

Ethical Implications of Integrating Artificial Intelligence in Talent Acquisition: A Bibliometric Analysis

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ABSTRACT Utilizing a bibliometric analysis approach, this study systematically reviews and retrospectively examines the emerging body of literature on the ethical concerns and implications of incorporating artificial intelligence (AI) into talent acquisition processes. The analysis uncovers the intellectual structure of papers published from 2020 to 2024 on the Scopus database. The research indicates a growing number of articles addressing ethical AI in recruitment, highlighting the increasing demand for studies in this area and the crucial role AI plays in transforming hiring practices. The UK and the United States are leading in research output, reflecting their advanced technological sectors and strong regulatory environments, while research on ethical AI in recruitment remains sparse in Eastern Europe and Africa. The cluster analysis identifies several key topics in ethical AI research within talent acquisition that are interconnected, offering valuable insights for stakeholders aiming to achieve fair and transparent recruitment processes. The findings underscore the importance of addressing algorithmic bias, ensuring transparency, protecting data privacy, and fostering diversity and inclusion. This study underscores the necessity for continuous research and the establishment of robust ethical frameworks to guide the responsible integration of AI in talent acquisition, ensuring that technological advancements are aligned with ethical standards and societal values.

KEYWORDS - *Artificial Intelligence, Talent Acquisition, Ethical Concerns, Bibliometric*

I. INTRODUCTION

The landscape of recruitment has undergone a profound transformation in recent years, largely driven by technological advancements and evolving business needs. Previously, recruitment processes were largely dependent on manual resume screening, in-person interviews, and subjective decision-making, which frequently resulted in inefficiencies, high costs, and inherent biases (Chapman & Webster, 2003). This traditional approach, which is grounded in human judgment, often faced significant challenges, including inefficiencies in time, high costs, and potential biases that could undermine the fairness and effectiveness of hiring decisions. In the contemporary digital age, the advent of artificial intelligence (AI) has initiated a significant shift in recruitment processes. Artificial intelligence (AI) recruitment tools, which encompass automated resume screening, candidate matching algorithms, and AI-powered chatbots, are being increasingly adopted by organizations worldwide. These tools are designed to streamline various stages of the recruitment process, from initial resume screening to final candidate selection. The advent of AI technologies, encompassing applications such as automated resume screening, candidate matching, and predictive analytics, has introduced unprecedented levels of efficiency and objectivity into hiring practices (Heilmann, 2018). These AI-driven tools are able to rapidly analyze vast amounts of data, identify patterns, and generate insights that may not immediately be apparent to human recruiters, thereby enhancing the quality and speed of recruitment decisions (Bogen, 2019).

It should be noted that the capabilities of AI extend beyond mere data processing, encompassing advanced functions such as natural language processing and machine learning algorithms that enable the predictive modelling of candidate performance and the improvement of engagement through AI-powered chatbots (Raghavan, Barocas, Kleinberg, & Levy, 2019). These developments suggest the potential for a more data-driven and equitable hiring process. The alignment of candidates' skills and experiences with job requirements could be more effectively achieved through the use of data-driven methods than through traditional methods.

Nevertheless, integrating AI in recruitment does not come without its own set of challenges. Ethical considerations, including those related to algorithmic bias, transparency, and data privacy, are of paramount importance in ensuring the responsible deployment of AI technologies (Sanchez-Monedero et al., 2020). It must

be acknowledged that while AI may have the capacity to reduce the impact of human biases during the hiring process, this may not always occur. In order for the potential benefits of AI to materialise, it is essential that the underlying data is properly managed, as well as that the algorithms are transparent and accountable (Bogen & Rieke, 2018). It is of paramount importance to address these ethical considerations in order to guarantee that AI tools are used in a responsible and effective manner in the context of recruitment.

As organizations increasingly adopt AI in their recruitment processes, it is becoming increasingly important to balance the technological benefits with ethical considerations in order to ensure that the use of these technologies aligns with the technological benefits and ethical considerations. It is of the utmost importance that this balance be achieved in order to develop AI tools that not only enhance efficiency and decision-making but also uphold the principles of fairness, transparency, and privacy. As the significance and applicability of artificial intelligence (AI) in recruitment processes continue to expand, this study aims to map to the extant literature through a bibliometric analysis that examines the ethical issues arising from implementing AI in recruitment processes between 2000 and 2024. A bibliometric analysis is a quantitative approach to literature assessment, employing statistical tools to analyse the production of scientific knowledge, including publications, journals, countries, languages, and organizations. It introduces a level of rigor previously lacking in the subjective assessment of literature (Aria & Cuccurullo, 2017). In the current digital age, new metrics, such as download statistics and page ranks, have the potential to facilitate multifaceted analysis of scientific production and may introduce a systematic, transparent, and reproducible review process, thus improving the quality of reviews. (Van Eck & Waltman, 2010). These bibliometric methods assist researchers in determining the most influential works, mapping the research field, and reducing the influence of subjectivity. These methods allow researchers to base their findings on aggregated bibliographic data produced by other scientists. This data can facilitate the exploration of the field's structure, social networks, and main topics (Moed, 2005).

This study employs bibliometric analysis supported by the visualization of similarities (VOS) mapping technique using the VOSviewer software package. The primary objectives of this research are as follows: (1) to identify literature streams; (2) to map the topics explored; (3) to observe and analyse the temporal evolution of the construct; and (4) to evaluate the development stage of the construct, ensuring its relevance for the professional community and not merely as an academic tool for bibliometrics. The methodology section outlines the procedures employed to collect and analyse the data. Subsequently, the results section is divided into two sections, namely the data obtained through the keyword search and the bibliometric maps, which present the findings from both methods. Lastly, the conclusions reiterate the study's objectives, emphasise the key findings, acknowledge the study's limitations, and propose future research directions on the ethical implications of AI implementation in recruitment processes.

