Artificial Intelligence in Hiring and Recruitment: A Comprehensive Bibliometric Analysis of Trends and Innovations

Sneha Phogat
Research Scholar, Department of Commerce, Chaudhary Bansi Lal University, Bhiwani (Haryana), India E-mail: snehaphogat1904@gmail.com

Dr. Preeti Devi
Assistant Professor Department of Commerce, Chaudhary Bansi Lal University, Bhiwani (Haryana), India E-mail: preeti.commerce@cblu.ac.in

Abstract:
Purpose: This research aims to provide a structured understanding of the field by combining existing knowledge. The main goal is to study how AI has changed hiring, how it is currently used in recruitment, and what trends and challenges are shaping AI-driven hiring methods.
Methodology: A total of 168 papers from the Scopus database (2000–2024) were analyzed through a bibliometric study on AI in recruitment. The research utilized Biblioshiny, an online tool within the R-language Bibliometric package, to systematically identify influential journals, leading authors, key countries, prominent articles, and emerging themes. Additionally, social, intellectual, and conceptual network analyses were conducted. The study also incorporated quantitative metrics to evaluate published AI-related research in talent acquisition.
Findings: The study revealed that AI significantly enhances recruitment efficiency by streamlining key hiring processes such as candidate matching, resume screening, and interview scheduling. Additionally, AI reduces human bias, promoting diversity and inclusivity in hiring. This research provides valuable insights and highlights areas that require further exploration.
Practical Implications: The research shows that AI can make hiring more efficient by reducing administrative tasks, allowing HR professionals to focus on important decisions. It highlights key concerns in AI recruitment and suggests new research topics. By exploring the social and intellectual structure of the field, the study helps researchers understand challenges, real-world applications, and opportunities for teamwork.
Originality/Value: By conducting a thorough bibliometric review, this report explores the latest trends and developments in AI technologies for recruitment, providing valuable insights into their integration. While prior conceptual and empirical studies have examined AI across various domains, this research consolidates the fragmented literature, highlighting influential authors, key sources, and significant publications in AI-driven talent acquisition.

Keywords: Artificial Intelligence, Talent Acquisition, Recruitment, Hiring, Bibliometric Analysis, R-Studio

1. Introduction

Technology is evolving to transform industries and workflows so artificial intelligence (AI) has become an important trend in modern recruitment. Its ability to analyse data at incredible speed allows companies to streamline candidate identification, attraction, screening, evaluation, interviews, and management in an efficient manner (Rigotti *et al*., 2024). Artificial intelligence (AI) integration into talent acquisition has significantly improved recruitment efficiency and making hiring strategies much better as well as smarter (Paramita *et al*., 2024). These artificial intelligence (AI) tools make the hiring process smarter in terms of candidate

screening, streamline interviews, and provide advanced workforce planning insights using predictive analytics, natural language processing (NLP), and machine learning (ML) (Nechytailo *et al.*, 2023). Candidate sourcing stands out as one of the most significant AI applications in human resources (HR). AI strengthen recruiter hidden talent by identifying passive job seekers, expanding candidate options while streamlining the hiring process (Hunkenschroer *et al.*, 2023). Artificial intelligence has become integral part for screening technique, where NLP-powered systems analyse, filter, and rank applications according to predefined standards. (Edwin *et al.*, 2023) AI-driven screening enhances efficiency which minimizes biasness in hiring decisions. (Koivunen *et al.*,2024) emphasize that these systems significantly enhance the speed and precision of candidate selection by efficiently aligning applicants with job criteria.

Talent Acquisition
Talent acquisition (TA) refers to the strategic process of identifying, attracting, and securing qualified candidates for specific positions within an organization. It's a crucial part of HR that consider everything from searching for candidates and reviewing applications to interviewing and making job offers (Vedapradha *et al.*, 2024).

Artificial intelligence and human
Rapid advancements in computer engineering and the study of deep neural networks, natural language processing, and machine learning, a significant obstacle still remains: balancing human and artificial intelligence. To overcome this obstacle, compatibility and trust are essential (Roumbanis, 2025). AI and humans essentially function at different levels whereas humans make decisions through reflection, ethical reasoning, and counterfactual thinking and on other side AI is still limited to pure calculation highlighting a critical gap in their capabilities. The ability to judge has been considered a characteristic of human intelligence since Aristotle (350 BC/1955). Expert judgment, with its capacity for discernment, consider both knowledge and scientific investigation. However, cognitive psychology research later demonstrated that human judgment is often biased, particularly when based on intuition or gut feelings. Systematic bias has even been observed in professional evaluations, such as those of statisticians, academic evaluators, and court judges (Roumbanis, 2017). Sociological studies further reveal that hiring experts frequently allow emotions and biases to influence personnel selection (Pedulla, 2020; Rivera, 2015). Monitoring modern machine- learning systems are already a significant challenge, as their emergent properties arise from complex interactions not explicitly encoded in their design, complicating efforts toward trustworthy AI (Yampolskiy, 2024).

1.2 Background on increasing role of Artificial intelligence Online recruitment
Before digital hiring platforms emerged in the mid-to-late 1990s, job searching was a manual and time-consuming process (Black and van Esch, 2020). As job seekers was completely dependent on printed job advertisements in newspapers or physical job boards and once they identified an opportunity of suitable job they had to collect, complete and manually submit a paper application to the employer.E-recruitment which is an integral aspect of Human Resource Management (HRM) encompasses Internet-based hiring practices and web solutions aimed at achieving the same objectives as traditional recruitment (Ghazzawi and Accoumeh, 2014). (Dhamija, 2012) defines e-recruitment as the strategic use of online technologies especially websites for candidate assessment, interviewing, and hiring. This method offers several advantages which includes a broader talent pool and greater efficiency in the

recruitment process (Chapman and Gödöllei, 2017). Traditionally recruitment and selection process has proven to be labour-intensive and susceptible to both conscious and unconscious biases from HR professionals. This can lead to hiring decisions influenced by personal characteristics such as gender and age, resulting in potential discrimination (Rigotti *et al*., 2024). Artificial intelligence (AI), defined as the transformation of human intelligence by machines, which enhance efficiency across various domains (Siau and Yang, 2017). There are some of platforms that basically interact with applicant through chat systems, LinkedIn, Glassdoor, Indeed and Monster and continuously evaluate and optimize the selection process to identify high-potential candidates (Horodyski, 2023). An effective hiring process creates a balanced workforce with the ideal combination of knowledge, skills, abilities, and attributes necessary for maintaining a competitive advantage. (Rigotti *et al*.,2024).

Ethical Considerations Surrounding AI in Recruitment
Despite the numerous advantages of incorporating AI into the employment process, there are moral dilemmas that cannot be disregarded (Bankins *et al*., 2023). Questions of impartiality, privacy, transparency, and prejudice are fundamental to these issues. One of the primary ethical quandaries is the data that AI systems depend on (Zafar *et al*., 2024). The biases that are systematic or historical in these datasets have the potential to be reproduced or even exacerbated by AI models (Kassir *et al*., 2023). For instance, the AI may inadvertently perpetuate prejudice based on age, gender, ethnicity, or other characteristics if previous hiring data disproportionately favors specific demographics. Transparency is an additional ethical concern. Many of the artificial intelligence (AI) tools employed in the employment process are "black boxes," which means that the decision-making process is concealed from both candidates and recruiters (Tusquellas et,al, 2024). This lack of transparency can be problematic, as candidates may not be cognizant of the standards that determine their acceptance or rejection (Hunkenschroer *et al*., 2022). Furthermore, organizations may encounter difficulties in guaranteeing that AI systems are operating in accordance with legal and ethical standards due to the fact that AI algorithms are not always readily comprehensible to non-technical personnel (Powell *et al*., 2024). Privacy is an additional critical ethical consideration in the context of AI-driven recruitment (Hunkenschroer *et al*., 2023). In the event that this data is inadequately safeguarded, it may violate individuals' privacy rights, thereby posing inquiries about consent and data security (Hoxhaj *et al*., 2023). In light of these ethical dilemmas, organizations must exercise caution in attempts to ensure that their AI driven hiring procedures are consistent with the principles of accountability, transparency, justice, and privacy (Vishwanath *et al*., 2023). Ethical AI in hiring (EAIH) necessitates that businesses prioritize the welfare of candidates and preserve the integrity of the recruitment process, in addition to adhering to legal mandates (Boelens *et al*., 2024).

2. Research objectives
The following research objectives are the main focus of this bibliometric study:

1. To investigate the publication scenario and framework for incorporating artificial intelligence in recruitment.
2. To investigate how the concept of AI evolved and used in recruitment.
3. To Identify current trends and difficulties in AI recruitment procedures.

The research objectives were achieved through the use of network and descriptive analysis. The study is divided into sections which cover different aspects of the investigation. The first

section covers research methods, then data analysis. The following section provides a full description of the findings, while the final portion covers research directions and conclusions.

