, surveys of HR professionals, and secondary quantitative data from industry journals. Descriptive statistics, independent and paired samples t-tests, ANOVA, and correlation/regression analyses were used in the statistical study, which was conducted mostly with SPSS, to assess diversity metrics and perceptions. C**onclusion** While there were no statistically significant age differences between groups in the ANOVA (p =.065) or a statistically significant correlation between age and the belief that AI reduces time-to-fill (p =.101), the results showed statistically significant differences between two groups in an independent samples t-test (p =.006 and.002).

Keywords : AI (or AI-driven) , Hiring , Bias , Diversity , Data , Recruitment , Groups , Ag , Results , Analysis

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Introduction

AI-driven recruitment systems are technologically advanced hiring solutions that use artificial intelligence (AI) to streamline and automate several hiring steps. (Gupta and Rahimi Ata 2024) the paper showed about data drive hiring.These applications screen resumes, evaluate applicants, interview candidates,(Biasioli 2025) the paper showed about independent music in Russia. and forecast job performance using machine learning,(Vergara et al. 2025)the paper showed about inter specific courtship. Natural language processing (NLP), and data Analytics. On the other hand, conventional hiring practices depend on human recruiters to handle duties like reviewing resumes, selecting candidates, and conducting interviews. Conventional hiring procedures have been successful for many years, but they are frequently prone to inconsistencies, inefficiencies, and unconscious bias. By offering a data-driven, impartial, and scalable method of hiring talent, AI-driven recruiting seeks to overcome these issues. The differences between AI-driven hiring systems and conventional approaches in reducing bias and fostering workplace diversity are examined in this comparative study.

Hiring the appropriate people quickly and fairly is essential for businesses looking to be innovative and competitive in today's rapidly changing labor market. Recruitment bias has long been a problem, limiting chances for underrepresented groups and resulting in under representation of varied talent. By standardizing recruiting criteria and reducing human biases, AI-driven recruitment presents a possible answer. Since diverse teams foster innovation, better decision-making, and enhanced business outcomes, many organizations now place a high priority on diversity,(Gupta and Rahimi Ata 2024) the paper showed about implementing all and assessing the impact of ai on . equality, and inclusion (DEI) efforts. Organizations may create a diverse and skilled workforce by using AI to automate the screening of candidates and lessen their reliance on human judgment. (Gupta and Rahimi Ata 2024) the paper showed candidate quality But there are still issues with algorithmic bias and the moral application of AI, thus using AI in hiring requires a balanced strategy.

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Material And Method

Using a mixed-methods approach, this comparative analysis will look at how AI-driven recruitment platforms and conventional recruitment techniques affect reducing hiring bias and fostering workplace diversity. Surveys will be used to gather quantitative data from hiring managers, recruiters, and HR specialists employed by companies that employ both traditional and AI-powered hiring practices. The poll will collect information on important diversity-related parameters, such as perceived fairness of AI-driven versus traditional recruitment methods, bias-related concerns, and demographic representation in hiring outcomes. In order to evaluate algorithmic fairness in AI-driven recruiting systems, DEI (Diversity, Equity, and Inclusion) statistics, and general hiring patterns, secondary quantitative data will also be collected from publicly accessible sources, including industry publications, scholarly research, and case studies.

Semi-structured interviews with hiring managers, HR specialists, and job seekers who have gone through both recruitment procedures will be used to gather qualitative data to supplement the quantitative data. Perceptions of AI's ability to lessen bias, difficulties in putting AI recruitment tools into practice, and its efficiency in promoting workplace diversity will all be covered in these interviews. To ascertain if AI-driven hiring improves fairness or strengthens pre existing prejudices, the experiences of candidates will also be examined. Transcripts of interviews will be

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subjected to a thematic analysis in order to find recurrent themes, such as ethical issues, confidence in AI judgments, and organizational dedication to impartial hiring. In order to comprehend its bias-mitigation mechanisms, the AI recruitment software utilized by participating firms will also be examined.

A thorough assessment of how AI-driven recruitment systems stack up against conventional techniques in tackling hiring bias and fostering workplace diversity will be possible thanks to the combination of quantitative and qualitative data. The results will be compared to determine the advantages, disadvantages, and trade-offs of each strategy. The lack of long-term hiring outcome data, differences in AI system functions among firms, and the possibility of self-reported bias in survey replies are some of the study's limitations. Strict adherence to ethical principles will guarantee participant anonymity, informed permission, and data confidentiality. This study attempts to offer an unbiased evaluation of AI's influence on inclusive and equitable hiring practices by combining data from several sources.

Statistics Analysis

The impact of AI-driven recruitment systems vs conventional hiring practices in reducing bias and fostering workplace diversity will be statistically analyzed using SPSS. Key diversity measures, including complaints of hiring prejudice, fairness perception scores, and demographic representation, will be compiled using descriptive statistics. Organizations employing AI-driven solutions and those using conventional approaches will have their diversity outcomes compared using an Independent Samples t-test to find statistically significant differences. A Paired Samples t-test will evaluate how diversity measures changed before and after AI implementation for businesses who made the switch to AI-driven recruiting. If there are several levels of AI adoption (such as basic AI screening, advanced AI matching, and AI-powered interviewing), a one-way ANOVA will be performed. with significant differences being identified by post-hoc tests. To ensure a thorough assessment of AI's efficacy in lowering bias and promoting inclusivity in hiring, correlation and regression analysis will be used to investigate links between diversity indicators and AI adoption levels.

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Results

Table: 1 Regardless of whether equal variances were assumed (t(df unknown) = 2.842, p =.006) or not (t(df unknown) = 3.189, p =.002), the independent samples t-test showed a statistically significant difference between the two groups, with a consistent mean difference of.727. The "equal variances not assumed" results are more dependable because the significance level of.004 for Levene's test indicates that the assumption of equal variances was probably broken.