II. LITERATURE REVIEW

2.1 Artificial Intelligence

The digital era is characterised by a multifaceted and intricate transition in human civilisation, with the widespread integration and significance of digital technology (Castells, 2011; Brynjolfsson & McAfee, 2014). This era has been shaped by numerous key developments, each contributing to changes in the ways in which we communicate, work, and interact on a daily basis (Negroponte, 1995; Floridi, 2014). These key developments include a multitude of technological advancements, societal transformations, and ethical challenges, which collectively reflect the dynamic nature of this era (Turkle, 2012). The digital era has been in existence since the mid-20th century, when the earliest computers were developed. Since then, the era has continued to evolve in response to a series of technological advances, including the growth of internet connectivity, the advent of social media platforms, and the development of artificial intelligence. Additionally, the digital era has been influenced by various external factors, including pandemic-related disruptions, which have accelerated the pace of change. (Ceruzzi, 2003; Leiner et al., 1997; Boyd & Ellison, 2007; Davenport & Dyché, 2013; Nicola et al., 2020). Two technological advancements, specifically the Internet of Things (IoT) and artificial intelligence (AI), are of particular importance in understanding the transformative nature of this era. In the definition of Whitmore, Agarwal, and Xu (2015), the Internet of Things (IoT) is not merely the connection of devices; it represents an ecosystem that is continuously generating, processing, and analysing data. This extensive network of interconnected devices, which encompasses a range of technologies such as wearable technology and advanced home automation systems, serves as a bridge between our physical and digital realities. It is through the development of this technology that we can expect the emergence of smart cities, enhanced industrial efficiency, and increasingly personalised experiences. Concurrently, as highlighted by Davenport and Dyché (2013), the field of AI has undergone a profound shift in capabilities and applications. AI has emerged as a major force in the digital era, driven by significant advancements in computing power, data proliferation, and algorithmic innovation. The field of AI has evolved beyond the mere simulation of human cognition to encompass the augmentation of it. The application of AI technologies, which encompass a diverse range of capabilities, from virtual assistants that facilitate daily scheduling to sophisticated algorithms that offer predictive healthcare

solutions, relies on the exploitation of vast quantities of digital data in order to enable precise and rapid decision-making processes that exceed human capacity.

The digital era has had a significant effect on society, with the rise of digital technologies and AI potentially revolutionising multiple fields (Norvig & Russell, 2016). This era has driven economic growth through the transformation of business practices, which has affected productivity, employment, and inequality (Brynjolfsson & McAfee, 2014). Additionally, the revolutionizing communication via social media has impacted interpersonal dynamics and has given rise to concerns about privacy (Dijck, 2013). Moreover, digital technology has facilitated the introduction of novel approaches to education, despite the challenges associated with ensuring the quality of these innovations and addressing the digital divide (Selwyn, 2013). Additionally, digital technology has transformed healthcare with the advent of electronic health records and telemedicine (Topol, 2019). In the political sphere, the advent of digital technology has enhanced civic participation. However, it has also presented challenges such as misinformation (Howard & Parks, 2012) and ethical issues related to privacy and digital rights (Floridi, 2014).

Digital transformation has become critical for modern organizations and involves the integration of digital technologies across all areas of the organization, fundamentally changing operations and value delivery to customers (He, Meadows, Angwin, Gomes, & Child, 2020). The alignment of digital initiatives with business objectives is critical to success and is a driver of innovation and competitive advantage (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013; Berman & Marshall, 2014). This transformation extends beyond technology to encompass organizational agility, efficiency, and customer centricity (Matt, Hess, & Benlian, 2015). Key challenges include integrating legacy systems with new technologies (Ross, Beath, & Mocker, 2016) and keeping pace with advances in AI and IoT (Vial, 2019). The role of leaders and culture is also important, with resistance to change and the necessity of a climate of innovation a key consideration (Kane, Palmer, Phillips, Kiron, & Buckley, 2015; Oreg, 2003). In addition, security, privacy, and ethical concerns are paramount (Dwivedi et al., 2020). Effective talent and skills management, along with evaluating performance and engaging customers through digital channels, are fundamental to the transformation process (Cappelli, 2019; Schallmo, Williams, & Boardman, 2017; Chen et al., 2012).

2.2 Talent Acquisition

The field of talent acquisition is undergoing a transformation, moving beyond the conventional boundaries of recruitment to encompass a more comprehensive range of strategic elements. These include the ability to anticipate future talent needs and to cultivate relationships in anticipation of specific roles. This shift is driven by the integration of multiple disciplines, including marketing, foresight, and the application of technology, as emphasized by Lou Adler (2007). Moreover, it plays an essential role in enhancing the organization's brand and culture, aligning with long-term business objectives, and utilizing data analytics to refine procedures (Sullivan, 2015; Ziskin, 2015). Employer branding is highlighted as a crucial factor for attracting and retaining talent (Ambler & Barrow, 1996; Minchington, 2010). It is imperative that organisations adopt a proactive approach to sourcing talent and strive to enhance the candidate experience. This is because research indicates that these two elements significantly impact organisational outcomes (Lievens & Slaughter, 2016; Tarver, 2019). Furthermore, it is widely acknowledged that fostering diversity and inclusion in the workforce is crucial for the creation of innovative and agile teams (Cox, 2001; Nishii, 2013). The integration of structured onboarding and talent analytics optimizes recruitment and creates competitive advantages (Bauer, 2010; Davenport, Harris, & Shapiro, 2010; Marler & Boudreau, 2016).