3. Methodology

This study used the bibliometrics analytic method (Cobo et al., 2011). According to (Donthu et al.,2021; Ellegaard, 2018), Bibliometric analysis is a quantitative method for analysing scholarly literature that uses bibliographies to display, measure, and record published research. Each bibliometric approach is relevant to certain research obstacles, and bibliometric analysis may manage the scientific mapping of the most prevalent research challenges (Aria and Cuccurullo, 2017). A bibliometric literature review is a systematic and objective collection of key research findings for specific the work. Bibliometric analysis, unlike traditional systematic reviews, use statistical tools to identify differences in topic exploration (Bhandal et al., 2022; Mishra et al., 2016). The approach allows for the collection of new data from literature reviews, which is able to go into the ongoing study (Donthu et al., 2021). First, in this study we used the Scopus bibliographic resource search engine to generate a list of bibliographic references that needed to be reviewed using the PRISMA methodology (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which is commonly used in this type of work. Second, the knowledge structures were examined using several bibliometric methods. Furthermore, conceptual frameworks emphasised important subjects and patterns, whilst social structures highlighted collaboration among authors and nations. (Solanki et al., 2024). The bibliometric analysis was performed using R Studio. The study included Bibliometric, a R statistical library (Aria & Cuccurullo, 2017; Team, 2013). The bibliometric R-Tool allows for more comprehensive bibliometric analysis by utilising particular methodologies for both bibliometric and scientific metric quantitative research (Aria and Cuccurullo, 2017). R software is a comprehensive set of tools for data processing, computing, and graphical display. (Dervis, 2020; Solanki et al., 2024). The approaches developed by Houghton et al. served as the foundation for the framework and organization of this study (Houghton et al., 2007; Zakaria et al. 2021).

Bibliometric analysis was carried out using Biblioshiny 4.1, an open-source bibliometric program from RStudio. Biblioshiny is superior to other bibliometric tools because it offers a comprehensive set of statistical methods and visualizations that facilitate performance analysis and conceptual mapping of the topic of study. (Gutiérrez- Salcedo,2017; Veloutsou et al., 2023). The R package Biblioshiny is made available to everyone.

This study was conducted in two stages: first, the Scopus database search contributions were identified, secondly, the R Studio bibliometrics package was used to conduct a bibliometric analysis of that contribution.

Table I. Research framework.

Step 1. Investigation scope
A bibliometric analysis of A.I on Talant Acquisition research from 2000 to 2024

Step 2. Selecting a Database
SCOPUS DATABASE

Step 3. Selection of Documents 1ˢᵗ selection criteria
TITLE-ABSTRACT-KEYWORD PLUS
Your Query: ((TITLE-ABS-KEY (("artificial intelligence" AND "Talent acquisition") OR ("artificial intelligence" AND "Recruitment") OR ("artificial intelligence" AND "Hiring")) OR TITLE-ABS-KEY (("AI" AND "Talent acquisition") OR ("AI" AND "Recruitment") OR (" AI" AND "Hiring")))

(Result-2024 documents) 2nd selection criteria
TIME INTERVAL **2000–2024**
(Result-1952 documents) 3rd selection criteria SUBJECT AREA
Business, Management & Accounting, Arts & Humanities
(Result-388 documents) 4ᵗʰ selection criteria DOCUMENTS TYPE
Research Article
(Result-195 documents)

5th selection criteria
PUBLICATION STAGE
Final
(Result-182 documents) 6th selection criteria
SOURCE TYPE
Journal
(Result-180 documents) 7ᵗʰ selection criteria LANGUAGE
English
(Result-168 documents)

Phase I-Selection Of Documents

Final Dataset – 168 documents exported as CSV file

Step 4. Processing of Selected Documents
RSTUDIO'S BIBLIOSHINY SOFTWARE

Phase II-Bibliometric

Step 5. Analysis and Inference of Results

Source: Author Compilation

3.1 Phase 1- Selection of Documents

In the above **Table I** we discussed few steps of research framework. First, we have explained the scope of the research area: A.I on Talant Acquisition research in the time period 2000-2024. Secondly, the SCOPUS Database was chosen as a research platform for mine articles or documents published in the defined area of research. SCOPUS was chosen because it can be considered as a comprehensive source and one of the primary bibliographic databases. (Zhu *et al*., 2020).

In phase I the search for the selection of documents were performed by keeping in the following keywords in Your query: ((TITLE-ABS-KEY (("artificial intelligence" AND "Talent acquisition") OR ("artificial intelligence" AND "Recruitment") OR ("artificial intelligence" AND "Hiring")) designating them as first line of the search box. Moreover, these keywords have been associated with some of the additional keywords: OR (TITLE-ABS-KEY (("AI" AND "Talent acquisition") OR ("AI" AND "Recruitment") OR (" AI" AND "Hiring"))) in the second line search. These additional keywords were used to show their characteristic features of Artificial Intelligence research from Talent acquisition with respective perspectives. Terms "Recruitment" "Talent Acquisition" "AI" "Hiring" combining these main and additional keywords, the boolen scholarly publications which cover a wide range of subjects linked to Artificial intelligence with recruitment from Scopus database. Hiring time can be cut by up to 50% using AI-powered solutions that automate processes like candidate matching, resume screening, and interview scheduling (Raji *et al*., 2024).

There were 2024 documents found in the first search without any filtering. The number of papers was reduced to 1952 by using the filtering option "years of publication" (2000–2024) to refine the results. As we all know that the AI is using most in Business, Management area. So, after using next filter of subject area- "Business, Management & Accounting, Arts & Humanities" the remaining number of articles is 388 articles.

Proceeding with the criteria for inclusion and exclusion, using the filter Document type, we chose only research articles, which reduced the number of articles to 195.
Further, we restricted our search results by choosing the publication stage filter as only Final. After this filter the number of remaining articles was 182. The next search filter is source type in which we choose only Journal articles for our analysis. This further brought down the number of documents to 180. The inclusion and exclusion criteria used for filtering the articles are presented in **Table I**, above. The last step is to choose language English. This step helps researchers narrow down the initial pool of articles and select those that aligns with the research objectives. After examining these steps resulted in the 168 most relevant articles, which were exported as CSV file format for further analysis.

3.2 Phase-II Bibliometric analysis

As previously said, performance analysis and scientific mapping analysis are the two main subfields of bibliometric analysis. The method is more effective since it combines mathematics and statistical analysis. The literature can help identify accurate and precise patterns. (Roblek *et al*., 2022) According to the study, qualitative methods such as observation and interviews can also be employed for data analysis. However, bibliometric analysis is based on the scientific mapping method. The tool uses a general representation and domain analysis process to analyses scientific groups and research areas as networks. (Bragge *et al*., 2019) analyzed three decades of management research publications to identify research

clusters and intellectual structures (Cortés-Sanchez, 2020). The study highlights the significant advances in business, management, and accounting studies during the past century. The features of the contributions are examined in the performance analysis. "The annual number of publications," the most cited articles, the most cited journals and authors, collaboration trends, high-performing institutions, and nations are a few performance analysis metrics (Donthu *et al*., 2021). This analysis was conducted in R studio's bibloshinny software for analyzing and inferences of results. The result of the above data analysis is to be presented below in the results section.

4. Data Analysis:
Bibliometric Analysis
There were two main approaches used in the data analysis.
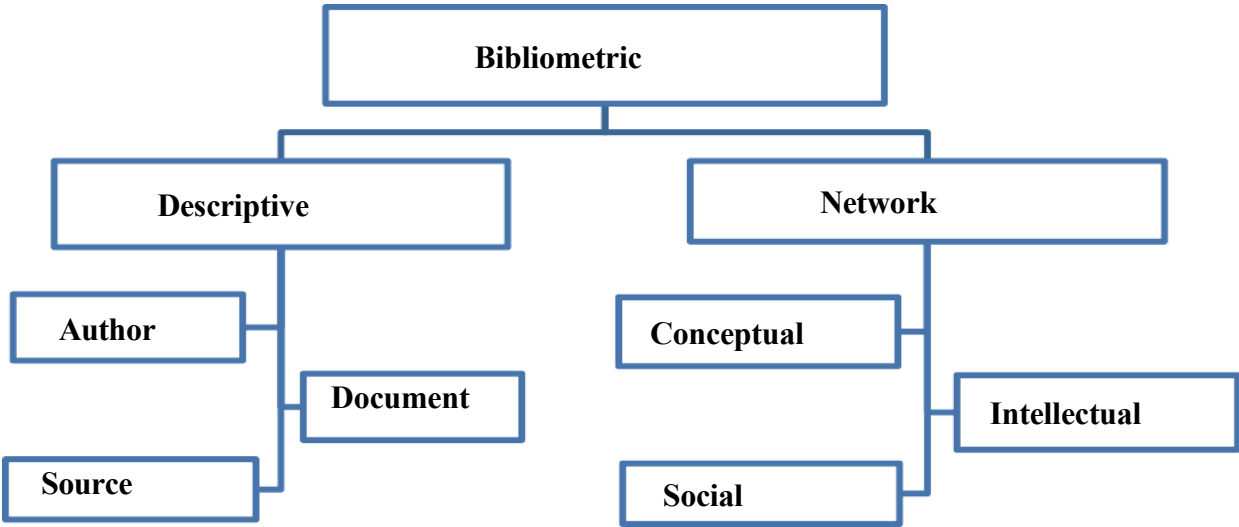1. Descriptive Analysis
2. Network Analysis

Figure 1: Bibliometric Analysis – Hierarchy

4.1 Descriptive Analysis: Exploring the bibliometric data in terms of the three components-the sources, the authors, and the documents-was the main goal of the descriptive analysis. This section of the paper is mostly concerned with descriptive analysis. The broad analysis encompassed numerous dimensions. It assisted the researcher in determining the knowledge structures that would enable additional analysis (Nusair *et al*., 2019).