Table: 2 Age differences between the groups are not statistically significant, according to the ANOVA results (F(4, 105) = 2.283, p =.065). Despite being greater than the within-group variance, the between-group variance is insufficient to rule out the null hypothesis at the usual significance threshold of 0.05.

Table: 3 Age and the belief that AI-driven hiring reduces time-to-fill and operational expenses are weakly correlated (r = -.161), according to a Pearson correlation analysis. There is no trustworthy linear relationship between age and this perception in our group, nevertheless, as this correlation is not statistically significant (p =.101).

Fig :1The mean age of responders at varying degrees of agreement with the phrase "Can AI provide real-time updates on application status to candidates?" is displayed in this bar chart. Even if the confidence intervals overlap, suggesting some variability, the data points to a trend where people who "Strongly disagree" are often younger, with mean age rising as agreement levels climb.

Discussion

Table: 1 Regardless of whether identical variances are assumed (p=.006) or not (p=.002), this independent sample t-test shows a statistically significant difference between the two groups because both p-values are below the standard alpha threshold of 0.05. Although the standard error of the difference changes significantly based on the variance assumption, the mean

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difference between the groups is consistently.727. When equal variances are not assumed, the standard error is reduced (.228), which results in a higher t-value (3.189). The two groups are probably selected from populations with varying incomes, according to the noteworthy findings.

Table: 2 Four groups' age differences are examined using the ANOVA. The p-value of.065 shows that the result is not statistically significant at the standard alpha level of 0.05, despite a trend indicating differences between groups ($F(4, 105) = 2.283$). Thus, based on this research, we are unable to draw the firm conclusion that the mean ages of the groups differ. To examine any age differences, more research may be required using bigger sample sizes or more targeted comparisons.

Table: 3 A Pearson correlation study between age and the belief that AI-driven hiring reduces time-to-fill and, therefore, lowers operating expenses is shown in the table. The two variables have a weakly negative association, as indicated by the correlation value of -.161. Given that the p-value is.101, which is higher than the standard alpha threshold of 0.05, this association is not statistically significant. As a result, we are unable to draw the conclusion that age and the perception that AI-driven hiring cuts expenses and time-to-fill are significantly correlated.

Limitation of the study

There are various restrictions on this study. Because perceptions of fairness and prejudice reduction may not perfectly match actual hiring outcomes, bias may be introduced by relying solely on self-reported data from HR experts, hiring managers, and job seekers. Because hiring procedures and degrees of AI usage differ throughout industries and businesses, the sample size may further restrict how broadly the results may be applied. Furthermore, the study concentrates on diversity and bias reduction, possibly ignoring other important aspects like work performance, long-term staff retention, and candidate quality. The findings of the study might soon become out of date if new AI-driven hiring tools appear, considering how quickly AI technology is developing. Finally, it is challenging to pinpoint the precise influence of AI on hiring practices due to their complexity, which means that a variety of factors outside of AI and conventional approaches may affect diversity and fairness in the hiring process.

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Conclusion

The results indicate that although AI-powered recruiting practices may lessen hiring bias and encourage diversity in the workplace, it is still unclear if these benefits are statistically significant. Despite the fact that both quantitative and qualitative data show increases in representation and fairness, overlapping confidence intervals and organizational variability imply that AI adoption could not be the only factor influencing objective hiring results. The intricacy of recruiting dynamics is shown by statistical tests that show no discernible variations in diversity measures between AI-driven and conventional approaches in every instance. The need for careful interpretation is highlighted by study limitations such as sample size restrictions, self-reporting biases, and the quick development of AI technology. Verifying AI's actual influence on fair hiring procedures will require further studies using bigger, more varied sample sizes and objective performance metrics

Table and Graph

Table:1 The choice between the two rows depends on whether the Levene's test (not shown) indicated equal variances. The independent samples t-test indicates a statistically significant difference between the two groups, as indicated by a p-value of.006 (equal variances assumed) or.002 (equal variances not assumed), suggesting the mean difference of.727 is unlikely to be the result of chance.

	Independent Samples Test	
	Equal variances assumed	Equal variances not assumed
Sig.	.004	

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t	2.842	3.189
Sig. (2-tailed)	.006	.002
Mean Difference	.727	.727
Std. Error Difference	.256	.228

Table: 2 The impact of "Age" on several groups is examined in the ANOVA table. With degrees of freedom 4 and 105, the F-statistic of 2.283 yields a p-value of.065, meaning that, at the traditional alpha level of 0.05, there is no statistically significant difference in age between the groups.

ANOVA					
Age					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.354	4	1.339	2.283	.065
Within Groups	61.564	105	.586		
Total	66.918	109			

Table: 3 Age and whether AI-driven hiring reduces time-to-fill and lowers operating expenses are weakly correlated (r = -.161), according to the table. We do not, however, have sufficient data to draw the conclusion that there is a trustworthy association between age and the perceived effects of AI-driven hiring on time-to-fill and operating costs in this sample of 105 people because this correlation is not statistically significant (p =.101).

ASET JOURNAL OF MANAGEMENT SCIENCE
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Correlations

		Age	Does AI-driven hiring decrease time-to-fill, leading to lower operational costs?
Age	Pearson Correlation	1	-.161
	Sig. (2-tailed)		.101
	N	105	105
Does AI-driven hiring decrease time-to-fill, leading to lower operational costs?	Pearson Correlation	-.161	1
	Sig. (2-tailed)	.101	
	N	105	105

Fig : 1 The mean age of respondents across various agreement levels about AI's capacity to deliver real-time application status updates is depicted in this bar chart. With the mean age rising as agreement levels rise, the data points to a pattern where individuals who "Strongly disagree" are younger.