The process of recruitment has undergone a significant transformation, moving from a purely reactive approach to filling open positions to a more strategic one known as talent acquisition. This new approach focuses on anticipating future talent needs and building a sustainable talent pipeline (Alves et al., 2020). Digital transformation has had a profound effect on talent acquisition, with online platforms like LinkedIn and Indeed facilitating recruiters' access to global talent pools (Sullivan, 2015). Applicant tracking systems (ATS) have streamlined hiring procedures, automating tasks and organizing candidate information, thereby facilitating more efficient recruitment processes (Davenport, Harris, & Shapiro, 2010; Bersin, 2015; Marler & Parry, 2016). Furthermore, advanced analytics provide data-driven insights which enhance recruitment strategies and decision-making (Marler & Boudreau, 2016). The use of digital tools, such as Zoom and Skype, has enabled more accessible and flexible interviews (Tippins, 2009). Furthermore, the integration of artificial intelligence (AI) technologies, such as automated resume screening and predictive analytics, has enhanced the effectiveness of talent acquisition processes (Rasmussen & Ulrich, 2015; Johar, 2022). It is becoming increasingly clear that enhancing the candidate experience through the use of chatbots, virtual reality tours and interactive applications is a necessity in the modern world of recruitment (Beamery, 2019; Taiminen, 2015; Hausknecht, Day, & Thomas, 2004). Moreover, the creation of a robust digital employer brand can serve as a significant draw for top talent and aligns with the values and expectations of candidates (Wilden, Gudergan, & Lings, 2010; Backhaus & Tikoo, 2004).

2.3 Ethical Theory

Ethics is a branch of philosophy that examines questions of morality. In particular, it addresses what is right and wrong, what is good and bad, what is fair and unfair. MacIntyre (1981) proposes that ethics is the study of the conditions that allow individuals to live good lives and act rightly, with a focus on virtues and the moral character of individuals. Despite the extensive insights that have been provided, defining a universal standard of moral goodness remains a matter of contention. These judgments are profoundly influenced by social norms, individual beliefs, and cultural contexts, which further complicates the quest for universal moral standards. Moreover, individual beliefs, shaped by familial interactions, educational experiences, and personal experiences, further contribute to this multifaceted complexity (Gilligan, 1982). The various ethical theories offer distinct answers, underscoring the complexity of moral judgments. The coexistence of ethical theories such as deontology, utilitarianism, and consequentialism adds further complexity to the determination of universal ethical principles, which can often give rise to conflicts (Mill, 1863; Kant, 1785). Globalization serves to intensify these debates by bringing together diverse cultures, prompting questions about the optimal balance between individual rights, communal responsibilities, economic equality, and freedom. It also serves to highlight the multifaceted and nuanced nature of universal moral standards (Sen, 1999).

2.3.1 Deontology

Immanuel Kant (1724–1804) is a key figure in modern philosophy, known for integrating rationalism and empiricism. His "critical philosophy" emphasizes human autonomy, as presented in his three major works: *The Critique of Pure Reason* (1781, 1787), *The Critique of Practical Reason* (1788), and *The Critique of the Power of Judgment* (1790). According to Kant, human understanding establishes natural laws while human reason formulates moral law. This framework unites scientific knowledge, morality, and religion, reflecting a teleological worldview (Kant, 1785). Kant's principle of universalizability asserts that an action is morally correct if its guiding principles can be universally applied without logical contradiction. For example, making a promise with the intention of breaking it is impermissible. Kant (1785) asserts that if everyone did so, trust in promises would collapse. Kant also argues that individuals possess inherent dignity, and should never be treated merely as means to an end (Johnson & Cureton, 2019). This stance contrasts with consequentialist ethics, which has led to criticism of Kant's rigidity and potential for morally counterintuitive results. Nevertheless, Kant's emphasis on moral autonomy and practical reason has had a significant impact on moral philosophy (Korsgaard, 1996; Peterson & Wood, 2008). Kant distinguishes between perfect and imperfect duties: the former are absolute obligations, such as the duty not to lie, while the latter, such as the duty of beneficence, allow for discretion in their performance (Kant, 1785).discretion in their execution. For example, the duty of beneficence allows for some flexibility in its execution.

Rossian deontology, developed by W.D. Ross, offers a more flexible approach to moral obligation than Kantian deontology. In *The Right and the Good* (1930), Ross introduces prima facie duties, which are binding unless overridden by a more important duty. These duties are self-evident, non-absolute, and may conflict, requiring careful balancing (Ross, 1930). Ross identifies various sources of duty, including promise, gratitude, justice, beneficence, and self-improvement, and emphasizes an intuitive grasp of these moral principles (Ross, 1930). Unlike other theories with fixed hierarchical orders, Ross's approach assesses the weight of each duty based on specific circumstances. This provides a flexible ethical framework (Ross, 1930). Ross explicitly rejects utilitarianism and focuses on the intrinsic nature of actions and underlying duties rather than outcomes. Critics, however, argue that Ross's reliance on intuition can lead to subjective and conflicting judgments, and the absence of a fixed hierarchy of duties can complicate moral decision-making (Ross, 1930).