4.1.1 Dataset. A brief summary of the data is taken in **Table II**. The analysis provides an overview of the dimensions examined. This report summarises key criteria from 129 sources between 2000 and 2024. The bibliometric data set included 168 documents founded by a stepwise search query on the Scopus database. The data set's annual growth rate of 19.07% reflects the research field's development all over time. The average age of the documents is 2.9 years, indicating a recent focus on the data set. The average of 28.55 citations per document highlights the intellectual impact of the collected works. The data set has 469 authors, including 34 who contributed to single-authored publications. Each document has an average of 2.89 co-authors, and 23.21% of collaborations are international, highlighting the research network's global scope. This was a positive sign that researchers were working

together effectively.

| Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2000:2024
Sources (Journals, Books, etc)	129
Documents	168
Annual Growth Rate %	19.07
Document Average Age	2.9
Average citations per doc	28.55
References	10787
DOCUMENT CONTENTS	
Keywords Plus (ID)	504
Author's Keywords (DE)	609
AUTHORS	
Authors	469
Authors of single-authored docs	34
AUTHORS COLLABORATION	
Single-authored docs	35
Co-Authors per Doc	2.89
International co-authorships %	23.21
DOCUMENT TYPES	
article	168

Table II: Brief summary of dataset Source: Author's Compilation

4.1.2   Three-field plots. Figure 2 shows the three-field plots used to clarify the relationship between three pieces of information. During the study, three-field plots were used to determine the percentage of selected items. The figure displays items next to rectangles, with rectangle height increasing with the strength of relationships among components in each row (Phoong *et al*., 2022). It shows the connection between authors, countries, and keywords. To examine the Artificial intelligence research hotspots, the top 10 most popular keywords are shown across the plot's right side. The most productive country with the greatest published artificial intelligence papers is signified on the left side of the plot, whereas the top 10 most productive authors using these keywords are depicted in the middle of the plot**.** The outcome of the analysis designates that the keywords "artificial intelligence". "recruitment", human resource management "are linked with authors and top most countries.
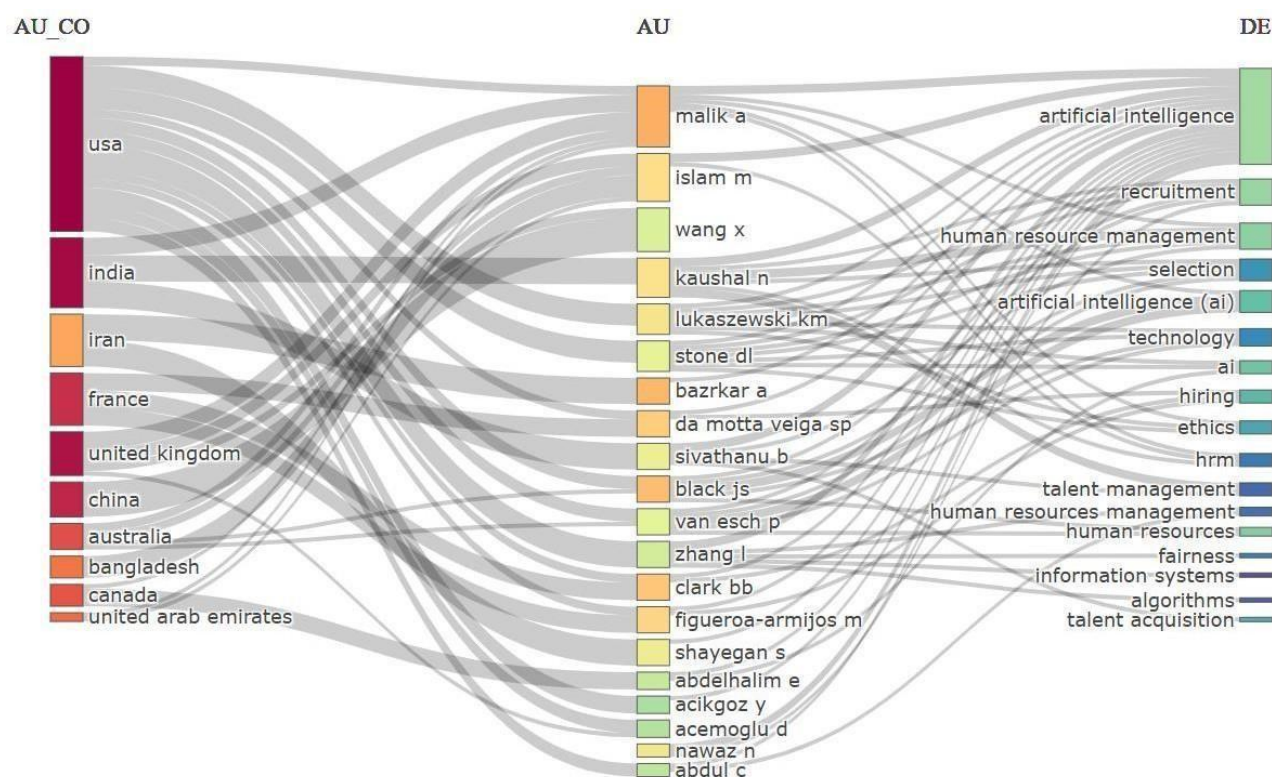
Figure 2 Three-field plot
Source: Author's Compilation

4.1.3   Sources. **Figure 3** Illustrates an increase in annual scientific production in the fields of artificial intelligence and recruitment. The author's research of AI and recruitment trends from 2000-2024 provides a good overview. The graph shows a partial plateau between 2000 and 2024. Since 2018, there has been a significant increase in interest in AI and recruitment. Post 2018, there has been an immense rise in publications in this field of study. The spike during the year(s) 2018 and 2024 could be related to the beginning of a global epidemic. Organizations started using effective Human Resource (HR) practices (Saxena *et al.*, 2021). The study highlighted the hurdles in implementing and accepting HR Analytics in organizations. According to a study by (Vitak and Zimmer, 2023), the future of work involves utilising technology to support work-from-home practices.
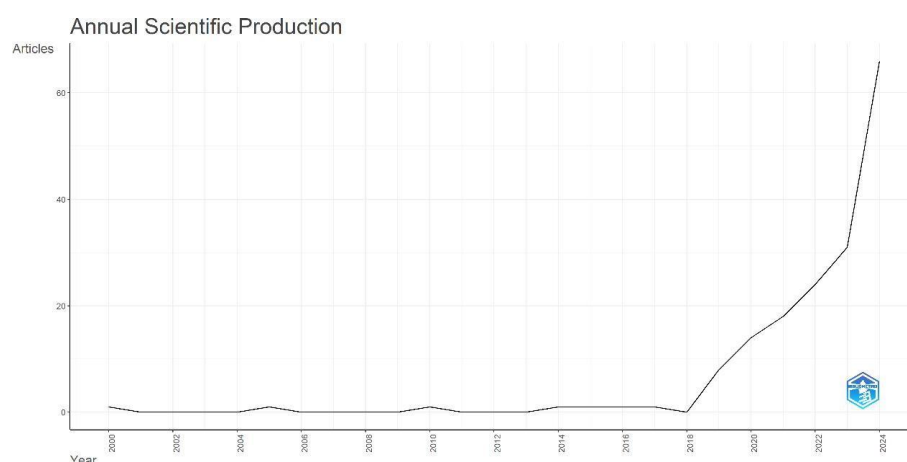
Figure 3: Annual Scientific production
Source: Authors Compilation

Figure 4: shows a changing trend in terms of the concept. This graph indicates the average number of times a research paper gets cited each year. The time period taken by us is between 2000 to 2024. For the first decade, citations were low and stable. The field seems to be extremely grounded and changing. Citations started increasing in about 2015, indicating that the research was becoming more popular. A huge spike happened about 2020, most likely as a result of a significant publication or event. However, citations fell, probably because newer research appeared or the topic's attractiveness declined. The context and aspects shaping research's impact and relevance might change throughout time.
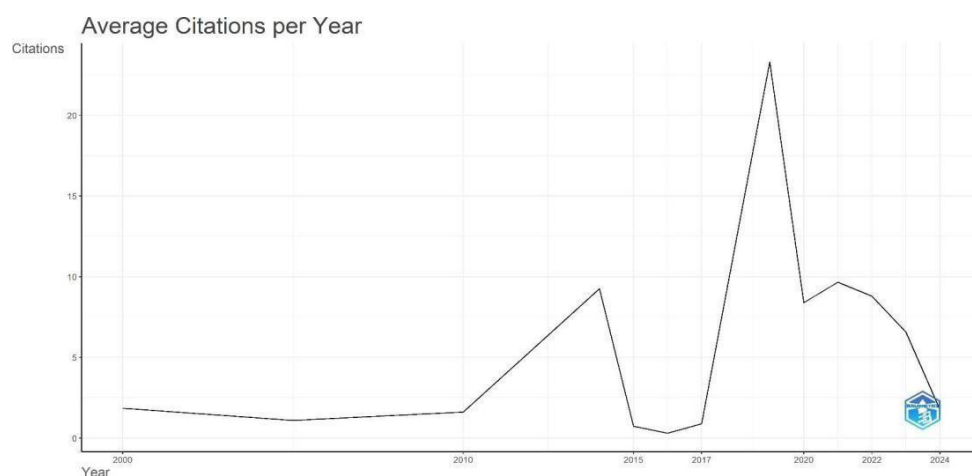

Figure 4: Annual Coverage of article citations
Source: Authors Compilation

Figure 5 shows the most relevant sources. This chart ranks the most relevant sources based on their document contribution. "AI and Society" leads with 6 documents, more than any other source, indicating a considerable focus on the subject. "*Computers in Human Behaviour*" ranks Second, with 5 documents. Several sources, including "*International Journal of Selection and Assessment*" and "*Technological Forecasting and Social Change*," provided 4 documents a piece. A broader group, which included "*Administrative Sciences*" and "*Philosophy and Technology*," each submitted 3 documents. The different circle sizes visually depict the number of documents, emphasizing "AI and Society's" importance. This visualisation makes it easier to discover key sources for additional investigation.