2.3.2 Consequentialism

Consequentialism is an ethical theory that judges the morality of an action by its consequences, focusing on the resulting happiness or welfare (Singer, 1993). Influenced by philosophers such as Jeremy Bentham and John Stuart Mill, this theory contrasts with deontological ethics, which emphasizes the nature and intentions behind actions (Bentham, 1789; Mill, 1863). Critics argue that consequentialism can justify morally questionable actions if they lead to a greater overall good (Nozick, 1974; Williams, 1973). Variants such as rule consequentialism address some criticisms by emphasizing adherence to rules that generally promote good outcomes (Brandt, 1959). At its core, consequentialism is focused on agent neutrality, which holds that everyone's happiness counts equally, potentially allowing actions that would be considered wrong in other systems if they lead to the best overall consequences (Scheffler, 1982; Parfit, 1984).

2.3.3 Utilitarianism

Act utilitarianism and rule utilitarianism are the two main branches of utilitarianism, both of which focus on the consequences of actions to determine their moral worth. Act utilitarianism, developed by Jeremy Bentham and John Stuart Mill, evaluates the moral value of each action based on its contribution to general happiness or welfare (Bentham, 1789; Mill, 1863). This approach is flexible, but has been criticized for justifying actions that may conflict with common moral intuitions or individual rights.

Rule utilitarianism, on the other hand, considers the long-term effects of following general rules of conduct. It posits that the morally right action is one that conforms to a rule that, if consistently followed, would produce the greatest overall happiness (Brandt, 1959; Hooker, 2000). This approach addresses some criticisms of action utilitarianism by emphasizing the importance of justice and individual rights.

Modern consequentialist theorists have developed these ideas. For example, Peter Singer's preference utilitarianism focuses on satisfying the maximum number of individual preferences rather than merely increasing happiness (Singer, 1979). Derek Parfit emphasizes the importance of future consequences and the reduction of both present and future suffering (Parfit, 1984). In addition, Robert Nozick's "experience machine" thought experiment challenges consequentialism by suggesting that authenticity of experience is essential to a good life, beyond mere happiness or pleasure (Nozick, 1974). Contemporary debates also explore the applicability of consequentialist principles in fields such as artificial intelligence and machine learning (Russell, Dewey, & Tegmark, 2015).

2.3.4 Virtue Ethics

Aristotle's "Nicomachean Ethics" lays the foundation for virtue ethics by focusing on character traits such as courage, wisdom, and temperance that lie between deficiencies and excesses, known as the "golden mean" (Aristotle, 2009). This framework emphasizes the importance of practical wisdom, or "phronesis," in guiding virtuous actions. It also emphasizes the role of community and friendship in ethical living.

Virtue ethics views virtues as integral to a broader social context and links personal fulfillment to ethical behavior (Aristotle, 2009). While influential, virtue ethics has been criticized for its perceived vagueness and challenges in providing clear guidance for moral dilemmas (Hursthouse, 1999). Despite these criticisms, virtue ethics remains an important and evolving perspective in contemporary moral philosophy (MacIntyre, 1981; Anscombe, 1958; Hursthouse, 1999).

III. METHODOLOGY

The literature review on ethical concerns in Artificial Intelligence (AI) within talent acquisition uses bibliometric analysis, which applies mathematical and statistical techniques to evaluate the scientific contributions and influence of publications in this research area. Documents are retrieved from various bibliographic databases, such as Web of Science (WoS), Scopus, and Google Scholar, and analyzed using bibliometric metrics and graphical representations like co-citation, co-word, and co-authorship analysis to understand the evolution of the intellectual and conceptual structure of this domain. In AI and human resource research, bibliometric studies often use metrics like citation counts to quantify the contributions and influence of authors, journals, and institutions. This research aims to understand what and how we know about ethical concerns in AI for talent acquisition by employing a keyword analysis strategy using frequently used keywords from previous bibliometric studies. This approach seeks to understand the knowledge structure of the research field and guide future research directions. Bibliometric analysis provides a systematic and objective method for evaluating existing literature on ethical concerns in AI for talent acquisition, identifying research gaps, and suggesting future research directions. In this study, bibliometrics was used to conduct a comprehensive literature review on ethical concerns in AI within talent acquisition. A Scopus database search was conducted using the keywords "Ethics," "Artificial Intelligence," "AI," and "Recruitment," restricted to the years 2020 to 2024 and within the "business and management" subject area to identify relevant English-language publications. The large number of publications found underscores the topic's significance. The sample was then analyzed using VOSviewer, a software tool for visualizing bibliometric networks. VOSviewer helped identify related categories and map the interrelationships between publications in this field.

In the VOSviewer map, the distance between items reflects the strength of their relationship, enhancing the understanding of key themes and relationships in the literature on ethical concerns in AI for talent acquisition.

TITLE-ABS-KEY ("Ethic*" AND "Artificial Intelligence" OR "AI" AND "Recruit*") AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (OA, "all")) AND (LIMIT-TO (PUBYEAR, 2024) OR LIMIT-TO (PUBYEAR, 2023) OR LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020)) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (SUBJAREA, "BUSI")) AND (LIMIT-TO (LANGUAGE, "English"))

In summary, the bibliometric analysis employed in this study enables a comprehensive and systematic review of the literature on ethical considerations in the use of AI for talent acquisition. It offers a visual representation of the principal themes and relationships between publications, which can inform future research and practice. The keyword co-occurrence network analysis determines the frequency of terms in the sample, thereby generating a map that illustrates the interrelationships between the conceptual structures of the sample (Zupic & Cater, 2015). The size of the circle and the strength of the connection between two keywords are proportional to the frequency of occurrence of the keyword in the sample and the strength of the relationship between them, respectively. The concepts situated at the core of the network are linked to a greater number of

clusters. The bibliographic coupling method assesses the similarity of two articles based on the number of shared references (Kessler, 1963). The proximity of two items indicates a high degree of shared references, which in turn suggests a high degree of shared content (Li & Hale, 2016). The size of the spheres is indicative of the number of citations on the Web of Science (WOS). The objective is to ascertain the intellectual structure of ethical concerns pertaining to the use of AI in talent acquisition.