 Figure 6 H-index is an index that aims to measure the accuracy and impact of published work by researchers (Mester *et al*., 2015). (Bordon's 2007; Hirsch 2005) developed the h-index statistic to assess academic accomplishment based on a single value derived from the number of publications and citations Below graph shows the effect of various factors using a metric known as the "H index." In the field of artificial intelligence and talent acquisition as determined by H- index. The greater the number, the more trustworthy the source. "*AI and Society*" and "*Computers in Human Behaviour*" and "*technological forecasting and social*

change" have the highest influence, having a score of four. "*Journal of Business Ethics*" and "*Philosophy and Technology*" come next, both with a score of 3. The remaining sources like business horizons, California management review etc get a score of two, indicating moderate influence. Basically, this chart shows you which sources are regarded as the most relevant and influential in this field of study.

Figure 7 Provides a timeline of research output for significant sources on Artificial intelligence and recruitment and hiring domains. Noteworthy sources include "*Administrative sciences*" and "*Computers in human behaviour*" constantly contributing to the literature with an increasing trend from 2000 to 2024 both stands out with h- index 6&5 respectively. "*Philosophy and Technology*" and "International Journal of Selection and Management" each also exhibit steady growth, reaching an h-index of 4. And remaining journals reaching h-index of 3. This summary focusses on significant individuals influencing discusses regarding artificial intelligence and talent acquisition, providing insight into the impact of local authors.
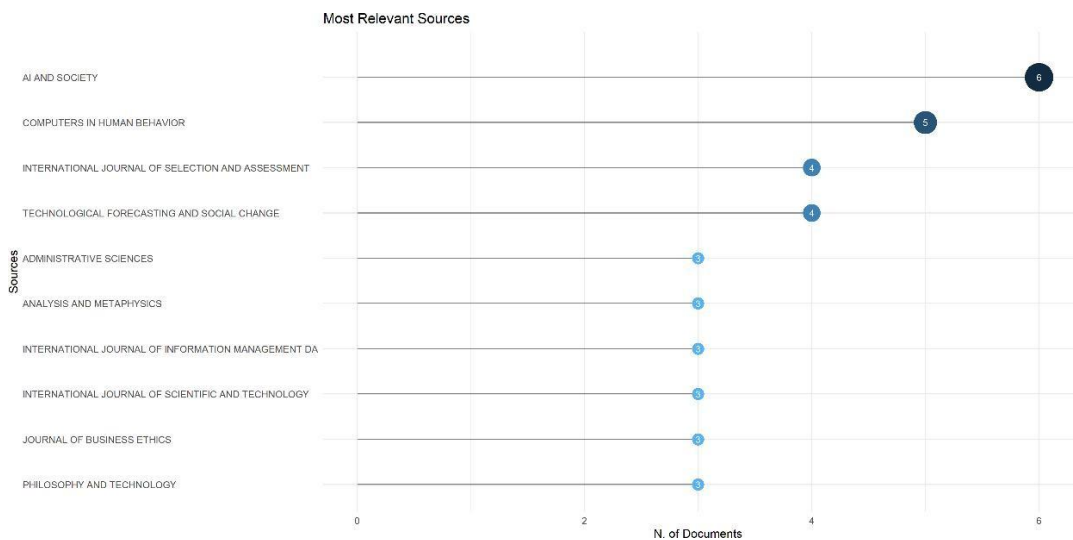
Figure 5: top 10 cited sources
Source: Authors Compilation
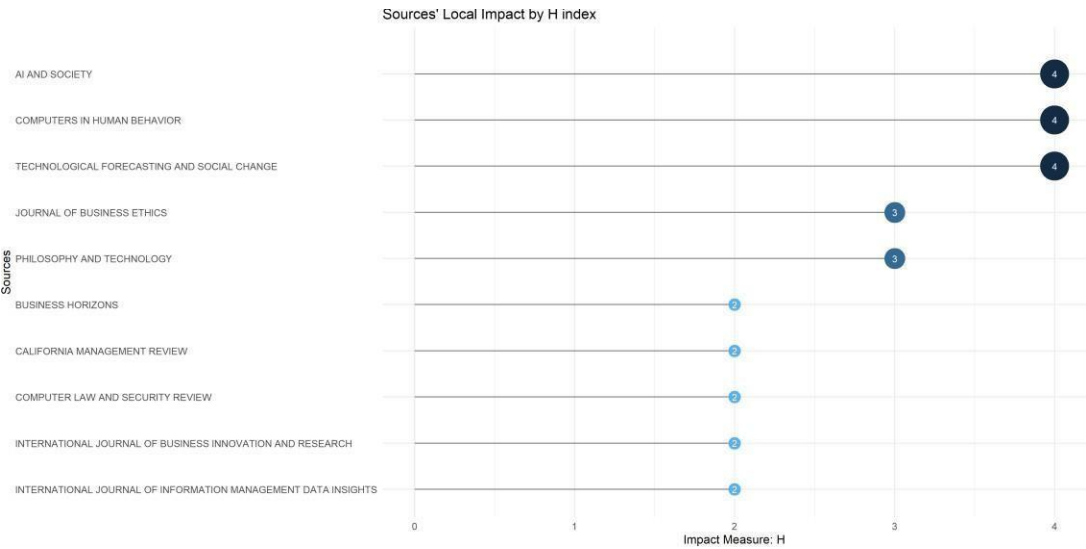
Figure 6: Source local impact by H-index
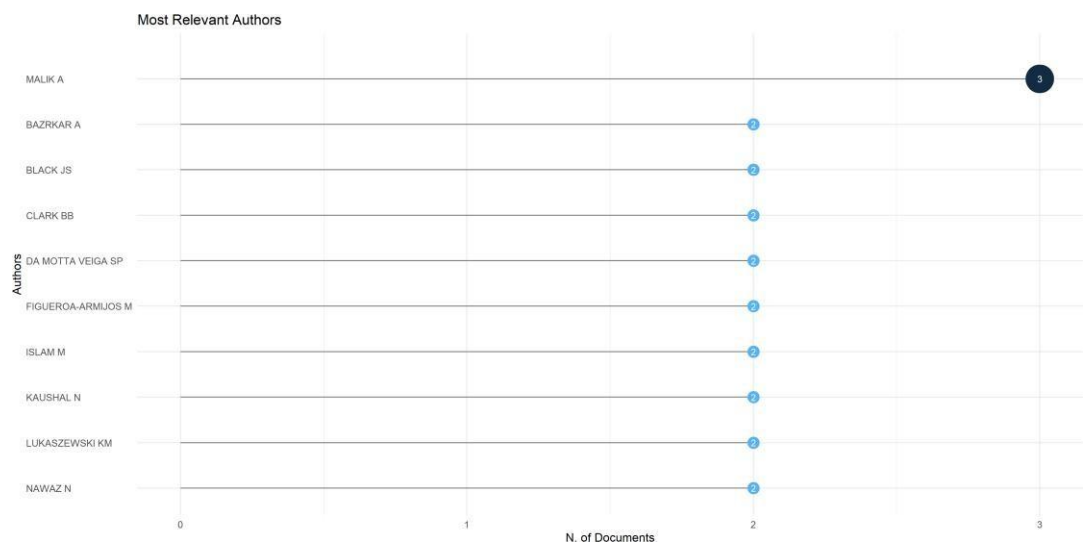**Source: Authors Compilation**
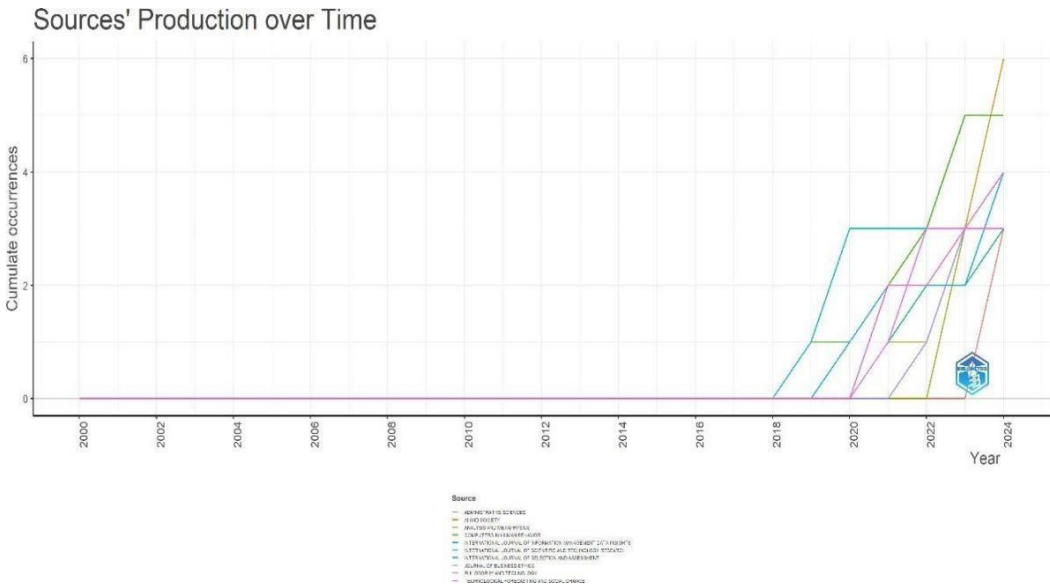
Figure 7: Sources' production over time
Source: Authors Compilation

4.1.4   Authors. Over the years, the scholarly contributions of *AI and Society* and *Computers in Human Behaviour* and *technological forecasting and social change* been notable, whereas other sources such as *Journal of Business Ethics* and *Philosophy and Technology* demonstrate varying level of impact.

Figure 8 represents the top 10 most relevant authors. In terms of the number of total publications, MALIK A is the most productive author having 3 documents, followed by

BAZRKAR A, BLACK JS, CLARK BB, DA MOTTA VEIGS SP, FIGUEROA-ARMIJOS M etc having the number of 2 documents each. The authors' and their contributions to the progress of knowledge in this field are appreciated.

Figure 9 In this figure H index is represented, this graphic ranks authors in order of their local impact. MALIK A leads with a H index of 3, reflecting the highest level of impact among the listed authors. Followed by MALIK A are numerous authors—BLACK IS, CLARK AR, DA MOTTA VEIGA SP, FIGUEROA ARMIJOS M, ISLAM M,

KAUSHAL N, LUKASZEWSKI KM, NAWAZ N, and SIVATHANUB they all are having H index of 2. This suggests that, while they have had an impact in their field, it is smaller than that of MALIK A. The graphic representation clearly shows the difference in impact between MALIK A and the other authors, allowing for a quick assessment of relative influence among them. The H index, as applied here, assesses both the number of publications and the number of citations they have received.


Figure 8: Most Relevant Author
Source: Authors Compilation
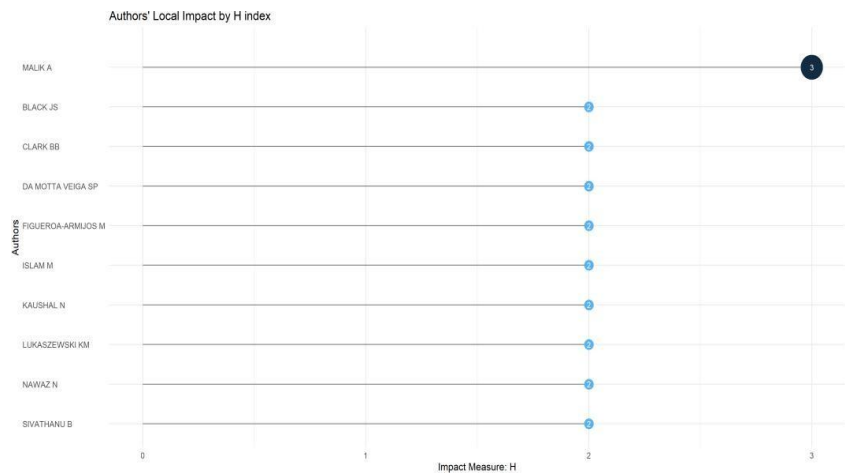
Figure 9: authors local impact by H index

Source: Authors Compilation

4.1.5 Countries Wise contribution

Figure 10 shows the corresponding Author's countries. These horizontal bars show the number of publications on a topic, likely related to Artificial intelligence in talent acquisition and hiring originating from the different countries. The bar length represents the number of documents, with the scale at the bottom indicating the range of top 10 countries. Each bar is separated into two colours: green (SCP) and pink (MCP). In this graph, the USA has the most publications, followed by India and the United Kingdom. Several countries, like Germany, Australia, China, and others, have a small but significant number of publications. The colour split indicates the proportion of single and multi-country cooperation in each country's output.
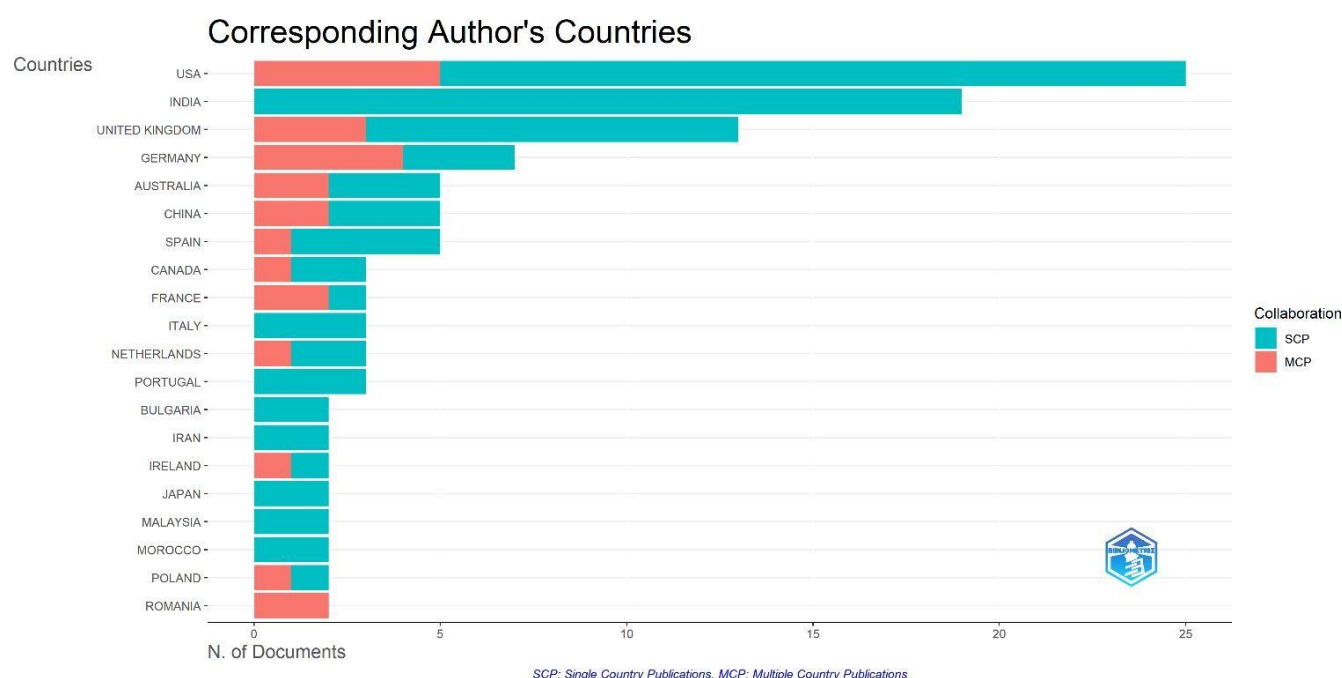
Figure 10: corresponding author's countries
Source: Authors Compilation

Table III shows the frequency or count of a specific measure across multiple countries. The United States leads with the greatest frequency of 89, indicating the largest count in this category. India follows with 61, while the United Kingdom has 37. Germany and China have counts of 25 and 23, respectively. France and Italy share a total of 16. Spain has 13, Portugal has 12, while Australia has the lowest total of 11. This data clearly depicts the distribution of the measured metric among these countries, highlighting the USA's great dominance and the very minor contributions of the other listed countries.

Country	Frequency
USA	89
INDIA	61
UK	37
GERMANY	25
CHINA	23
FRANCE	16
ITALY	16
SPAIN	13
PORTUGAL	12
AUSTRALIA	11

Table III: Countries scientific production
Source: Authors Compilation

Figure 11 shows the "Most Cited Countries" and the number of citations their work has achieved. The countries are displayed vertically, while the horizontal axis shows the number of citations, which ranges from 0 to 800. Each country's citation count is shown by a blue circle on the horizontal axis, with the precise number printed inside. The United States leads by a large margin, with 797 citations, greatly exceeding the citation counts of all other countries included India ranks second with 372 citations, followed by Australia with 289. The United Kingdom has 279 citations, and the Netherlands has 232. Germany follows with 231 citations. France and Israel have 156 and 152 citations, respectively.

Canada has 108 citations, whereas New Zealand has the fewest citations of the countries listed 91. The chart clearly shows the significant gap in citation counts between the United States and the rest of the world, emphasizing its dominance in terms of research effect. The graphic depiction allows for quick and easy comparisons of citation influence across nations. Additionally, it can help identify influential persons in the domain's conversation and knowledge base.
Analyzing contributions from different countries can provide insights into cultural, political, and economic factors that contributed to the field's development and current status.
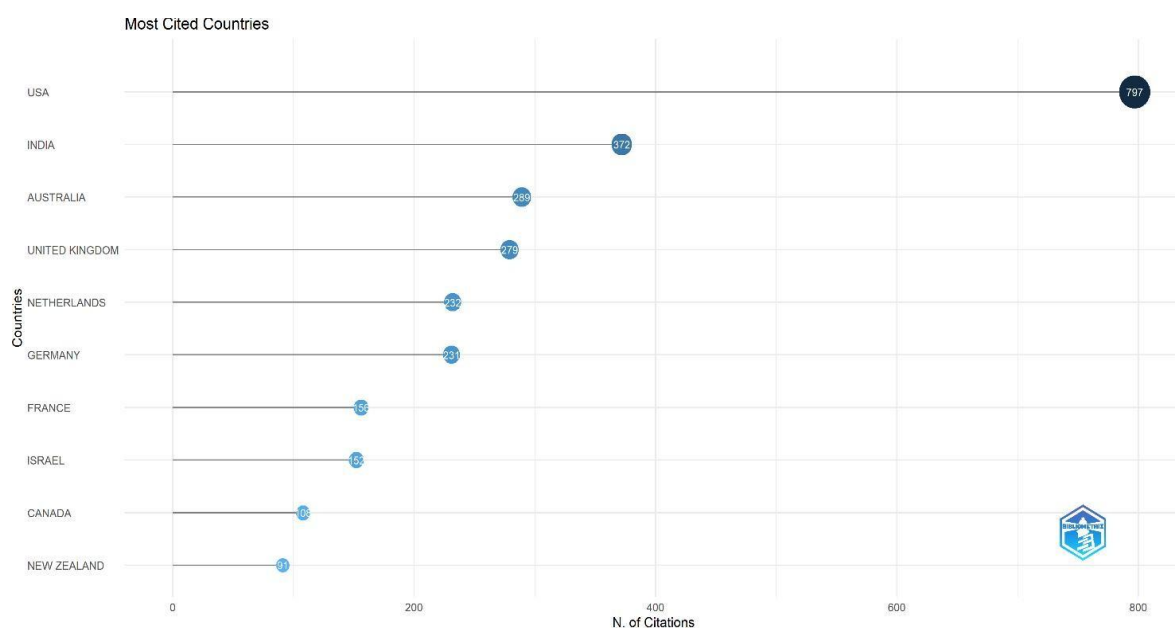
Figure 11: Most cited countries
Source: Authors Compilation