The three-stage model of construct evolution, as developed by Reichers and Schneider (Schneider et al., 2013), was employed to ascertain the developmental stage of the ethical concerns construct pertaining to AI for talent acquisition. In accordance with this model, the evolution of constructs adheres to a discernible sequence: (1) introduction and elaboration, (2) evaluation and expansion, and (3) consolidation and accommodation (Schneider et al., 2013). The discussion section elucidates these three phases and the present developmental stage of the field of ethical concerns in AI for talent acquisition.

IV. FINDING AND RESULTS

4.1 Year of Publication

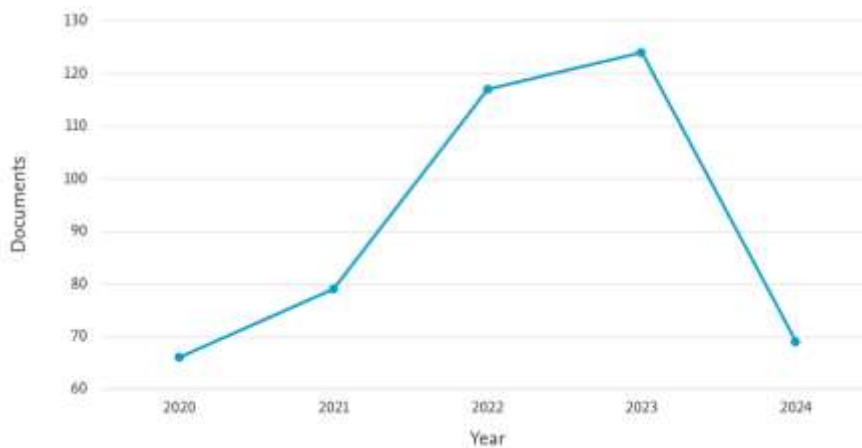


Figure 1 Year Publication from 2020 - 2024

A total of 455 scientific papers addressing ethical concerns in artificial intelligence (AI) within the context of talent acquisition were published between 2020 and 2024, according to the Scopus database. During this period, there has been a notable expansion in the academic discourse surrounding the ethical implications of AI in recruitment, reflecting a growing interest in this area. These publications offer invaluable insights into the challenges, opportunities, and outcomes of integrating ethical AI practices in talent acquisition. They serve to advance knowledge and assist practitioners and policymakers in their decision-making processes. The number of articles on this topic has exhibited a notable increase on an annual basis. During the initial phase of this period, 70 papers were published in 2020 and 80 in 2021. However, as awareness of the importance of ethical AI increased, the number of publications on this subject rose significantly. This upward trajectory persisted, reaching its zenith in 2023 with 125 published papers. This increase demonstrates that an increasing number of businesses, particularly those in the recruitment sector, are acknowledging the significance of advocating for ethical AI practices. In 2022, 120 papers were published. As 2024 is still in its infancy, it is premature to ascertain whether the number of publications for this year will increase or decrease.

From an analytical standpoint, the increasing number of papers suggests a growing necessity for research and development in ethical AI practices within the domain of talent acquisition. As the number of published papers continues to grow, businesses will have access to a wealth of information and knowledge that can inform the development of their ethical AI strategies. Moreover, this growth indicates that an increasing number of businesses are integrating ethical considerations into their AI-driven decision-making processes, with the aim of positively impacting the environment and societal welfare.

4.2 Country Analysis

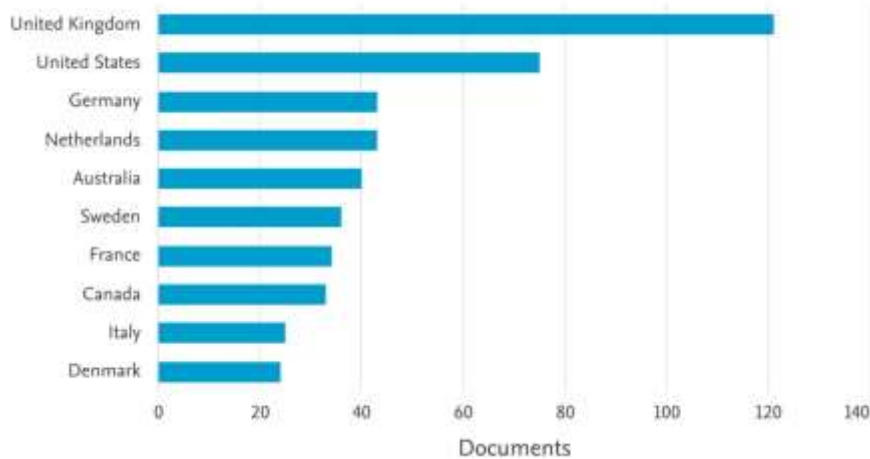


Figure 2 Country Analysis
Table 1 Country Analysis and Number of Document

Country	Number of Documents
United Kingdom	121
United States	75
Germany	43
Netherlands	43
Australia	40
Sweden	36
France	34
Canada	33
Italy	25
Denmark	24