4.1.6   Documents

Most Cited documents **Figure 12** displays the Most Global Cited Documents, ranked by the number of citations they've received. In this figure two documents stand out. The first paper by TAMBE P (2019) in the *California management review* leads with impressive 575 citations, which indicates everlasting impact. Second significant works done by HUANG M-H (2019) paper in the *California management review* also done their work efficiently and leads with 305 citations. Following these two highly cited documents, there's a substantial drop in citation count. "VAN ESCH P. (2019), *Computer in Human Behavior*" and "BUSUIOC M (2021), *Public Administrative Review*" have 214 and 197 citations respectively. The remaining documents, including "VAN DEN BROEK E. (2021), *Management Information System*" with 197 and others, have citation counts clustered below 200. The s*et al*lows researchers to identify important contributions that affect the subject at hand, as well as provide insight into its historical significance and continuing relevance in the field.
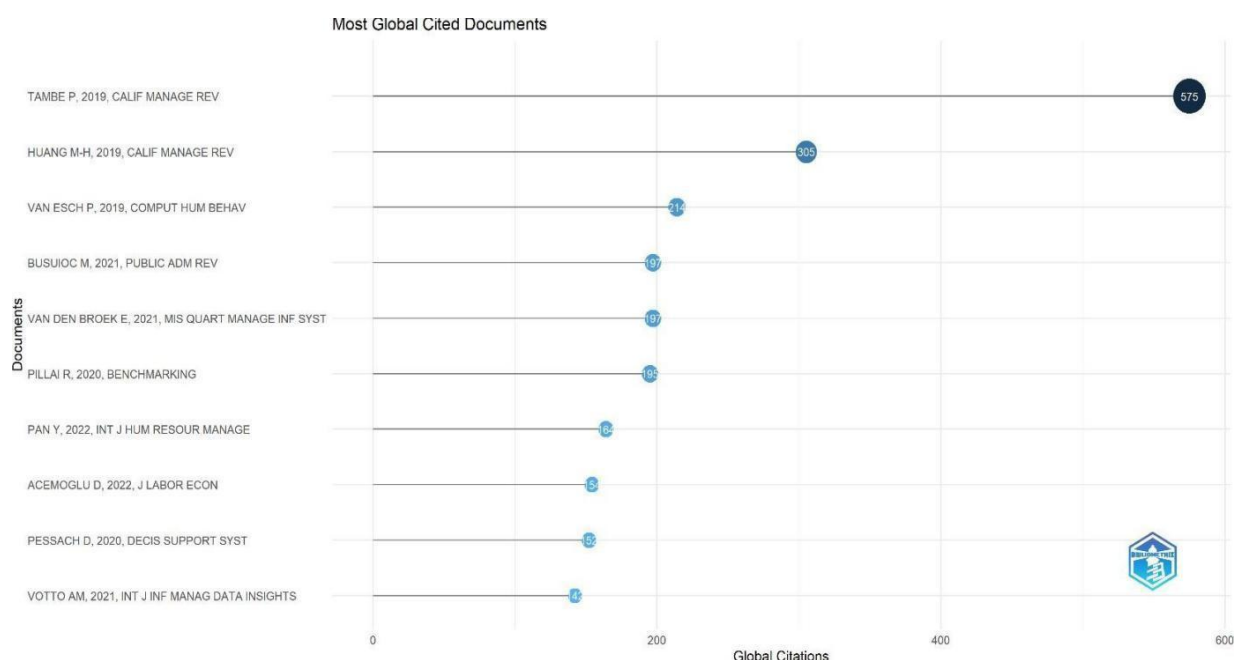
Figure 12: most cited documents
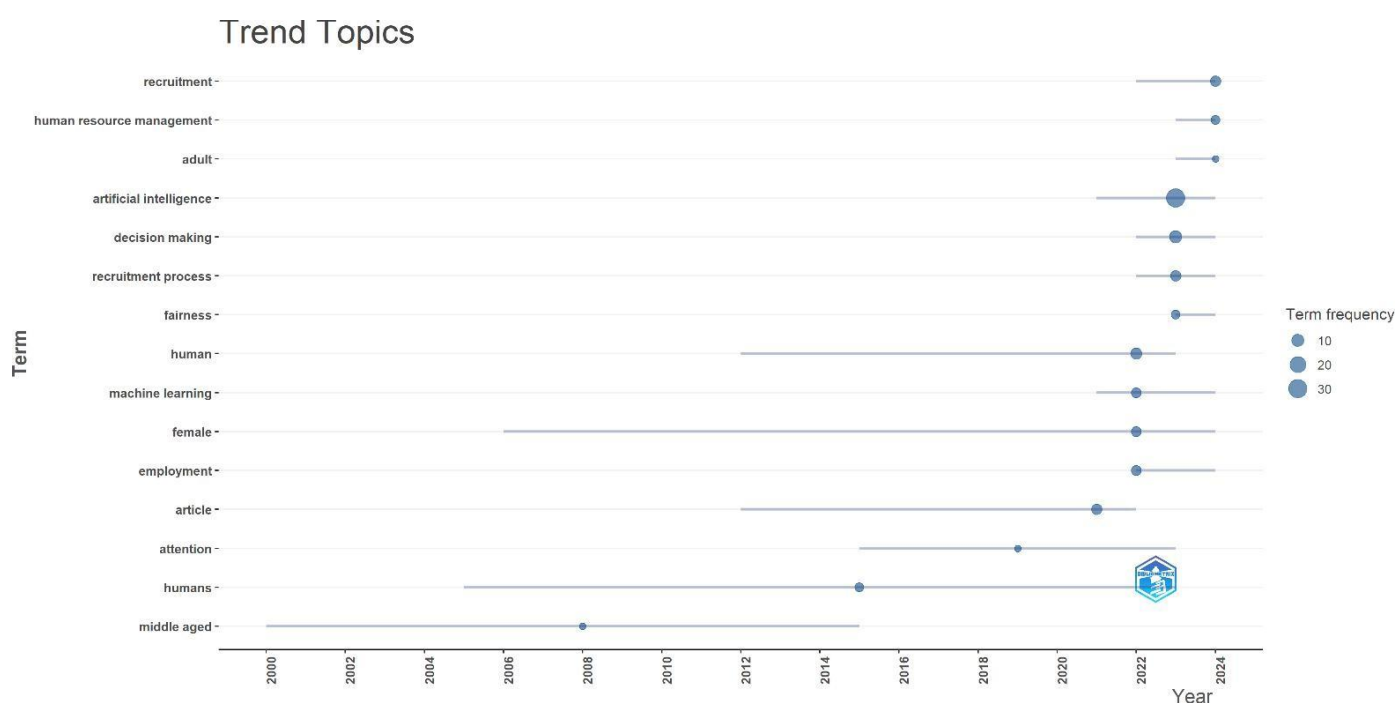**Source: Authors Compilation**

4.1.7 Keywords

Figure 13: shows word cloud by highlighting the most commonly recurring terms. The Word Cloud displays and represents the frequency of keywords. The terms stand out on the word cloud. The value of a word indicates it's significance. In this, "artificial intelligence" is the leading topic, appearing 30 times occurrences in the word cloud underscoring in central role in research discussions. Artificial intelligence can help improve recruitment and HR practices. Likewise, "decision making" follows closely with 10 times occurrences, "human" with 8 times, and "recruitment process" with 7 times are commonly used in both, underlining AI's role in hiring and decision-making. The word cloud also emphasises "machine learning," "employment," and "fairness," which are indirectly reflected in the chart, highlighting worries about AI's impact on hiring. The combination of "male" and "female" indicates gender-related issues in recruitment. Overall, this word cloud highlights AI's impact on hiring, mainly decision-making, fairness, and automation in human resource management. Experts are getting more interested in machine learning and recruitment, adopting AI. E- recruitment is among the top ten most relevant words (Aydın and Turan, 2023; Pandey *et al*., 2020; Wang *et al*., 2021).

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Figure 13: Word Dynamics.
Source: Authors Compilation

4.1.8   Trend Topics. Figure 14 shows the most trend topics related to artificial intelligence (AI) domain over time, with a focus on recruitment and talent acquisition. The most popular topics include "artificial intelligence," "decision making," and "recruitment." Studies by Aydın and Turan (2023) and Tian *et al*. (2023) supports the link between AI and recruiting trends. Recent studies by Kaushal *et al*. (2023) and Kaushal & Ghalawat (2023) have established the study focus for AI's function in HR. Notably "Artificial intelligence" is the most common, appearing 30 times and maintaining consistent attention from 2021 to 2023. The keyword "decision making" is also remarkable with 10 occurrences expanding from 2022 to 2023. There was a significant increase in research focused on the "recruitment process" in the year 2022 and 2023. Keywords like "human resource management," "machine learning," and "hiring" remain relevant throughout many timeframes. Overall, the graph highlights the evolving landscape of AI research and its increasing formation into human resource practices.