The extent and focus of research on ethical concerns in artificial intelligence (AI) within talent acquisition varies across the globe, as evidenced by the number of publications from different countries. The United Kingdom leads the way with 121 publications, followed by the United States with 75 papers. Germany and the Netherlands are tied, each contributing 43 papers, while Australia has 40 papers. Other notable contributors include Sweden with 36 publications, France with 34 papers, Canada with 33 papers, Italy with 25 papers, and Denmark with 24 papers. Similarly, the United States places significant emphasis on AI ethics, particularly in mitigating biases and ensuring compliance with equal employment opportunity laws. Germany and the Netherlands also display a strong focus on ethical AI in talent acquisition, driven by their robust industrial and technological sectors that prioritize responsible AI deployment. Australia, Sweden, France, and Canada are active contributors, reflecting their national policies and business practices that emphasize ethical considerations in AI use within the recruitment process. Italy and Denmark, despite having fewer publications, are becoming increasingly active contributors to this research area. Their studies frequently address the integration of ethical AI practices within the distinctive contexts of their labor markets and regulatory environments, underscoring the necessity of adapting global AI ethics standards to local requirements and circumstances.

Furthermore, countries such as Finland, India, Spain, Austria, and China have made notable contributions to the research, with approximately 20 papers published in each country. Furthermore, other countries, including Poland, Switzerland, Norway, South Africa, Brazil, Belgium, New Zealand, Cyprus, Ireland, Malaysia, Portugal, Singapore, and the United Arab Emirates, have made smaller but noteworthy contributions, with publication counts ranging from six to 15.

This variation in the number of papers across different countries underscores the disparate levels of engagement and emphasis on ethical AI in talent acquisition. The countries that have made the greatest contributions to this research have comprehensive policies and a higher awareness of AI ethics, which drive both academic and

practical inquiries into this field. Conversely, regions with fewer publications may still be in the process of developing their frameworks or may be experiencing difficulties in integrating ethical AI practices within their talent acquisition processes.

The global distribution of research demonstrates an ongoing necessity for comprehensive and pervasive inquiry into ethical artificial intelligence practices in talent acquisition. It is of the utmost importance that businesses worldwide are able to adopt and utilise these technologies in a responsible manner if we are to foster a fair and transparent recruitment environment. The expanding corpus of research serves as a foundation for the development of best practices and guidelines that can assist organizations in navigating the intricate ethical terrain of AI in recruitment.

4.3 Number of Citation

Author(s)	Number of Citations	The Output of the Paper
Raisch, S., Krakowski, S.	530	This paper explores the dual nature of AI in management, emphasizing its potential to both automate tasks and augment human capabilities. It discusses the ethical considerations and the need for a balance between AI and human intelligence to achieve optimal outcomes in organizational settings.
Budhwar, P., Malik, A., De Silva, M.T.T., Thevisuthan, P.	134	This review examines the integration of AI in human resource management, highlighting the challenges and opportunities it presents. The paper discusses the impact of AI on HR functions and offers a research agenda to guide future studies on the role of AI in enhancing employee and organizational outcomes.
Kordzadeh, N., Ghasemaghaci, M.	146	The paper provides a comprehensive review of algorithmic bias in AI systems, particularly in HR and recruitment. It synthesizes existing literature on the sources and impacts of bias and proposes future research directions to address these ethical issues in AI applications.
Chowdhury, S., Dey, P., Joel-Edgar, S., Abadie, A., Truong, L.	156	The paper examines the unlocking value of artificial intelligence in human resource management through AI capability framework. It explores AI applications, collective intelligence, AI and employment, drivers and barriers to AI adoption, and develops a framework for AI organizational resources, transparency issues, AI-employee collaboration, and learning for AI use at work.
Loureiro, S.M.C., Guerreiro, J., Tussyadiah, I.	201	The paper investigates AI-enabled recruiting, exploring the ethical implications and proposing a research agenda for addressing future trends and challenges in AI applications in business. It includes a systematic review of AI-related literature, analysis of business implications, and suggestions for future research directions.
Köchling, A., Wehner, M.C.	136	This systematic review examines instances of discrimination and fairness issues in algorithmic decision-making within HR recruitment and development. It highlights the ethical challenges posed by AI systems and offers recommendations for improving fairness and reducing bias in AI-driven HR processes.
Lo Piano, S.	112	This paper discusses the ethical principles in AI and machine learning, emphasizing the need for fairness, accuracy, accountability, and transparency. It examines guidelines and practical examples in fields like criminal justice and autonomous vehicles, highlighting points of friction across ethical principles and suggesting ways to improve AI governance.
Hunkenschroer, A.L., Luetge, C.	74	This paper reviews the ethical issues in AI-enabled recruiting and selection, identifying key concerns such as bias, transparency, and accountability. It offers a research agenda aimed at addressing these ethical challenges and improving the fairness and effectiveness of AI-driven recruitment processes.
Morley, J., Floridi, L., Kinsey, L., Elhalal, A.	292	This review investigates the tools and methods available for translating AI ethics principles into practice. It evaluates publicly available resources and provides recommendations for improving the implementation of ethical guidelines in AI development and application, particularly in the context of HR and talent acquisition.

The results of the research conducted indicate that there is a significant and increasing body of literature examining the ethical implications of AI in recruitment processes. The paper with the highest number

of citations by Raisch and Krakowski (530 citations) emphasizes the dual nature of AI in management. It highlights the potential of AI to automate tasks and augment human capabilities, while also emphasizing the importance of balancing AI and human intelligence to achieve optimal outcomes. Similarly, other papers reviewed in the table address various aspects of AI integration in HR management and recruitment, examining both opportunities and challenges. Budhwar et al. (134 citations) examine the impact of AI on HR functions and propose avenues for future research to enhance organizational outcomes. Kordzadeh and Ghasemaghahi (146 citations) provide a comprehensive review of algorithmic bias in AI systems, with a particular focus on its implications for HR and recruitment. They propose methods to mitigate these biases. Chowdhury et al. (156 citations) investigate the potential benefits of AI in HR management through a capability framework, while Loureiro et al. (201 citations) examine AI-enabled recruiting, proposing ethical guidelines and future research agendas. Köchling and Wehner (136 citations) examine discrimination and fairness issues in AI-driven HR processes, offering recommendations for improving fairness. Additionally, papers by Lo Piano (112 citations), Hunkenschroer and Luetge (74 citations), and Morley et al. (292 citations) delve into ethical principles, transparency, and practical recommendations for implementing AI ethics in recruitment.

The collective evidence presented in these papers highlights the critical necessity for ethical considerations, fairness, and transparency in the implementation of AI technologies within organizational contexts. The steady increase in publications over time indicates a growing awareness of the significance of ethical AI practices in recruitment, with the aim of facilitating an equitable and efficient hiring process. This trend underscores the necessity for continued research and development to inform the implementation of AI in ways that benefit both organizations and society, ensuring responsible and transparent AI usage in HR practices.

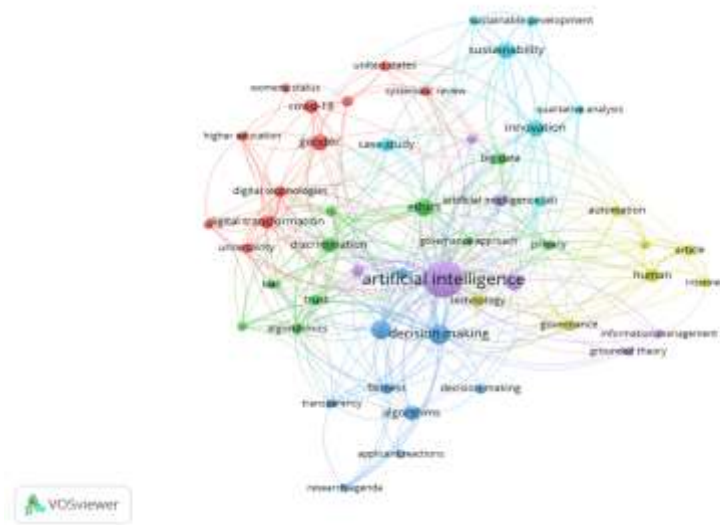
4.4 Keyword Analysis

Table 2 Keyword Analysis

Keyword	Number
Artificial Intelligence	76
Decision Making	27
Ethics	25
Human Resource Management	14
Digital Technologies	7
Privacy	6
Fairness	7

A keyword analysis of ethical concerns in the field of artificial intelligence (AI) within the context of talent acquisition reveals that AI is a significant topic in current academic discussions. This is evidenced by the 76 papers that address AI in this context. Furthermore, the themes of decision-making and ethics are also prominent, with 27 and 25 papers, respectively. This suggests that researchers are giving considerable attention to the ethical aspects of AI decision-making processes. Another notable subject is human resource management, with 14 papers discussing its role in integrating AI technologies into recruitment practices. The integration of digital technologies and fairness is a recurring theme in the literature, with seven papers addressing each topic. This highlights the importance of technological advancement and the necessity for equitable practices in AI applications. Another significant area of concern is that of privacy, with six papers devoted to it. This reflects the growing awareness of data protection and privacy issues in AI-driven talent acquisition.

Notwithstanding this concentration of research, the literature on ethical concerns in AI within talent acquisition appears to neglect certain topics, such as transparency and strategies for mitigating bias. Consequently, further research is required to gain a deeper understanding of these issues and to ascertain how ethical AI practices can be effectively implemented to enhance fairness and trust in recruitment processes.



The VOS viewer cluster analysis identifies multiple interrelated clusters within the literature on ethical concerns in artificial intelligence (AI) as they pertain to talent acquisition. The initial cluster, depicted in purple, is centered on the topics of artificial intelligence, decision-making, and algorithms. This underscores the emphasis on the deployment of AI technologies in decision-making procedures and the ethical concerns pertaining to algorithmic transparency and fairness. The second cluster, indicated in red, encompasses subjects such as gender, the impact of the Coronavirus disease 2019 (Covid-19) pandemic, the status of women, and the digital transformation of society. This cluster underscores the nexus of AI with social issues and digital transformations, particularly the impact of AI on gender equity and the adaptations spurred by the global health crisis precipitated by the SARS-CoV-2 virus. The third cluster, illustrated in green, encompasses digital technologies, uncertainty, bias, discrimination, and trust. This cluster underscores the ethical challenges associated with biases and discrimination in AI systems, as well as the necessity of fostering trust in AI applications. The fourth cluster, represented in blue, is concerned with sustainability, sustainable development, and innovation. This cluster reflects the interest in the potential of AI to contribute to the achievement of sustainable development goals and to foster innovation in ethical practices within talent acquisition. The fifth cluster, depicted in yellow, encompasses topics such as ethics, governance, privacy, and human aspects. This cluster emphasizes the significance of governance frameworks and privacy concerns in the deployment of AI, as well as the ethical considerations related to human interactions with AI systems. The sixth cluster, depicted in light blue, encompasses case studies, qualitative analysis, big data, and systematic reviews. This cluster elucidates the methodological approaches utilized to examine ethical concerns in AI, underscoring the significance of qualitative research and big data analytics. In conclusion, the VOS viewer cluster analysis reveals a multitude of interrelated topics within the research on ethical concerns in AI within the context of talent acquisition. These topics offer invaluable insights for stakeholders seeking to navigate the ethical terrain of AI technologies, ensuring responsible and equitable utilization in recruitment processes

V. CONCLUSION

The comprehensive bibliometric analysis conducted in this study allows for the drawing of several key conclusions regarding the ethical concerns and implications of integrating AI within talent acquisition processes. The rising number of publications on the ethical implications of AI in recruitment between 2020 and 2024 indicates a notable increase in awareness and interest in this field. This upward trend indicates a growing recognition of the crucial role that ethical considerations play in the deployment of AI technologies in talent acquisition.