Figure 14: Trend Topics
Source: Authors Compilation

5   Data visualization

There has been rising demand for artificial intelligence and recruitment. The current section of the study explores the evolution of the domain's topics. Data visualisation is a quantitative tool for identifying clusters, occurrences, and relationships among different domains of study. The technique analyses texts, authors, and keywords to identify network links. The statistical analysis generated a map that indicated network connections. As represented in **Figure 1,** this network analysis results in three types of knowledge frameworks. The three types of structures are social structure, conceptual structure, and intellectual structure. below section shows the field's thematic progression. Data visualization uses network analysis to statistically examine clusters, occurrences, relationships, and citations. Network analysis provides quantitative assessments of cluster formation, instances, connections, link strength, and citations (Low and Siegel, 2019). Networks are made up of nodes connected to each other. Statistical study of generated maps shows several network metrics (Aria and Cuccurullo, 2017). Network analysis is used in scientific mapping to generate conceptual and social knowledge models. (**Figure 1**).

5.1   Conceptual Analysis*:* The 'conceptual framework' displays the association of the three T's (topics, themes, and trends). **Figure 15** shows a co-occurrence network diagram. It is also called co-word analysis. The Co-occurrence network is shown by four separate-coloured nodes. Artificial intelligence in red colour; human resource in green colour; artificial intelligence system in blue colour and human resource management in purple colour. The contents of the articles are extracted and analyzed. Topics like AI, technology, blockchain, and algorithms appear to be related. The red nodes represent artificial intelligence. Human resources are a close cousin to artificial intelligence. They are deeply connected to artificial intelligence. The study focusses on a frequently used notion, phrase, or topic in the network (Li *et al*., 2018).
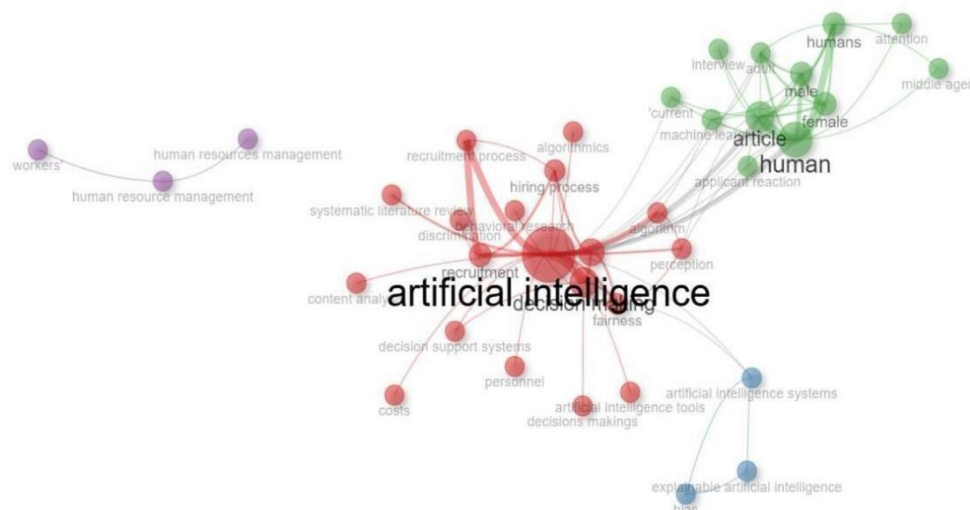
Figure 15: Co-occurrence Network
Source: Authors Compilation

5.1.1 Thematic Map: A thematic map generates a two-dimensional visual representation of typological themes (Cobo *et al*., 2011). Co-word analysis identifies authors' keyword clusters and creates themes within the explored subject. On a two-dimensional graph, topics can be classified into four quadrants based on their density and centrality. Each subject is represented by its own bubble on the map. **Figure 16** shows that the map is based on two axes, with themes' centrality and density determining their location on the two-dimensional network. A 'Thematic Map' is drawn on two dimensions with typological themes. Keyword clusters are found with references taken from the co-occurrence and co-word analysis. This helps in the next step of producing themes in the study domain. As seen in Figure 16, the mapping is built on two axes. The centrality and density of the themes determine its place on the two-dimensional graph. A bubble on the thematic map denotes the theme. According to (Viedma-Del-Jesus *et al*., 2011) the Thematic map is divided into four quadrants: upper right quadrant for motor themes, lower right quadrant for basic themes, lower left quadrant for emerging or declining themes, and upper right quadrant for speciality themes. The figure shows a strong correlation between AI and recruitment.
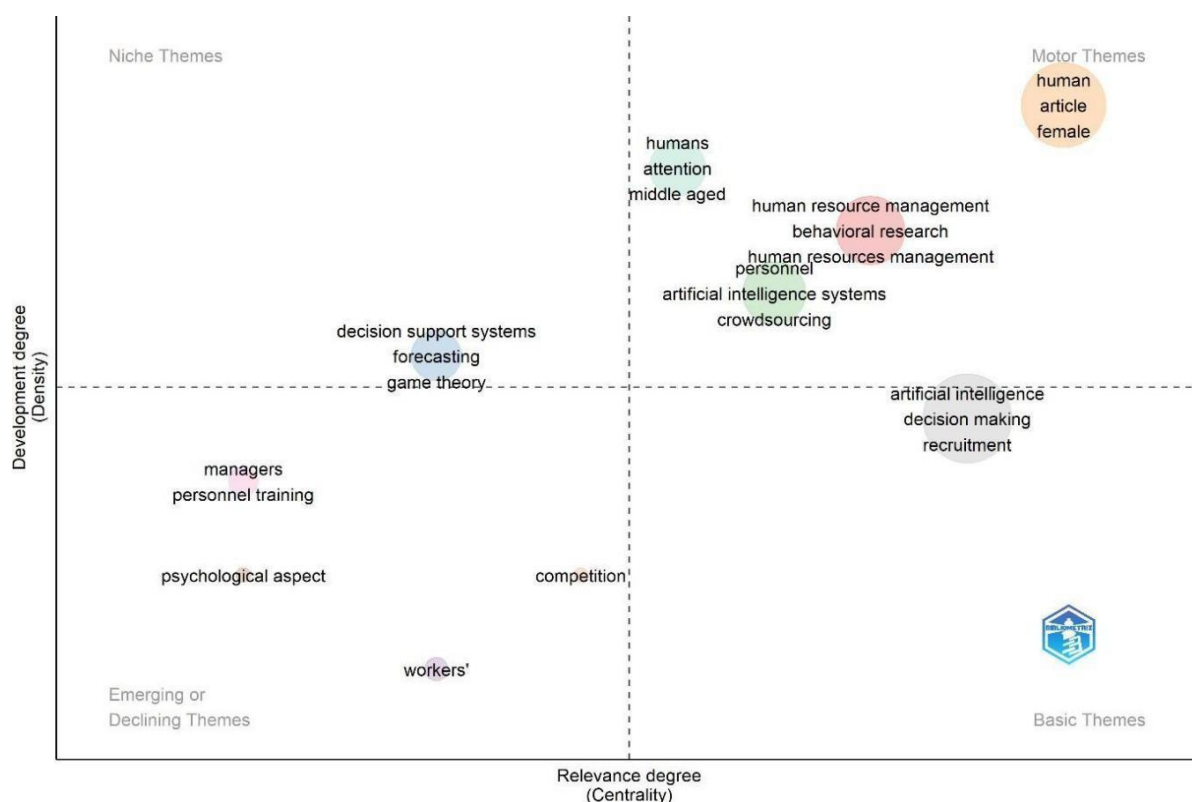
Figure 16: Thematic Map
Source: Authors Compilation

5.2   Intellectual structure*:* The intellectual structure shows the author's impact on the scientific community. The relationship between authors and countries are examined. The partnership and cooperation among research organizations and their links with different universities (Ingale and Paluri, 2020). (Pampouktsi *et al*., 2021) developed a 3-in-1 framework for machine learning-based selection and positioning. The system efficiently picks meritocratic persons and positions, either horizontally within divisions or vertically in leadership roles.

5.2.1   Tree Map: Figure 17 This tree map shows the globalization of significant subjects of artificial intelligence (AI) in recruitment and human resource management. Each rectangle represents a topic, and its size indicates its importance or frequency in the collection. Top four terms are "Artificial intelligence" is the most popular topic (24%), followed by "recruitment" (8%), "human resource management" (6%), and "machine learning" (4%). Other major topics include "hiring," "bias," "ethics," "selection," and "technology," indicating concerns about AI's impact on HR operations. Most authors and scholars are researching the relationship between AI, machine learning, and recruitment (Rab-Kettler & Lehnervp, 2019). The essay suggests that newer models are evolving to reflect contemporary social trends. Artificial intelligence has led to the development of humanistic management and talent recruiting strategies.