Nevertheless, research on ethical AI in recruitment varies considerably across different countries. The United Kingdom and the United States are at the vanguard of research output in this field, reflecting their advanced technological sectors and robust regulatory frameworks. Conversely, regions such as Eastern Europe and numerous African developing nations exhibit a paucity of research output, underscoring the necessity for more inclusive and globally representative studies to ensure diverse perspectives and equitable technological advancements.

One of the primary ethical concerns identified is algorithmic bias. Although AI has the potential to reduce human biases in hiring, it can also perpetuate or even exacerbate these biases if the underlying data is flawed. It is of the utmost importance to guarantee the fairness and transparency of AI algorithms in order to

mitigate the aforementioned risks and promote equitable hiring practices. It is of the utmost importance that AI decision-making processes are transparent and that those responsible for the outcomes are held to account. The study emphasizes the necessity of rendering AI algorithms and their decision-making criteria comprehensible to stakeholders, including candidates and recruiters, in order to foster trust and guarantee accountability.

Moreover, the deployment of AI in recruitment entails the handling of extensive quantities of personal data, giving rise to substantial concerns pertaining to privacy. It is of the utmost importance to guarantee the implementation of robust data protection measures and compliance with data privacy regulations in order to safeguard the information of candidates and to maintain ethical standards in the field of talent acquisition. Additionally, the incorporation of AI-driven recruitment tools must prioritize the advancement of diversity and inclusion within the workforce. The study underscores the necessity for AI systems to be meticulously monitored and subject to periodic audits to forestall discriminatory practices and facilitate the formation of heterogeneous and inclusive teams.

It is of paramount importance to develop and implement ethical governance frameworks and regulatory standards for AI in recruitment. Such frameworks should provide guidance on the responsible use of AI technologies, ensuring that they align with broader ethical principles and societal values. It is imperative that ongoing research and development be conducted to address emerging ethical challenges and enhance the efficacy of AI applications in talent acquisition. The study recommends interdisciplinary collaboration and the incorporation of ethical considerations from the outset of AI system design and deployment.

In conclusion, while AI has the potential to revolutionize talent acquisition processes by enhancing efficiency and objectivity, it also presents significant ethical challenges that must be addressed. It is of the utmost importance to guarantee fairness, transparency, accountability, and data privacy as fundamental tenets of the responsible integration of AI in recruitment. It is imperative that ongoing research and the development of robust ethical frameworks be pursued to navigate the complex ethical landscape and harness the benefits of AI in talent acquisition in a responsible manner.

VI. LIMITATION AND FURTHER RESEARCH

This bibliometric study offers significant insights into the research landscape surrounding the ethical considerations and implications of integrating artificial intelligence (AI) within talent acquisition processes. It should be noted, however, that the study is not without limitations. Firstly, it should be noted that the study's analysis was limited to articles indexed in the Scopus database. Consequently, it is possible that relevant articles from other sources, such as Web of Science, Google Scholar, and domain-specific databases, were excluded. This limitation indicates that the findings may not be comprehensive and may not encompass the entire body of relevant literature.

Moreover, while the study's precision and recall are sufficient for large-scale bibliometric research assessments, there is potential for further improvement. The use of keyword searches may have resulted in the exclusion of relevant studies that employed different terminology or focused on related yet distinct aspects of AI ethics in recruitment. Moreover, the bibliometric analysis predominantly focuses on quantitative metrics, such as citation counts and the co-occurrence of keywords, which may not fully capture the qualitative depth of research conducted in this field.

To address the gaps identified in this study, further research in the field of AI ethics in talent acquisition is required. One area that requires further attention is the development of standardized ethical guidelines and frameworks that can be universally applied across different contexts and industries. Another area that requires further investigation is the practical implementation of these ethical guidelines, including the development of tools and methodologies to ensure transparency, accountability, and fairness in AI-driven recruitment processes.

Furthermore, research should be conducted in countries and regions where studies on AI ethics in talent acquisition remain limited. Such research would provide a more comprehensive understanding of the global dynamics, challenges, and best practices in integrating AI ethically in recruitment processes. Moreover, longitudinal studies are required to examine the long-term impacts of AI integration on recruitment outcomes and organizational diversity. This will enable the assessment of the effectiveness and potential unintended consequences of these technologies.

This study serves as a foundation for future research by consolidating a fragmented field and offering a comprehensive basis for evaluating the various ways in which AI can be integrated ethically into talent acquisition strategies. Despite the limitations of the study, it contributes to a better understanding of the importance of ethical considerations in AI-driven recruitment and suggests promising directions for future research. To maximize the benefits of AI in talent acquisition while mitigating ethical risks, practitioners and researchers must be aware of the latest developments in the field. Further research will help to address the existing gaps and enhance our understanding of how to integrate AI in recruitment processes responsibly and effectively.

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