Figure 17: Tree Map
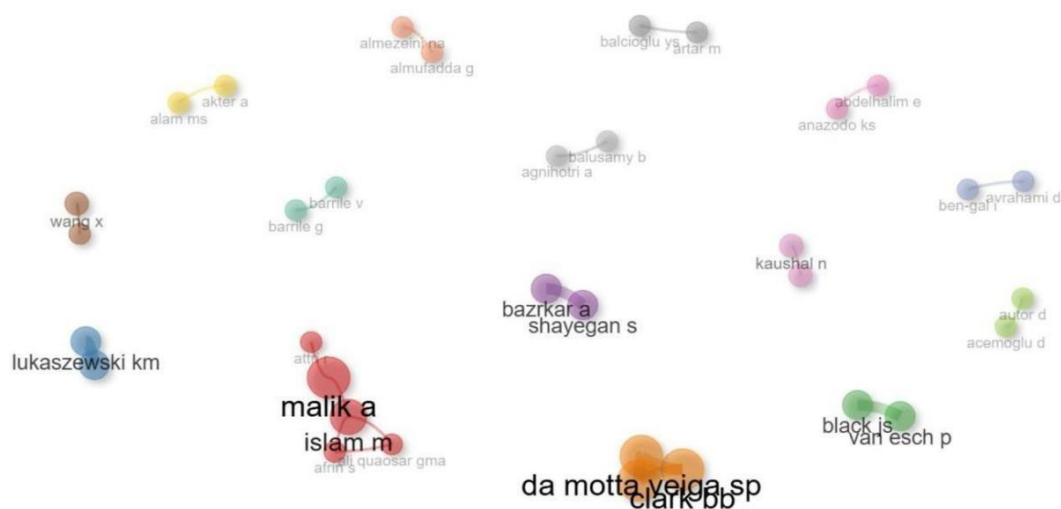**Source: Authors Compilation**

5.3   Social Structure:

Social network Analysis facilitates the development of interrelationships within the research domain. Scholars, authors, and sources of publication are referred to as 'nodes' in a social network. The interconnection of these nodes is indicated by their set. The network dynamics reveals the connections that exist between different areas (Low and Siegel, 2019).
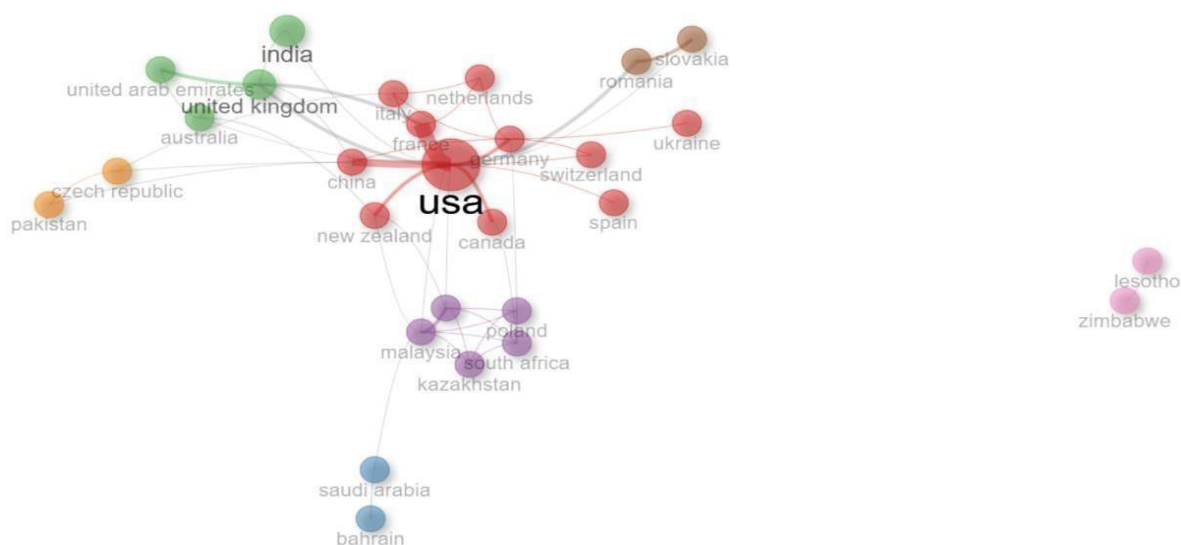
Figure 18 This geographical collaboration network shows research collaborations across various locations. Each circle represents an author, and the colour indicates their connection. Lines connecting circles represent collaborative work.

Distinct colour groups identify authors focused by geographical area, while connecting lines highlight partnerships between academics in various fields. Authors such as "malik a," "islam m," "malik a," "da motta veiga, sp," "clark, bb," and "van esch, p" appear to be participating in worldwide collaborations that connect diverse research communities. The graph shows the geographical distribution of researchers and the interconnection of their work, demonstrating international collaboration in research.

Figure 19 The author indicates the geographical collaboration and distribution of around 45 countries. The graph shows a worldwide collaboration network, with the USA being the most connected. Green shows groupings of closely collaborating countries, whereas purple represents similar clusters. Lesotho and Zimbabwe appear to be isolated, indicating a lack of international engagement.

Figure 18: Geographical Collaboration Network of Authors.
Source: Authors Compilation

Figure 19: Geographical Collaboration Network of Countries
Source: Authors Compilation

6. Conclusion

This bibliometric analysis of Artificial Intelligence (AI) in Hiring and Recruitment provides a comprehensive review of research trends, key contributors, and emerging challenges in AI-driven talent acquisition from 2000 to 2024. Based on 168 research articles extracted from the Scopus database and analysed using R Biblioshiny, the study highlights a significant annual growth rate of 19.07%, indicating increasing scholarly interest in AI-based recruitment processes. The USA (89 papers, 797 citations), India (61 papers, 372 citations), and the UK (37 papers, 279 citations) emerge as the leading contributors, with the USA having the highest citation impact. The most cited document is by Tambe P (2019) with 575 citations, followed

by Huang M-H (2019) with 305 citations, emphasizing AI's transformative role in hiring. Influential authors such as Malik A (H-index: 3), Bazrkar A, and Black JS (H-index: 2) have significantly shaped the field, while key journals such as AI & Society (6 publications, H-index: 4), Computers in Human Behavior (5 publications, H-index: 4), and Technological Forecasting and Social Change (4 publications, H-index: 4) have contributed significantly to AI recruitment research. The co-occurrence network analysis reveals that frequently occurring keywords include "Artificial Intelligence" (30 occurrences), "Decision-Making" (10 occurrences), and "Recruitment Process" (7 occurrences), demonstrating AI's growing influence in hiring strategies. The geographical collaboration network highlights strong international partnerships, particularly among the USA, UK, and India, signifying the global nature of AI-driven recruitment research.

AI's adoption in recruitment has enhanced efficiency by streamlining resume screening, candidate sourcing, and interview scheduling. However, major challenges persist, particularly regarding algorithmic bias, data privacy, and transparency. AI-based hiring systems may perpetuate biases if trained on historical data that reflect past discrimination, leading to unfair outcomes. AI-driven resume screening and interview assessment tools may unintentionally favour certain demographics, raising concerns about fairness. The opacity of AI hiring models, often termed "black-box" AI, creates transparency issues, making it difficult for recruiters and candidates to understand selection decisions.

Additionally, the increasing use of AI to analyse candidates' digital footprints, including social media profiles and behavioural traits, poses ethical dilemmas regarding privacy and consent. The most cited countries analysis further confirms the USA's dominance in AI recruitment research, while emerging contributors like Germany, China, and Australia show increasing engagement.

The conceptual structure study shows how AI has progressed from basic hiring automation to complex predictive analytics, natural language processing, and deep learning. The social structure analysis emphasizes the importance of worldwide universities, research institutes, and HR technology companies in defining AI recruiting research. The H-index ranking of prominent AI recruitment publications indicates the academic significance of AI hiring research.

Future research must focus on developing AI models that are unbiased, transparent, and ethical, while also examining how AI-driven hiring impacts candidate perceptions and workforce diversity. Research should also explore AI's long-term effects on HR decision-making, employee retention, and job market trends. Collaboration between academia and industry is necessary to establish best practices for ethical AI governance in recruitment, ensuring fairness and accountability. As AI continues to transform talent acquisition, organizations must balance technological advancements with ethical considerations to maintain fairness, inclusivity, and transparency. This study provides valuable insights for HR professionals, policymakers, and researchers in shaping the future of AI-driven recruitment. While AI offers significant opportunities to improve hiring efficiency and accuracy, organizations must navigate its challenges responsibly to ensure fair and unbiased hiring practices.

6.2   Research limitations

Despite the broad scope of the bibliometric analysis used in this work, some limitations were identified.

First, the study was limited to publications indexed in the SCOPUS database, which, while vast, may not have included all relevant material, particularly those published in non-English languages or in lesser-known journals.

Second, the selection criteria were limited to research articles, possibly disregarding major contributions from industry reports, white papers, and grey literature that could provide further context and insights into the practical implications of AI in talent acquisition.

Furthermore, the investigation relied mostly on quantitative methodologies, which may not fully capture the qualitative nuances of how AI is viewed and deployed in various organizational contexts. Future research should use a broader range of sources and approaches to have a more complete picture of AI's impact in talent acquisition.

6.3 Recommendations for Future Research

To improve our understanding of AI in recruitment, the report proposes numerous future research topics. Future research should look into the developing ethical considerations of using AI tools in talent recruiting, namely prejudice and fairness in algorithmic decision-making. Furthermore, researchers could look into the long-term effects of AI on job seekers' experiences and outcomes in the recruitment process.

Collaborative research including both academics and industry practitioners could result in the establishment of best practices for incorporating AI in recruiting, as well as addressing the challenges that HR professionals encounter throughout this shift. Finally, ongoing research initiatives should strive to produce a balanced narrative that shows both the potential benefits and challenges brought by AI in the changing landscape of talent acquisition.

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